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# Indonesian Stock Market Volatility: GARCH Model

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ABSTRACT

The purpose of this paper is to examine the effect of macroeconomic variables (interest rates, inflation and exchange rates) and global stock exchanges (STI, SSE, N225, DJIA, FTSE100) on the movement of the Indonesian stock exchange (IHSG). The research data analysis method uses the GARCH model for time series data for the period January 2012 to December 2018. The results show that the BI-rate, Inflation, Exchange Rate, Straits Times Index (STI), Shanghai Stock Exhange (SSE), Shanghai Stock Exhange (SSE), Nikkei 225 (N225)), Dow Jones Industrial Average (DJIA) and Financial Times Stock Exchange 100 (FTSE100) together have a significant effect on the IHSG. Partially shows the BI-rate, Inflation, and SSE have a significant negative influence, negative N225 is not significant, while the Exchange, STI, DJIA has a significant positive effect and FTSE100 has a non-significant positive effect on the IHSG.

## INTRODUCTION

The phenomenon that occurs lately is that the movement of the Indonesian stock price index which is proxied by the Composite Stock Price Index (IHSG) is related to two groups of influential factors namely; global stock exchanges and macroeconomic indicators. Changes that occur in global stock exchanges are quickly responded by Indonesian stock exchanges, so that the movements of the Indonesian stock exchanges move together with the global stock exchanges. Some world and regional stock exchanges that are considered to represent global stock movements include; Singapore Straits Times Index (STI), China Shanghai Stock Exhange Index (SSE), Japan Nikkei 225 Index (N225), United States Dow Jones Industrial Average Index (DJIA) and British Financial Times Stock Exchange 100 (FTSE100) Index. These five indices are considered capable of representing global stock indices in Asia, the United States and Europe and are able to represent the strength of the world economy that can influence the Indonesian stock market. The average movement of the Composite Stock Price Index (IHSG) for 7 years with an

index of 5 countries tends to move with the same pattern. This condition also shows that global stock exchanges are integrated with each other.

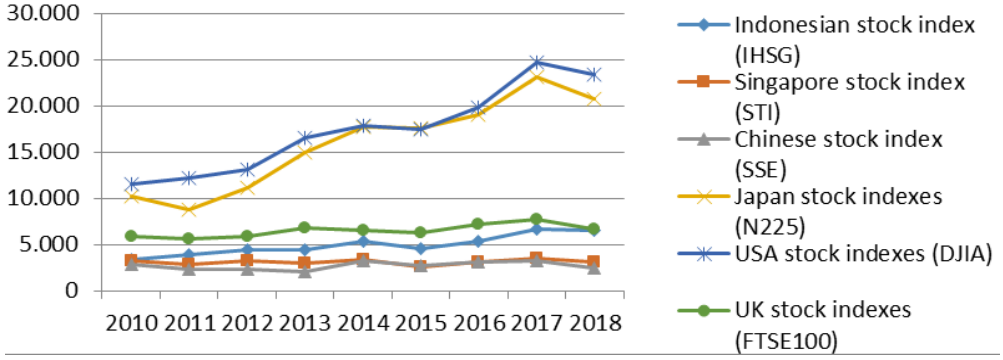


**Figure 1.** Average growth of the global stock price index 2010-2018

Source: Data Processed (2019)

Indonesian stock price movements are also influenced by a number of macroeconomic indicators, among them; interest rates, inflation and exchange rates. An increase in interest rates causes investors to divert their funds to money market instruments that provide higher and safer yields, thereby causing share prices to decline. In line with interest rates, an increase in the inflation rate causes share prices to fall because consumers reduce demand for goods so that corporate profits are reduced. Depreciation in the exchange rate of the rupiah against the US dollar tends to cause share prices to be corrected, because investors in the Indonesian stock market are dominated by foreign investors, so that when foreign currencies strengthen they tend to exit the stock market by selling large shares. Previous studies related to the influence of macroeconomic variables on stock price movements find that any changes that occur in macroeconomic variables are quickly responded to by stock prices. Theoretically, stock prices have a very strong relationship with a country's macroeconomic variables. Based on a simple discount model, the fundamental value of a company's shares is the same as the present value of expected dividends in the future, so future dividends must ultimately reflect economic activity. Thus, information about the dynamic relationship between macroeconomic variables and stock prices is very important to know for investors in the capital market and policy makers.

## 1. LITERATURE REVIEW

Previous studies examining the effect of global stock exchanges and macroeconomic variables on stock price movements have been conducted by many researchers, but they still give different results. Oseni and Nwosa (2011) tested the effect of volatility in macroeconomic variables, namely real GDP, inflation, and interest rates on stock market volatility for the period 1986 to 2010 in Nigeria. Using the AR (k)-EGARCH (p, q) and LA-VAR Granger Causality test, the results show that there is a causal relationship between stock market volatility and real GDP volatility, while there is no causal relationship between interest rates and inflation volatility, and volatility stock market. Zakaria and Shamsuddin (2012) examined the relationship between volatility of the stock market returns in Malaysia with five macroeconomic volatility selected (IPI proxy for GDP, CPI proxy for INF, ER, IR and M2) based on monthly data from January 2000 to June 2012 using the GARCH model (1,1) and bivariate, and multivariate VAR Granger causality test together with regression analysis. The results of the VAR bivariate VAR causality test show that only the volatility of CPI and IR significantly Granger causes volatility in the stock market returns. The results of both tests show that the volatility of macroeconomic variables as a group also does not cause volatility changes in stock

market returns. The results of the regression analysis show that only the volatility of the money supply is significantly related to stock market volatility. Samadi et al. (2012) examined the relationship between Tehran's stock market returns and macroeconomic variables; exchange rates, world gold prices, inflation, liquidity and oil prices using monthly data for the period 1979 to 1989. Using the GARCH model it was found that the variable gold prices, inflation and exchange rates affect stock returns while oil prices and liquidity have no effect. Mlambo et al. (2013) using the GARCH model (1,1) tested the effect of exchange rate volatility and stock market performance for South Africa based on data during the period 2000 - 2010. The findings prove that the relationship is weak between exchange rate volatility and the stock market.

Hunjra et al. (2014) examined the effect of interest rates, exchange rates, and GDP and inflation rates on share prices in Pakistan based on eleven years of monthly data ranging from January 1, 2001 to December 31, 2011. Using the Granger causality and cointegration test methodology, the results of the study revealed that there is no relationship between the dependent variable and explanatory variables in the short run. On the other hand the results show that there is a strong relationship in the long run. Oluseyi (2015) examined the relationship between stock price volatility and volatility of macroeconomic variables (IPI, CPI, M2, ER and interest rates) in Nigeria using monthly data for the period January 1990 to December 2014. The results of the VAR Granger bivariate causality test and Regression analysis showed that ER and CPI volatility significantly causes Granger's volatility in stock prices. The GARCH model (1.1) reveals exchange rate volatility, interest rates and money supply that affect stock price volatility in Nigeria. Jareño and Negrut (2016) who analyzed the relationship between the US stock market and some relevant US macroeconomic factors, such as gross domestic product, consumer price index, industrial production index, unemployment rate and long-term interest rates. All relevant factors show a statistically significant relationship with the stock market except for the consumer price index. Sichoongwe (2016) examines the impact of exchange rate volatility on returns to Zambian stock market shares using the GARCH approach (1,1). Empirical findings reveal that stock market returns are negatively related to exchange rate volatility.

Recent research by Jamaludin et al. (2017) examines the impact of macroeconomic and stock market variables on the 3 countries' stock market based on monthly data from January 2005 to December 2015. The findings show that interest rates and inflation have a positive effect on stock price movements and for the money supply has no effect on prices shares on the Indonesian stock exchanges of Singapore, and Malaysia. Khan and Khan (2018) analyzed the effect of various macroeconomic variables on Pakistan stock prices using monthly data from May 2000 - August 2016. The results showed that the Karachi Stock Exchange price in the long run was significantly affected by the money supply, exchange rate, and interest rates. In the short run all variables are insignificant except the exchange rate which has a negative effect on stock prices. Chanrashekar (2018) also explores the role of macroeconomic variables and stock prices for developing economic perspectives involving two countries, namely; India and Brazil. This study uses monthly data from 2000M1-2016M08. Empirical findings confirm that the long-term relationship between variables and causality is unidirectional. The results also reveal that GDP, inflation, exchange rates, interest rates and stock prices play an important role in economic development.

Related to the influence of global stock market movements on the domestic stock market, several studies have been carried out in the form of linkages in the stock market, integration or interdependence. The stock market is said to be integrated when there is a correlation between markets. Wang (2014) investigated the joint movements of six East Asian Stock Exchanges before and during the 2007-2009 global financial crisis proving that the market was less adaptive to US stock market shocks after the crisis. Tripathi and Sethi (2012) examine the relationship between Indian stock markets and emerging markets. Endri (2010) investigated the relationship between the stock markets in ASEAN-5 countries that are classified as developing stock markets, namely Indonesia, Singapore, Malaysia, Thailand, and the Philippines with the world's strong stock markets, namely the US stock market and the strong Asian stock market, namely Japanese stock

markets are both classified as developed stock markets by applying the multivariate cointegration model. Cointegration test results show the ASEAN-5 stock market and the US and Japan stock markets are co-integrated with each other during the full period and stronger during the pre-crisis period. In addition, these results also indicate that emerging stock markets are very sensitive to the movements of developed countries' stock markets, particularly the US stock market. Do (2011) analyzes the integration of six ASEAN stock markets (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam) with four international stock markets (US, ASEAN Bloc, Asia and the world) and channel interactions between domestic and international stock markets. The results showed that the channel of integration / segmentation / interaction between domestic and international markets. Kapoor and Singh (2013) examined the cointegration of the Asian Capital Markets and found opportunities to diversify to potential investors in Pakistan, India, Bangladesh and China.

Adas and Tussupova (2016) examined the impact of the global financial crisis on the movements of the Chinese, Japanese, Indian and US stock markets using the E-GARCH model based on daily stock price data for the period from 6 January 2006 to 22 April 2011. The results showed that the stock market The United States has a strong influence on the Chinese, Japanese and Indian stock markets, but not vice versa. Indian stock markets experience an abundance of volatility from all stock markets. The Japanese stock market only accepts an abundance of volatility from the US stock market. Shahzad (2016) also proves that the South Asian stock market is closely interrelated with each other, as well as developed / European markets which are also interrelated. The US stock market not only has an impact on European stock markets, but also has a strong influence on the South Asian stock market. The strong influence of the US stock market on the stock markets of other countries, especially developing stock markets is also evidenced by many other studies.

Research that conducts a combination of global stock exchange factors and macroeconomic variables on the movement of a country's stock prices, among others, is carried out by; Chanharat et al. (2007); Hasan and Zaman (2015); Robiyanto (2019). Chanharat et al. (2007) examined the impact of several stock price indexes and macroeconomic variables on the Thai stock market using the GARCH-M model and monthly data (1988M1-2004M12). The results found that (a) changes in the prices of shares in Singapore, Malaysia and Indonesia before the 1997 crisis, and changes in share prices in Singapore, the Philippines and Korea after 1997 affected the price of shares in the Thai stock market; (b) changes in oil prices have a negative effect only before 1997; (c) volatility clustering and the GARCH-M model were present only before 1997; and (d) the stock market outside the region has no direct impact on the Thai stock market. Hasan and Zaman (2017) tested the volatility of the Bangladesh stock market returns in response to the volatility of macroeconomic variables using the Dhaka Dhaka Stock Exchange (DSE) monthly index data and four macroeconomic variables (Call Money Rate, Crude Oil Prices, Exchange Rates and SENSEX from Bombay Stock Exchange) from January 2001 to December 2015. The results of the GARCH-S model reveal that DSE returns volatility is significantly influenced by macroeconomic variables, such as exchange rates and SENSEX. Robiyanto et al. (2019) examined the effect of macroeconomic variables: Dow Jones Industrial Average, USD / IDR, and world oil prices on the Composite Stock Price Index (IHSG) during the period 2005-2016 using the GARCH model (1.1) showing that Dow Jones Industrial Average and world crude oil prices have a positive effect on the IHSG while USD / IDR has a negative effect on the IHSG

## 2. RESEARCH METHODS

Data on Composite Stock Price Index (IHSG) as the dependent variable is sourced from the Indonesia Stock Exchange. For independent variable data consisting of macroeconomic variables, namely; interest rates, inflation and exchange rates are sourced from Bank Indonesia, while global stock exchanges, represented by the United States stock exchanges (DJIA), the United Kingdom

(FTSE100), Japan (N225), China (SSE), and Singapore (STI) are sourced from Yahoo finance. The type of research data is the time series collected monthly from January 2012 to December 2018 with a total of 84 months of observation.

The Autoregressive Conditional Heteroscedasticity (ARCH) model was first popularized by Engle in 1982. In 1986 it was perfected by Bollerslev who introduced the GARCH model (Bollerslev, 1986). Bollerslev (1986) states that residual variants depend not only on past period residuals but also residual variants of past periods. For the GARCH Model (p, q), in general, var ($\epsilon_t$) can be represented by the form:

$$IHSG_t = \beta_o + \beta_1 BIrate_{1t} + \beta_2 INFi_{2t} + \beta_3 FOREX_{3t} + \beta_4 STI_{4t} + \beta_5 SSE_{5t} + \beta_6 N225_{6t} + \beta_7 DJIA_{7t} + \beta_8 FTSE100_{8t} + \epsilon_t \quad (1)$$

$\sigma^2_t = \alpha_o + \alpha_1 \epsilon^2_{t-1} + \ldots\ldots + \alpha_p \epsilon^2_{t-p} + \lambda_1 \sigma^2_{t-1} + \ldots\ldots + \lambda_q \sigma^2_{t-q}$ or written with:

$$\sigma^2_t = \alpha_o + \sum_{i=1}^{p} a_i \epsilon^2_{t-1} + \sum_{i=1}^{q} \lambda_1 \sigma^q_{t-1} \quad (2)$$

And for the conditional variance $\sigma_t^2$, where:

$\sigma_t^2$ = Residual variant at time t
$\alpha_0$ = Constant residual variant
$\alpha_1 \varepsilon_{t-1}^2$ = Previous period residual volatility (ARCH component)
$\lambda_1 \sigma_{t-1}^2$ = Residual variants in the previous period (GARCH component)

From the model above, it can be seen that the magnitude of var (ϵt), besides being assumed to depend on ϵ2, also depends on σ2t in the past.

## 3. RESULTS AND DISCUSSION

Descriptive statistics show the amount of data, the maximum value, the minimum value, the average value and the standard deviation of each dependent variable (X) and the independent variable (Y). The results of descriptive statistical data processing are as the following table.

**Table 1.** Descriptive Statistics of Dependent and Independent Variables

| | *Variable* | *Data* | *Mean* | *Median* | *Maximum* | *Minimum* | *Std. Dev.* |
|---|---|---|---|---|---|---|---|
| Y | IHSG | 84 | 4,380.35 | 4,450.08 | 5,518.67 | 2,549.03 | 721.78 |
| X1 | Birate | 84 | 0.0665 | 0.0665 | 0.0780 | 0.0480 | 0.0078 |
| X2 | INF | 84 | 0.0544 | 0.0497 | 0.0879 | 0.0279 | 0.0162 |
| X3 | FOREX | 84 | 10,929.24 | 10,103.50 | 14,657.00 | 8,508.00 | 1,901.38 |
| X4 | STI | 84 | 3,059.91 | 3,053.57 | 3,487.39 | 2,629.11 | 214.23 |
| X5 | SSE | 84 | 2,679.74 | 2,638.15 | 4,611.74 | 1,979.21 | 566.81 |
| X6 | N225 | 84 | 13,553.01 | 13,817.70 | 20,585.24 | 8,434.61 | 3,899.11 |
| X7 | DJIA | 84 | 14,736.28 | 15,012.59 | 19,762.60 | 9,774.02 | 2,761.20 |
| X8 | FTSE100 | 84 | 6,169.58 | 6,236.35 | 7,142.80 | 4,916.90 | 550.87 |

Source: Data processed (2019)

Descriptive statistical analysis results obtained in general the highest BIrate level of 7.80% and the lowest of 4.80%. The lowest inflation rate was 2.79% and the highest was 8.79%. The lowest exchange rate is IDR 8,508 per USD and the highest exchange rate is IDR 14,657 per USD. The lowest STI index was 2,629.11 and the highest was 3,487.39. The lowest SSE index was 1,979.21

and the highest was 4,611.74. The lowest N225 index was 8,434.61 and the highest was 20,585.24. The lowest DJIA index was 9,774.02 and the highest was 19,762.60. The lowest FTSE100 index was 4,916.90 and the highest was 7,142.80. For IHSG in 2010-2016 the highest number was 5,518.67 which occurred in February 2015 while the lowest lift was 2,549.03 which occurred in January 2010. The average value of IHSG was 4,450.08 with a standard deviation of 721.78. Stationerity testing is done with a unit root test using the Augmented Dickey Fuller (ADF) test based on a comparison between the ADF probability value with a significance level of 5%. If the ADF probability value is <5%, then H0 is rejected, it means that the residual data is stationary and if the reverse residual data is not stationary. Stationary test results with the ADF test at the level level showed that all of the research variable data were not stationary because they had a ADF probability value of> 5%. Testing the first difference level (1st difference level) shows that all research data is stationary.

**Table 2.** Augmented Dickey Fuller Stationary Test Results (ADF)

| *Variable* | *Unit Root test* | *ADF test Statistic* | *Test critical values* | | | *Probability* |
|---|---|---|---|---|---|---|
| | | | *1% level* | *5% level* | *10% level* | |
| IHSG | *Level* | -2.276438 | -3.511262 | -2.896779 | -2.585626 | 0.1820 |
| | *1st Difference* | -8.711825 | -3.512290 | -2.897223 | -2.585861 | 0.0000 |
| BIrate | *Level* | -1.448228 | -3.513344 | -2.897678 | -2.586103 | 0.5546 |
| | *1st Difference* | -4.125330 | -3.513344 | -2.897678 | -2.586103 | 0.0015 |
| Inflation | *Level* | -2.028987 | -3.513344 | -2.897678 | -2.586103 | 0.2741 |
| | *1st Difference* | -6.801452 | -3.513344 | -2.897678 | -2.586103 | 0.0000 |
| Forex | *Level* | -0.252790 | -3.511262 | -2.896779 | -2.585626 | 0.9263 |
| | *1st Difference* | -9.691173 | -3.512290 | -2.897223 | -2.585861 | 0.0000 |
| STI | *Level* | -2.704921 | -3.511262 | -2.896779 | -2.585626 | 0.0775 |
| | *1st Difference* | -9.556792 | -3.512290 | -2.897223 | -2.585861 | 0.0000 |
| SSE | *Level* | -2.286095 | -3.512290 | -2.897223 | -2.585861 | 0.1789 |
| | *1st Difference* | -6.538024 | -3.513344 | -2.897678 | -2.586103 | 0.0000 |
| N225 | *Level* | -0.498695 | -3.511262 | -2.896779 | -2.585626 | 0.8853 |
| | *1st Difference* | -8.342727 | -3.512290 | -2.897223 | -2.585861 | 0.0000 |
| DJIA | *Level* | -0.664458 | -3.511262 | -2.896779 | -2.585626 | 0.8491 |
| | *1st Difference* | -7.818697 | -3.513344 | -2.897678 | -2.586103 | 0.0000 |
| FTSE100 | *Level* | -1.378899 | -3.512290 | -2.897223 | -2.585861 | 0.5888 |
| | *1st Difference* | -10.525940 | -3.512290 | -2.897223 | -2.585861 | 0.0001 |

Source: Data processed (2019)

To determine the selected GARCH model, the Akaike Information Criterion (ACI) and Schwartz Criterion (SC) tests were tested. This study simulates four GARCH models to choose the best model. AIC and SC calculation results show that the best model is the GARCH model (1,1) because it has the lowest AIC and SIC values, which is equal to; 13.37522 and 13.72248.

**Table 3.** Results of GARCH Model Selection with AIC and SC Test

| *Variable* | *GARCH (1,1)* | *GARCH (1,2)* | *GARCH (2,1)* | *GARCH (2,2)* |
|---|---|---|---|---|
| AIC | 13.37522 | 13.37547 | 13.40885 | 13.43860 |
| SC | 13.72248 | 13.75167 | 13.78505 | 13.84374 |

Source: Data processed (2019)

Estimates of the GARCH (1,1) model indicate that all macroeconomic variables used in this study significantly influence the IHSG movement, where the Birate and Inflation variables are negative and the exchange rate is positive. For global stock exchanges, except for the UK stock exchanges which affect the movement of the Indonesian stock exchanges. The United States and Singapore stock exchanges have positive effects, while the Japanese and Chinese stock exchanges have negative effects. The results of the calculation of the F-test value in the GARCH (1,1) model resulted in 105,8621 with a probability value of 0.0000 at a confidence level of 99 percent (α = 1%), which means H0 is rejected, meaning that all variables are independent of macroeconomic factors (BIrate, Inflation , Exchange rates) and global stock exchanges (STI index, SSE, N255, DJIA, FTSE100) in the GARCH (1,1) model together significantly influence JCI movement. For testing the goodness of fit with the coefficient terminated R2 adjusted from the GARCH (1,1) (1.1) gives a value of 0.9100 which means that the entire independent variable, consisting of; BIrate, Inflation, Exchange Rate, STI index, SSE, N225, DJIA and FTSE100 are able to explain fluctuations in the movement of the Indonesian stock market (IHSG) by 91 percent, while the remaining 9 percent is explained by other factors not included in the GARCH (1,1) model.

**Table 4.** Model GARCH (1,1) Results

| *Variable* | *Coefficient* | *Std. Error* | *z-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | -2173.266 | 625.6737 | -3.4734810 | 0.000500 |
| Birate | -9284.358 | 3470.924 | -2.674896 | 0.007500* |
| INFLATION | -8179.945 | 1651.448 | -4.9531940 | 0.000000* |
| FOREX | 0.115638 | 0.045336 | 2.5506990 | 0.010800* |
| STI | 1.236903 | 0.157301 | 7.8633010 | 0.000000* |
| SSE | -0.102871 | 0.047684 | -2.1573590 | 0.031000** |
| N225 | -0.057001 | 0.030630 | -1.8609610 | 0.062700*** |
| DJIA | 0.234851 | 0.034945 | 6.7205570 | 0.000000* |
| FTSE100 | 0.022515 | 0.103404 | 0.2177380 | 0.827600 |
| R-squared | 0.9186460 | Mean dependent var | | 4380.3480 |
| Adjusted R-squared | 0.9099680 | S.D. dependent var | | 721.77870 |
| S.E. of regression | 216.57230 | Akaike info criterion | | 13.375220 |
| Sum squared resid | 3517768.0 | Schwarz criterion | | 13.722480 |
| Log likelihood | -549.75920 | F-statistic | | 105.86210* |
| Durbin-Watson stat | 0.6613450 | Prob(F-statistic) | | 0.0000000 |

Source: Data processed (2019)

* Significance of 1% level

** Significance of 5% level

*** Significance of 10% level

Based on the results of the GARCH (1,1) model, the equation model of the GARCH (1,1) model can be written as follows.

IHSG = -2173.266 - 9284.358 BIrate - 8179.945 INF+ 0.116 FOREX + 1.237 STI - 0.103 SSE - 0.057 N225 + 0.235 DJIA + 0.023 FTSE100

While the results of the variance equation from the GARCH (1,1) model in the following table.

**Table 5.** Results of the GARCH(1,1) Model Variance

| *Variable* | *Coefficient* | *Std. Error* | *z-Statistic* | *Prob.* |
|---|---|---|---|---|
| C | 22891.60 | 9433.716 | 2.426573 | 0.015200 |
| RESID(-1)^2 | 0.914184 | 0.415874 | 2.198225 | 0.027900 |
| GARCH(-1) | -0.272482 | 0.128310 | -2.123617 | 0.033700 |

Source: Data processed (2019)

So based on the results of the GARCH (1,1) model, the GARCH (1,1) model variance equation can be written as follows.

$$\sigma_t^2 = 22891.60 + 0.914\,\varepsilon_{t-1}^2 - 0.272\,\sigma_{t-1}^2$$

From the GARCH (1,1) variance model equation shows a constant value of 22,891.60. ARCH coefficient of 0.914 for the volatility reaction to market movements which shows a fairly intensive number of market movements. The GARCH coefficient of -0.272 for each period of movement that occurs in a variant which indicates the variant does not require a long time to return.

Based on empirical findings show that macroeconomic variables, in the form of; interest rates, inflation and exchange rates have a significant effect on the IHSG movement. The variable interest rates and inflation have a negative effect, while the exchange rate has a positive effect. The negative influence of interest rates on stock prices shows that when interest rates rise, investors look for investment alternatives such as bonds, so demand for shares decreases and stock prices will fall. The research results are in line with the findings of Peiro (2015). An increase in interest rates causes the discount rate to increase, which means a final decrease in the present value of future cash flows that negatively impacts stock prices. While several other studies found a positive relationship with interest rates. They explain the reason when the Federal Reserve raises interest rates more (less) than expectations then it is considered bad news (good) for the stock market, it means that the influence of interest rates is positive, but bad news has a strong impact on the stock market.

The negative effect of inflation on stock prices indicates that varying inflation rates produce more uncertainty and thus the demand for minimum returns will also increase which will reduce market valuations as evidenced by; Mehr-un-Nisa and Nishat (2011) for Pakistan and Bekhet and Mugableh (2012) for Malaysia. Wongbangpo and Sharma (2002) also found a negative relationship between inflation and share prices in five Asian countries, namely Indonesia, Malaysia, Singapore, the Philippines, and Thailand.

The positive effect of the exchange rate with the IHSG movement is in line with the findings of Hasan and Zaman (2017). With the traditional approach which states that exchange rate depreciation can increase the country's external competitiveness and improve the trade balance and real output. As a result, the company's profitability increases with an increase in the exchange rate or depreciation and thus the stock price volatility increases. This result also implies that international trade plays an important role in Indonesia and especially for companies listed on the stock market. Another explanation reveals that the exchange rate in the stock market is important for the performance of fund portfolios. Diamandis and Drakos (2011) concluded positive effects for exchange rates on stock prices. This positive effect can be explained by the fact that local companies become more competitive with depreciation which leads to an increase in their exports thereby increasing share prices. Negative effects were found by Bekhet and Mugableh (2012). According to the international market, the demand for these goods has increased and more cash flow has entered the country. At the same time currency depreciation also makes imported goods expensive, so if a country is highly dependent on imports of production inputs, currency depreciation will negatively affect the economy. international markets, so that demand for these goods increases and more cash flow into the country. At the same time currency depreciation also

makes imported goods expensive, so if a country is highly dependent on imports of production inputs, currency depreciation will negatively affect the economy.

Estimation results show that global stock markets, except for the UK stock exchanges, have an effect on the IHSG movement. The United States and Singapore stock exchanges have positive effects, while the Japanese and Chinese stock exchanges have negative effects. Zuhri and Endri (2008) found that the American stock market influenced the movements of the Indonesian stock market. The results of this study are in line with the findings of Kabir and Masih (2014) stating the Nikkei 225 has a positive effect on Malaysian stock prices, research by Vardhan and Sinha (2015) states that US stock prices have a positive effect on stock prices in India. Vardhan and Sinha (2015) proved that the foreign stock prices of the United States (Dow Jones Industrial Average (DJIA) and Japan (Nikkei 225) were able to influence stock prices in India and Estonia.

## CONCLUSION

The movement of stock prices in the Indonesian stock exchange is strongly influenced by changes that occur in both macroeconomic variables and changes in global stock exchanges. Any changes that occur in macroeconomic variables will have an impact on the movement of Indonesian stock prices. This is due to the fact that the price of shares formed is a reflection of investor expectations of earnings and dividends that are much influenced by changes in economic conditions. The research highlights three indicators of macroeconomic variables that affect stock prices, namely; interest rate, inflation, and exchange rate. The interest rate and inflation affect stock prices negatively, while the exchange rate affects positively. The results are in line with the research hypothesis and support many previous studies that the interest rate and inflation have a negative effect, and the exchange rate has a positive effect.

The influence of global stock exchanges on the movement of Indonesian stock exchanges, many studies prove that the US and UK stock markets affect the global stock market, the stock markets of Japan and China affect the Asian stock market, and Singapore affects the ASEAN stock market. Indonesia is an open economy, so the Indonesian stock market is influenced by the stock markets of other countries both globally and regionally. In addition, the five research sample countries, namely: the United States, the United Kingdom, Japan, China, and Singapore are Indonesia's main trade partners. The study is based on the hypothesis that the five global stock exchanges that serve as the research sample, namely: the stock exchanges of the United States, Britain, Japan, China, and Singapore positively affect the Indonesian stock market. Empirical findings prove that the US and Singapore stock exchanges have a positive effect, while Japan and China stock exchanges have a negative effect. While the UK stock exchange cannot influence the movements of the Indonesian stock market. The results of the study also confirm many previous studies that the United States stock exchange globally has a strong influence, while the Singapore stock exchange for the ASEAN region. This is due to the fact that the United States financial markets have become the world's financial epicenter, while Singapore is for ASEAN countries. Japan and China stock exchanges have the opposite and weak impact on Indonesian stock exchanges, because indeed the two countries are more focused on foreign direct investment rather than portfolio investment.

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# Relationship of Social Protection Expenditures and Socio-economic Indicators: A Panel Data Analysis of the EU Countries

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## ABSTRACT

Systems of social protection and approaches in tackling social risks differ by the degree of redistribution and by its generosity. The current issue in developed countries is finding the optimal relationship between economic and social policy. Therefore, the selected areas of social policy and economic development from a narrow perspective are subjected to the research investigation. To address the issue, the paper aims to analyse the association between social protection expenditures and the selected socio-economic indicators. In line with the aim, four hypotheses have been verified. H1: There is a positive relationship between social protection expenditures and indicators of socio-economic development. H2: There is a positive relationship between social protection expenditures and indicators of unemployment. H3: There is a negative relationship between social protection expenditures and indicators of income inequality. H4: There is a negative relationship between social protection expenditures and indicators of poverty. The panel data regression for the sample of the 27 EU countries in the period 2007-2015 was applied to test the hypotheses. The results of the final fixed effect model with robust coefficients revealed a positive relationship between Human development index and unemployment rate on the one side and social protection expenditures on the other. On the contrary, a negative relationship was identified between social protection expenditures on the one side and poverty rate for the elderly 65+ and income inequality (measured through Gini coefficient) on the other. These findings confirm the fact that the amount of social protection spending is reflected in the socio-economic development of the EU countries.

## INTRODUCTION

The extent and consequences of social and economic phenomena with their mutual interaction drive the search for an optimal relationship between economic and social policy. The interrelation of both policies is more intense when the societal development achieves a higher level (Spick-

er, 2014). The idea behind welfare state is a range of redistribution processes, defined by the volume of public social protection of the population. The aim is to balance the chances in one's life and to use social policy to create conditions to ensure welfare commensurate with the potential of the society (Sinn, 1995; Korpi and Palme, 1998; Pestieau, 2006). Each welfare state type, as Diamond and Lodge (2013, p. 5) explain, is "*a reflection of a particular set of political forces and philosophies, which is reflected in contemporary social policy and institutional regimes*". The Nordic and Continental European models essentially converge in terms of expenditure, but social democratic regimes are service-intensive, while private welfare provision is low". The social protection system can be defined by its degree of redistribution and by its generosity (Pestieau, 2006). According to Forster and Whiteford (2009, p. 35), "*the redistributive impact of alternative systems of social protection differs and in assessing these impacts it is important to distinguish between targeting, progressivity, and redistribution*".

A number of studies is devoted to social protection, redistribution, and assessment of social protection expenditures with different perspectives and methods (Goudswaard and Caminada, 2010). Another group of scholarly papers is related to selected areas of economic and social development (Pestieau, 2006; Furceri and Zdzienicka, 2012; Alper and Demiral, 2016); related to income inequality (Afonzo et al., 2008; Niehues, 2010; Anderson et al., 2016; Sanchez and Perez-Corral, 2018); and last but not least related to poverty reduction (Caminada and Goudswaard, 2012; Notten and Guio, 2016 or Mieziene and Krutuliene, 2019).

Therefore, the purpose of this paper is to present a more complex view on social protection expenditures based on previous research efforts. Furthermore, the aim is to evaluate the long-term relationship between social protection expenditures and socio-economic indicators in the EU countries from 2007 to 2015, using panel data. The subjected to research investigation are selected areas of social policy and economic development in a narrow perspective. Quantitative research of the existence and nature of this relationship implies the selection of instruments associated with socio-economic indicators. The paper is focused on 1) indicators of socio-economic development (GDP per capita, Human development index); 2) indicators of unemployment (unemployment rate, long-term unemployment rate); 3) indicators of income inequality (Gini coefficient of equalised disposable income, Income quintile share ratio); and 4) indicators of poverty (at-risk of poverty rate, at risk of poverty or social exclusion rate for the elderly 65+, Impact of social transfers on poverty reduction).

The regression model included indicators from all four groups in order to verify the following relationships in the sample of the 27 EU countries, specifically:

H1: There is a positive correlation between social protection expenditures and indicators of socio-economic development.

H2: There is a positive relationship between social protection expenditures and indicators of unemployment.

H3: There is a negative relationship between social protection expenditures and indicators of income inequality.

H4: There is a negative relationship between social protection expenditures and indicators of poverty.

## 1. LITERATURE REVIEW

The Human Development Index (HDI) is, according to authors Ravallion (2012) or Burns and DeVille (2017), the best known indicator of long-term social and economic development of individual countries. The Human Development Index (HDI) is a summary measure of the average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and having a decent standard of living. It represents a geometric mean of normalised indices for each of the three dimensions (Human Development Report, 2016). Numerous authors such as

Costantini and Monni (2008) or Diniz and Sequeira (2012); consider the Human Development Index a more complex indicator of socio-economic development than income per capita or GDP. According to Mikusova, Merickova and Halaskova (2014b) it combines HDI information on economic growth (GDP per capita in the latest methodology of calculation of national income per capita), level of education (literacy in adult population), and state of health (life expectancy). The relationship between *social protection expenditures and Human development Index* was studied in many papers (e.g. Pestieau, 2006; Halaskova and Mikusova Merickova, 2017). As mentioned in Halaskova and Mikusova, Merickova (2017) the relationship between the selected expenditures of social protection according to function (expenditures on sickness/health-care, on the disabled and on the elderly people) on the one hand, and the achieved level of socio-economic development quantified Human-Development Index (HDI) on the other was evaluated on a sample of 17 European countries in the period 2005-2012.

The relationships between *social protection expenditures and economic growth* were the subject of many research papers. Furceri and Zdzienicka (2012) assessed effects of social spending on economic activity, with a panel of OECD countries from 1980 to 2005. Their results show that social spending has expansionary effects on GDP. More specifically, sub-categories of social spending devoted to health and unemployment benefits have the greatest effects. Alper and Demiral (2016) investigated the effects of governments' social expenditure proxies, namely education, health and social spending on economic growth performances, represented by the changes in gross domestic product (GDP) per capita. Using the feasible generalised least squares (FGLS) estimators based on a balanced panel dataset covering 2002-2013 periods of 18 OECD countries, authors conclude that social expenditures in all three dimensions significantly contribute to economic growth. As Tkacheva et al. (2017) believe that active social support for the population adversely affects the efficiency of the economy, which results in increased unemployment. Some theoretical and practical studies demonstrate that economic behaviour of the working population is determined solely by full rationality. Authors analysed the dependence of GDP of the EU countries on public expenditures on social benefits and unemployment rate for the period of 2005 - 2015.

Most of the studies are focused on the *effect of social protection expenditures on income inequality* from different perspectives. Ferrarini and Nelson (2003) stress that only a limited number of studies have attempted to identify the connection to income inequality, the negative correlation between social expenditures and income inequality was identified in most countries. Pestieau (2006) applied correlation and regression analysis of the relationship between social expenditures and income inequality evaluated by use of Gini coefficient, in 15 OECD countries in the period 1994-2000. The results suggested a negative impact of social expenditures on income inequality. Afonzo et al. (2008) applied a different perspective in studying the impact of public spending, education, and institutions on income distribution in advanced economies and the efficiency of public spending in redistributing income for a set of 26 OECD countries by using a DEA (Data Envelopment Analysis) nonparametric approach. The results concluded that public policies significantly affect income distribution, notably via social spending, and indirectly via high quality education (human capital) and via economic institutions. In addition, also research by Sanchez and Perez-Corral (2018) or Ulu (2018) examined the relationship between government social expenditure and income inequality.

Numerous studies are devoted to *poverty rate and poverty reduction* in relation *to social expenditures* and their effects. The impact of social expenditures on income poverty and material deprivation in four EU countries was studied by Notten and Guio (2016), while Cantillon and Van Mechelen (2013) conducted research on reducing poverty through social transfers, and Avram (2016) examined the efficiency of social expenditures in reducing poverty rates in the EU countries. Moreover, available studies indicate a strong negative correlation between poverty and social expenditures in the EU countries. It means that the countries' at-risk-of-poverty rate tends to erode with increasing social expenditures (Pestieau, 2006 or Caminada and Goudswaard 2012). Pes-

tieau (2006) evaluated the relationship between poverty rate and social spending on the example of 15 of OECD countries from 1994 to 2000. According to this research, social transfers exert a clear-cut effect on poverty and there is a strong negative correlation between the two variables. The results revealed that larger social expenditures correspond to lower poverty levels and that the impact of social transfers on poverty rate has not changed over time. Halaskova (2018a, p. 129) says that "Caminada and Goudswaard (2012) analysed the relationship between gross total social expenditures and poverty rates across 28 countries (15 of the EU countries and 13 non-EU countries) in 2003-2007 with the use of regression analysis. The authors conclude that there is a strong negative relationship between the level of gross public social expenditures and poverty. Countries with higher gross public social expenditure ratios tend to have lower poverty rates than countries with lower expenditure ratios. Furthermore, the results have also proved that the correlation is less strong in the EU countries compared to non-EU countries". Other the studies e.g. Miezienе, Krutuliene (2019) have demonstrated that the impact of government spending on poverty may vary according to the sector of spending, how well it is targeted, and the way of financing.

# 2. MATERIAL AND METHODS

## 2.1 Data

To fulfil the aim of the paper, the object of the quantitative analysis is a set of the EU 27 countries, comprising: Belgium (BE), Bulgaria (BG), Czech Republic (CZ), Denmark (DK), Germany (DE), Estonia (EE), Ireland (IE), Greece (EL), Spain (ES), (France (FR), Italy (IT), Cyprus (CY), Latvia (LV), Lithuania (LT), Luxembourg (LU), Hungary (HU), Malta (MT), Netherlands (NL), Austria (AT), Poland (PL), Portugal (PT), Romania (RO), Slovenia (SI), Slovakia (SK), Finland (FI), Sweden (SE), United Kingdom (UK). The data were collected from available Eurostat sources, and all indicators were assessed for the 2007 - 2015 period due to data availability. However, Croatia was excluded from the analysis due to the limited availability of the required data for this period.

Expenditures on social protection were selected as a dependent variable which represents a significant part of public spending. *Social protection expenditures* (SPEXP) are the outlay for social protection interventions. They consist mainly of: social benefits, or transfers in cash or in kind, to households and individuals with the aim to relieve them of the burden of a defined set of risks or needs; administration costs, or costs of managing or administering the social protection scheme; and other miscellaneous expenditures by social protection schemes, i.e. payment of property income and other (Eurostat, 2017 - Social Protection Statistics – background). The European system of integrated social protection statistics - ESSPROS defines social protection as "encompassing all interventions from public or private bodies intended to relieve households and individuals of the burden of a defined set of risks or needs, defined through eight functions of social protection: sickness/health care, disability, old age, survivors, family/children, unemployment, housing, social exclusion not elsewhere classified" (European union, 2016 – ESSPROS. Manual and User Guidelines).

Before the data analysis, the stationarity test of the dependent variable SPEXP had been carried outusing the Dickey-Fuller Test to check for stochastic trends. The zero test hypothesis is determined by the fact that the data in the time series, i.e. the panel data in our case, do not exhibit stationarity, i.e. no unit root is present. If proved, this fact would have to be taken into account by calculating the first difference. Subsequently, Figure 1 shows that the average SPEXP values, including confidence intervals, remained very similar from 2009 onwards.

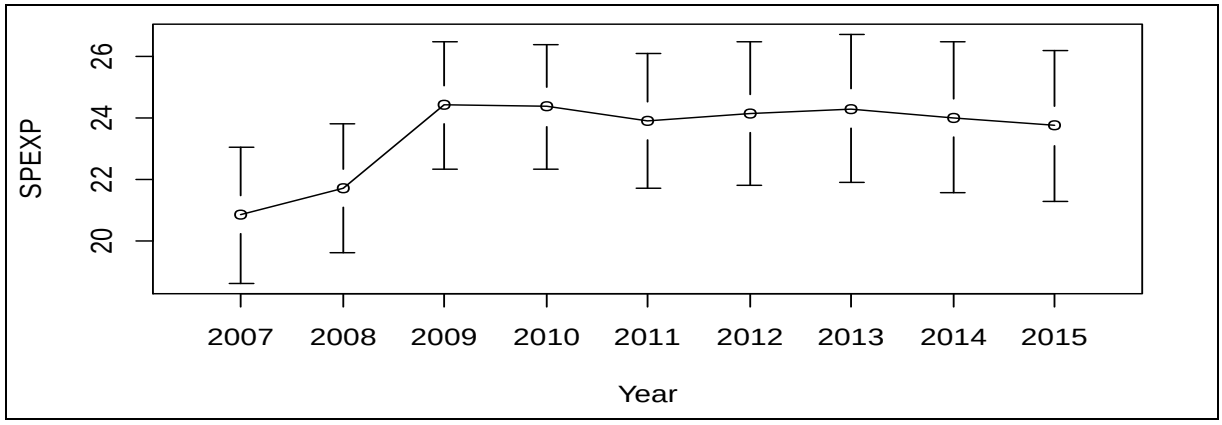


**Figure 1.** Group Means and Confidence Intervals for Social protection expenditures (SPEXP) in the EU 27 countries 2007-2015

Source: Own results based on Eurostat (2018)

The nine indicators of social and economic development were selected as independent variables. Available data from Human Development Report (2016) were received for Human development index. The Eurostat Statistics (2018) database was exploited to obtain the next eight independent variables. The list and description of the selected socio-economic indicators treated as independent variables is presented in Table 1.

**Table 1.** Description of the selected socio-economic indicators

| *Indicator* | *Abbr.* | *Description* |
|---|---|---|
| GDP per capita | GDPCAP | Real GDP per capita is calculated as the ratio of real GDP to the average population of a specific year. It is often used as an indicator of how well off a country is, since it is a measure of average real income in that country. However, it is not a complete measure of economic welfare. For example, GDP does not include most unpaid household work. Neither does GDP take account of negative effects of economic activity, like environmental degradation. |
| Human Development Index | HDI | HDI is a statistic composite index of life expectancy, education, and per capita income indicators, which are used to rank countries into four tiers of human development. A country scores higher HDI when the lifespan is higher, the education level is higher, and the GDP per capita is higher. (HDI between 0 and 1) |
| Unemployment rate | UNEM | Unemployment rates represent unemployed persons as a percentage of the labour force. The labour force is the total number of people employed and unemployed. Unemployed persons comprise persons aged 15 to 74 who were: a. without work during the reference week, b. currently available for work, i.e. were available for paid employment or self-employment before the end of the two weeks following the reference week, c. actively seeking work, i.e. had taken specific steps in the four-week period ending with the reference week to seek paid employment or self-employment or who found a job to start later, i.e. within a period of, at most, three months. (UNEM in percentage) |
| Long-term unemployment rate | LTUNEM | It is the number of persons unemployed for 12 months or longer as a percentage of the labour force (i.e. economically active population), based on the International Labour Office (ILO) definition. (LTUNEM in percentage) |
| Gini coefficient of equivalised disposable income | GINI | The Gini coefficient is defined as the relationship of cumulative shares of the population arranged according to the level of equalised disposable income, to the cumulative share of the equalised total disposable income received by them. (Gini coefficient scale from 0 to100) |
| The income quintile share ratio (S80/S20 ratio) | S80/S20 | It is a measure of the inequality of income distribution.It is calculated as the ratio of total income received by the 20% of the population with the highest income (the top quintile) to that received by the 20% of the population with the lowest income (the bottom quintile). |

| | | |
|---|---|---|
| The at-risk-of-poverty rate | ARPOR | Is the share of people with an equivalised disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60% of the national median equivalised disposable income after social transfers. This indicator does not measure wealth or poverty, however, low-income residents in comparison to other residents in that country, which does not necessarily imply a low standard of living. (ARPORin percentage) |
| At risk of poverty or social exclusion rate for elderly 65+ | ARPOR 65+ | The sum of the elderly (65+) who are: at risk of poverty or severely materially deprived or living in (quasi-)jobless households (i.e. with very low work intensity) as a share of the total population in the same age group. (ARPOR65+ in percentage) |
| Impact of social transfers on poverty reduction | PORED | Reduction in percentage of the risk-of-poverty rate, due to social transfers (calculated comparing at-risk-of-poverty rates before social transfers with those after transfers; pensions are not considered as social transfers in these calculations). The indicator is based on the EU-SILC (in percentage). |

Source: Eurostat (2018), Human Development Report (2016)

Subsequently, the independent variables were subjected to the correlation analysis applying Pearson's correlation test. The results are presented in Table 2.

**Table 2.** Correlation matrix of the socio-economic indicators in the EU 27 countries 2007-2015

| | GDPCAP | ARPOR65 | ARPOR | GINI | S80/S20 | PORED | LTUNEM | UNEM |
|---|---|---|---|---|---|---|---|---|
| ARPOR65 | -.585*** | | | | | | | |
| ARPOR | -.404*** | .684*** | | | | | | |
| GINI | -.380*** | .602*** | .891*** | | | | | |
| S80/S20 | -.430*** | .633*** | .932*** | .967*** | | | | |
| PORED | .543*** | -.636*** | -.830*** | -.752*** | -.787*** | | | |
| LTUNEM | -.353*** | .045 | .359*** | .350*** | .398*** | -.350*** | | |
| UNEM | -.307*** | .055 | .400*** | .403*** | .441*** | -.310*** | .913*** | |
| HDI | .743*** | -.719*** | -.505*** | -.471*** | -.512*** | .606*** | -.234*** | -.185*** |

Source: Own compilation based on Eurostat (2018). *** indicates the significance level at 0.01 level.

After evaluation, proxy variables for individual socio-economic indicators were selected due to the high degree of collinearity. Their selection was set so that their mutual correlation value did not exceed 0.800. This is normally considered an indicator of strong data correlation. For this reason, the following variables have been selected as independent variables, namely 1) HDI as proxy variable of social and economic welfare; 2) UNEM as proxy variable for unemployed persons as a percentage of the labour force; 3) GINI as proxy variable for a measure of inequality of income distribution; and 4) ARPOR65 as proxy variable for people at risk of poverty or social exclusion. Thus, all proxy variables measure socio-economic indicators in the context of the degree of disadvantage of EU citizens.

## 2.2 Methods

Time-invariant country specific unobserved heterogeneity through *fixed effects model* of our balanced panel was used to accomplish the main objective of the paper, which is the interpretation of the impact of independent variables that vary over time on SPEXP.
Hence, the fixed effects model took the form:

$$Yit = \beta 1Xit + \alpha i + uit \qquad (1)$$

where

Yit = the dependent variable where i = entity (i.e. the EU 27 countries in our case) and t = time (i.e. panel data within nine consecutive years from 2007 to 2015 in our case);
Xit = independent variable,
β1 = the coefficient estimate for independent variables,
αi = the intercept for each entity, i.e. n entity-specific intercepts,
uit = the error term.

In our case, the fixed effect model was tested using a fixed effect estimator, applied within transformation. Subsequently, the fixed effects equation of our model took the form:

$$SPEXP_{(EU27,2007\text{-}2015)} = \beta 1HDI_{(EU27,2007\text{-}2015)} + \alpha_{HDI} + \beta 2UNEM_{(EU27,2007\text{-}2015)} + \alpha_{UNEM} + \beta 3GINI_{(EU27,2007\text{-}2015)} + \alpha_{GINI} + \beta 4ARPOR65_{(EU27,2007\text{-}2015)} + \alpha_{ARPOR65} + u_{(EU27,2007\text{-}2015)} \quad (2)$$

In order to confirm the suitability of using the fixed effect model, the following tests were carried out to compare the quality of each model, such as pooled OLS, fixed effect model and random effect model, according to differences between coefficients estimates, i.e. 1) Lagrange multiplier test for pooled OLS vs. random effects model; 2) Chow test for pooled OLS model vs. fixed effect model; 3) Hausman test for fixed effects vs. random effects model. In addition, heteroscedasticity was controlled for fixed effects and random effect model employing Breusch-Pagan test, serial correlation was controlled using Breusch-Godfrey test for panel data, and cross-sectional dependency using Pesaran's CD test for correlation of residuals across the EU countries. Following the violation of the fixed effects and the random effects model assumptions, these robust alternatives of tests were used 1) owing to a cross-sectional dependency violation, by adopting an alternative Pesaran's CD test hypothesis, robust Hausman test was used in favour of a fixed vs. random effect model, i.e. its auxiliary-regression-based version, see Wooldridge (2010, Sec. 10.7.3) exploiting the White's (1984) robust variance-covariance matrix of the coefficents of a fitted model (Baltagi, 2005); and 2) due to violation of homoscedasticity and serial correlation (quasi-) t Wald tests of estimated coefficients using the variance covariance matrix of the coefficients was applied to robustly estimate the coefficients of the resulting model.
The first step to achieving the main aim of the paper and its partial hypotheses was to calculate the pooled OLS model using the variables contained in Equation 2. The use of the OLS regression model pooled assumption that in its general expression

$$y_{it} = \beta x_{it} + \alpha_i + \varepsilon_{it} \quad (3)$$

x is not correlated with both error components, namely $\alpha_i$ and $\varepsilon_{it}$. Thus, two assumptions emerge, i.e. neither entity-specific time-constant unobserved heterogeneity (random effects) nor time-varying unobserved heterogeneity (fixed effects) are present. The second step was to calculate the random effect model for its comparison with the pooled OLS model and fixed effect model. Breusch-Pagan test showed 1) heteroscedasticity in the random effect model (BP = 11.659, df = 4, p-value <0.05); 2) serial correlation using Breusch-Godfrey test (chisq = 58.47, df = 1, p-value <0.001); 3) and the cross-sectional dependency proved by Pesaran CD's test (a = 21.316, p-value <0.001). The third step was to calculate the model's fixed effects for its comparison with the pooled OLS model and random effect model. Application of Breusch-Pagan test revealed 1) heteroscedascity in the random effect model (BP = 11.659, df = 4, p-value < 0.05); 2) serial correlation using Breusch-Godfrey test (chisq = 38.788, df = 1, p-value <0.001); 3) and the cross-sectional dependency proved by Pesaran CD's test (z = 21.61, p-value < 0.001). A subsequent series of tests performed testing pooled the OLS versus random effect model and fixed effect model. Lagrange Multiplier Test - Honda's uniformly most powerful test for balanced panels (Baltagi, 2005) was applied to test the pooled OLS model vs. random effect model. The result shows that variances across the EU 27 countries are not zero (normal = 26.29, p-value < 0.001). Hence, the null hypothesis was rejected and it was concluded that the random effect is appropriate. Chow test to

evaluate the pooled OLS model vs. fixed effect model was employed. The test proved that the fixed effect model has to be preferred to the pooled OLS model as the test accepted rejection of the null hypothesis that the coefficients for all years are jointly equal to zero (F = 80.013, df1 = 26, df2 = 212, p-value < 0.001), i.e. the individual effects are presented. Respecting the given results of all these previous tests, a robust version of Hausman test was utilised where null hypothesis assumed that the random effect model did not suffer from the violation of the Gauss-Markov theorem and therefore not ending up with biased and inconsistent parameter estimates, i.e. the individual effects are uncorrelated with the other regressors (Park, 2011). The robust Hausman test suggested prefering the fixed effect model to random effect model as the null hypothesis had been rejected (chisq = 22.604, df = 4, p-value < 0.001).

## 3. RESULTS AND DISCUSSION

The resulting fixed effect model exhibits a coefficient of determination: 0.495. The adjusted coefficient of determination, taking into account the use of multiple independent variables in the model, reached the value of 0.423. Thus, the model presented by us can be interpreted in such a way that the amount of variance dependent variable (SPEXP) is explained by the amount of variance of independent variables from 42.3%. The prerequisite for evaluating the individual estimations of coefficients is the F-statistic, when all the coefficients in the model are different from zero (F-test: 51.8531 on 4 and 212 DF, p-value: < 0,001).Their results are shown in Table 3.

**Table 3.** Estimation of coefficients in the fixed effect model for Social protection expenditure in the EU 27 countries 2007-2015

| Variable | Coeff. Estimate | Standard Error | t-Value | P-Value |
|---|---|---|---|---|
| HDI | 21.828949 | 9.883642 | 2.2086 | 0.02827 ** |
| UNEM | 0.334838 | 0.034114 | 9.8153 | < 2e-16 *** |
| GINI | -0.135201 | 0.079388 | -1.7030 | 0.09003 * |
| ARPOR65 | -0.039394 | 0.022691 | -1.7361 | 0.08400 * |

Source: Own compilation based on Eurostat (2018). * indicates significance level at 0.10 level, ** indicates significance level at 0.05 level, *** indicates significance level at 0.01 level.

Nonetheless, the resulting model is burdened with a violation of assumptions for consistent coefficient estimates. Therefore, a model with corresponding parameter estimates based on their robust counterparts using the "arellano" method for fixed effects models and type HAC3 giving less weight to influential observations is presented in Table 4.

**Table 4.** Robust estimation of coefficients in the fixed effect model for Social protection expenditure in the EU 27 countries 2007-2015

| Variable | Coeff. Estimate | Standard Error | t Value | P-Value |
|---|---|---|---|---|
| HDI | 21.828949 | 15.384169 | 1.4189 | 0.1574 |
| UNEM | 0.334838 | 0.068276 | 4.9042 | 1.865e-06 *** |
| GINI | -0.135201 | 0.105964 | -1.2759 | 0.2034 |
| ARPOR65 | -0.039394 | 0.035520 | -1.1091 | 0.2687 |

Source: Own compilation based on Eurostat (2018). *** indicates significance level at 0.01 level.

Table 4 shows that the only significant factor influencing SPEXP values is the registered unemployment rate (UNEP, $p < 0.001$). For the other factors, the obtained data did not provide sufficient evidence of their significance. Consequently, the interpretation of this coefficient estimate in the fixed effect model indicates how much SPEXP changes overtime, on average per country, when UNEP increases by one unit taking all other variables constant, namely by 0.334838 in that case. In this regard, SPEXP is expected to increase by 21.828949 units on average in the model, if one-unit increase occurs in HDI. This represents the highest value in the model, however, with an insignificant relationship between both variables encumbered with a large standard error. For the other two independent variables, namely ARPOR65 and GINI, there is a change to SPEXP overtime, on average negative per country. Thus, SPEXP is expected to decrease by -0.039394 and -0.135201 respectively.

On the other hand, all hypotheses 1-4 were confirmed from the perspective of the individual signs of the coefficients within the independent variables, i.e. H1: there is a positive relationship between SPEXP and the socio-economic development represented by HDI; H2: SPEXP increases in relation to the amount of UNEM; H3: there is a negative relationship between SPEXP and GINI, i.e. higher amount of expenditure on social protection mitigates income inequality; H4: there is a negative relationship between the SPEXP and the poverty rate (ARPOR65) with the same explanation as for H3. Nevertheless, it must be reiterated that a sufficient significant effect on SPEXP was revealed only in the case of UNEM.

The evaluation of socio-economic indicators and social protection expenditures accomplished in this research is consistent with findings in Pestieau (2006); Mikusova Merickova and Halaskova (2014a; 2014b) or Halaskova and Mikusova Merickova (2017) with a positive correlation between the *social protection expenditures and socio-economic development* quantified Human-Development Index. Furthermore, Mikusova Merickova and Halaskova (2014a or 2014b) came to the conclusion that there is a positive correlation between social protection expenditures on family and old age and socio-economic development. Halaskova and Mikusova Merickova (2017) suggested that social protection expenditures on health care and old age had a positive impact on socio-economic development; only social protection expenditure on disability had a negative impact on socio-economic development evaluated by Human development index.

Findings of this paper are consistent with former studies, such as Niehues (2010); Anderson et al. (2016); Halaskova and Mikusova Merickova (2017) or Sanchez and Perez-Corral (2018) where a negative relationship between *social expenditures and income inequality* was identified. Moreover, Niehues (2010) analysed whether more generous social spending policies lead to lesser income inequality or not in the EU 15 member states until 2004 and EU 25 member states from 2005. This research reflected the fact that the structure of benefits, particularly unemployment benefits and public pensions is responsible for the inequality reducing impact. Additionally, Halaskova and Mikusova Merickova (2017) assessed the correlation between social protection expenditure by selected function and income inequality for a set 17 European countries in the period 2005-2012. Results of this study revealed that social protection expenditures on health care, on the disabled and on old age had a mainly negative impact on income inequality, based on the Gini coefficient. Furthermore, study by Anderson et al. (2016) realised a meta-regression analysis exploring the effects of government spending on income inequality, with a particular focus on low- and middle-income countries. The results concluded the presence of a moderate negative relationship between government spending and income inequality, which is strongest for social welfare and other social spending, with using the Gini coefficient. Nevertheless, a range of other factors affects both the size and direction of the estimated relationship between government spending and income inequality. Moreover, the results of study by Sanchez and Perez-Corral (2018), who analysed the relationship between public social expenditures and income inequality in the EU 28 countries, showed a negative correlation between public social expenditures as a whole and income inequality.

Our results have confirmed a weak negative relationship between *social protection expenditures and poverty rate* for elderly 65+. If we focus on research into this issue having been carried out before, such as Caminada et al. (2012); Halaskova (2018a); Mieziene and Krutuliene (2019), we can conclude that they reached similar conclusions. Halaskova (2018a) analysed the relation between social expenditures in relation to poverty and social exclusion in the 28 European countries in the period 2007-2015. The results of correlation analysis showed a moderate negative correlation between social protection benefits (all functions) and income poverty and social exclusion. Halaskova (2018a, p. 124) says that specifically, "the study by Caminada et al. (2012) was dedicated to the impact of social expenditures on poverty rate for the period 1985–2005, where demographic and macroeconomic differences across countries were considered. Results of this study verified a negative, but quite a strong relationship between the level of social expenditures and poverty rate". Ageing and unemployment rates were found to have some explanatory power but without affecting the association between social transfers and poverty. The multivariate approach chosen in this paper verified the results of previous research agenda. Thereby, a positive relationship between social protection expenditures and unemployment rate in the EU 27 member states was identified.

Results of our research have also shown a positive relationship between *social protection expenditures and unemployment rate* in the EU 27countries. Research conducted by Ding (2014) with using a panel data of 34 OECD countries from 1980 to 2010, confirmed that total welfare expenditures as a percentage of GDP proves a positive impact on unemployment outcomes (total unemployment, long-term unemployment and youth unemployment). Likewise, Cabelkova (2015) investigated the effect of social protection expenditures on the level of unemployment of the disabled in the EU. In addition, Chzhen (2017) confirmed the effect of social protection expenditures on unemployment and on the poverty risks of children in very low work intensity families.

Our findings are hereby consistent with previously published scholarly papers on social protection expenditures and socio-economic indicators. However, some differences could be perceived due to various aspects of expenditures (public expenditure, public social expenditure, social protection expenditure by selected functions), or due to diverse approaches of welfare state (*Social-democratic, Conservative and Liberal*). Research findings may also vary owing to different time-periods in prior research.

## CONCLUSION

The aim of the paper was to analyse association between social protection expenditures and the selected socio-economic indicators in the years 2007-2015, using a regression analysis of panel data for the EU 27 countries. In our case, a fixed effect model was exploited for the analysis that proved the causal interpretation of the impact of independent variables that vary over time on social protection expenditures, however, in the case unemployment solely. The used regression model with a robust estimation of coefficients confirmed the predefined hypotheses H1-H2 with positive relationships of Human development index (HDI) and unemployment rate on social protection expenditures changes over time, on average per country. Moreover, hypotheses H3-H4 were confirmed, exhibiting negative relationships for poverty rate (measured by at risk of poverty or social exclusion rate for elderly 65+) and income inequality (expressed by Gini coefficient of equalised disposable income). Nevertheless, no independent variables in H1, H3 and H4 contribute to the amount variance of social protection expenditures significantly.

The consequences of the interaction of economic and social phenomena are discussed in many countries. In this context, one poses a question of a compromise between efficiency and equality, which is projected into the relationship between economic and social policy. Despite our results, the future research is proposed to be focused on the comparison of these results with Granger causality test ones as well as interaction effects of independent variables as fixed effects model could provide such analysis. Moreover, respecting the continuation of the divergence in

unemployment rate among the EU countries, least squares dummy variable model for fixed effect model is supposed to be applied using dummy variables for the EU countries or institutional regimes and vice versa as well as exploring its longitudinal effect, i.e. influence of the economic cycle on social protection expenditures.

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# Does Financial Perception Mediating the Financial Literacy on Financial Behavior? A Study of Academic Community in Central Java Island, Indonesia

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ABSTRACT

This study aims to investigate the financial knowledge, financial awareness, and financial experiences through financial perception toward financial behavior among academic community in Indonesia. Structural equation modeling (SEM) is used to answer the research purpose. Using probability random sampling this study, take 300 samples as participants among lecturer in Central Java Island, Indonesia. The data are collected by face to face field survey. The samples consist of 59% lecturer in public University and 41% in private University. The proportion of gender is 50% female and 50% male. The majority of the participants were 26-50 years old. This study has proven a significant positive impact of financial knowledge, financial awareness, financial experience and financial perception on financial behavior. Financial behavior was found to be caused by financial perception variables which, in turn, were influenced by knowledge, awareness and experience. People, who has a better understanding in financial concept and have awareness on how they manage financial information and have experience will act in a better way to manage the money financial knowledge possessed by a person can be influenced by financial experience and financial awareness, and ultimately can form a good perception, in turn, actual financial behavior depends on all (knowledge, awareness, experience and perception).

## INTRODUCTION

Nowadays the new business models in the financial services has been changes to novel forms be digital finance. The financial services delivered through mobile apps and internet that enable individuals to have access to payments, savings, and credit facilities via online. These changes of

business model of financial service from conventional to moderate, as known "FinTech". The fastest development of FinTech occurs in developing countries. This is because many people in developing countries do not have access to traditional financial services likely banks. As a country with the largest population in Southeast Asia and the fourth largest in the world, Indonesia is a big market for FinTech. FinTech in Indonesia is reinforced by the increase in the population of middle-class and affluent consumers. The impact of financial product innovation not only a positive effect but also a negative impact on individuals' well-being and financial behavior. The growth of this industry can be a magnet for fraud and crime because there is less control from regulators. Moreover, the low level of financial literacy in developing countries is a challenge for FinTech to growth. Supervision and monitoring between FinTech and financial literacy from Financial Services Authority or central bank is needed.

The growth of FinTech in developing countries is facing the challenge of low financial literacy, especially the understanding of basic financial concepts that are still limited. Financial literacy has been described in various studies that continue to be studied and developed over time. Financial literacy cannot be measured directly; so, dimensions must be used to measure it . Someone who financially literate can show their competence and ability of financial knowledge obtained through practical experience and active knowledge integration. Financial literacy is not only important for depositors or investors, but also for financial system and economy. Not only does financial literacy have great implications for the welfare of individuals in managing their financial matter, it also influences the behavior of financial institutions and financial stability. The concept of financial literacy has been defined variously. At first, financial literacy was defined as financial knowledge studied by researchers around the world. (Huston, 2010; Hasting et al., 2013; Lusardi and Mitchell, 2011). Financial knowledge was used in making financial decisions about how to manage finance and decide investment. Financial knowledge as human capital is important and needed to make a financial plan and produce good financial behavior.

The conceptualization of financial literacy has been extended along with the development of dynamic financial issues. Furthermore, many researchers have proved, not only knowledge but also other multi-dimension was used to measure financial literacy. Financial awareness, financial experience and financial perception or attitudes are also the antecedent of financial literacy. How can a good perception of finance be formed? Perception can be constructed, not only if individuals have knowledge and awareness of an object, but also experience obtained from personal experience and other people who helped someone has positive or negative financial perception and in the end influences financial behavior.

Based on the literature review, financial knowledge, financial awareness, financial experience and financial behavior have been studied (de Bassa 2013; Robb and Woodyard, 2011; Tokar Assad, 2015) . The studies employed various participants including students (Ahsan, 2013; Nidar & Bestari,2012; Robb, 2011) , entrepreneurs (Gupta and Kaur,2014; Oseifuah & Rugimbana, 2010), employees (Agarwalla, 2013; Bhushan & Medury, 2013; Clark et al., 2017), Teachers women (Priyadharshini, 2017; Zaimah et al., 2013). Unfortunately, there is still limited literature discussion the financial literacy and financial behavior of lecturer as academic community. According to a review of previous studies, the purpose of this study is to investigate the effect of financial knowledge, financial awareness and financial experience through financial perception on the financial behavior of lecturers as members of academic community.

The academic community is a society that has the motivation to build a system of scientific thinking that relies on scientific rules to obtain truth. The academic community is considered to have competence in science, skills and behavior. Research on financial literacy has been done in various countries but still limited investigation in academic community. This research will provide a new insight into financial literacy.

# 1. LITERATURE REVIEW

## 1.1 Financial Literacy

The concept of financial literacy has been defined variously in many studies. Hilgert et al. (2003) define financial literacy as financial knowledge. Financial literacy is an empirical and theoretical study has been started since 1966 by Bakken, and then studied continuously by researchers around the world. Financial literacy is defined as a unity of knowledge, skills, and attitudes that proved affect financial behavior (Lusardi & Mitchel, 2013; Xiao et al. 2014; Khan et al. 2017). The Presidents Advisory Council on Financial Literacy (PACFL, 2008) defines financial literacy as the ability to use knowledge and skills to effectively manage financial resources to achieve financial well-being for life. Financial literacy refers to the ability to make judgments and make effective decisions regarding the use and management of money.

Increasing financial literacy supports financial inclusion and improves community welfare. From such various definitions, financial literacy can be defined as a process in perceiving financial knowledge, financial awareness and financial experience to be used in financial decision-making through enhanced skills and positive financial managing capability so as to have positive financial behavior to achieve financial goals and freedom.

## 1.2 Financial Perception and Financial Knowledge

Perception can be formed well if an individual not only has good knowledge and awareness of an object but also comes from the experiences obtained from personal experience and other people who helped shape these perceptions. Robb and Woodyard (2011), Sivaramakrishnan et al. (2017) and Woodyard (2013) stated that financial perceptions are formed objectively and subjectively where objective financial knowledge can be formed through education or learning processes; this can be measured through questions related to interest rates, inflation, diversification of risk, risk of stocks. Meanwhile, the subjective financial knowledge is reflected in financial attitude towards the knowledge they have. Objective knowledge reflects individual knowledge about financial issues and is measured by assessing the level of understanding of various issues of basic financial issues namely compound interest, inflation, deposits, time value of money, diversification and interest rates, debt, assets (Lusardi and Mitchell, 2014; Khan et al., 2017; Woodyard, 2013). Research on Objective Financial knowledge has been carried out Clark et.al (2017); Knoll and Houts (2012); Sivaramakrishnan et al. (2017); Woodyard (2013); Xiao et al. (2014); and Walstad and Rebeck (2010).

Subjective knowledge is an assessment of a person's own knowledge Van Rooij et al., 2011). Subjective financial knowledge can also be defined as a person's interests, beliefs and abilities related to financial problems or financial decision-making (Sivaramakrishnan et al., 2017). Subjective financial knowledge is understood as an assessment of an individual or individual to the level of financial knowledge (Khan et al., 2017). Subjective knowledge is basically reflected through financial attitude. Financial attitude refers to one's beliefs and values related to various concepts of personal finance (Priyadharsini, 2017). These values and beliefs can shape a person's behavior in making decisions namely behavior to control themselves, patience, long-term thinking, and the ability to solve financial problems faced. Financial behavior can also show how a person tolerates a risk (risk tolerance). Several studies from financial organizations and previous researchers in the world namely the Canada Financial Capability Survey (CFCS), the National Financial Capability Survey (NFCS) in the United States, FINRA Investor Education Foundation, used subjective financial knowledge to measure respondents' literacy. Studies of subjective financial knowledge have been carried out by Robb and Woodyard (2011); Woodyard (2013); Sivaramakrishnan et al. (2017), Xiao et al. (2014), and Riitsalu and Murakas (2019).

Subjective financial knowledge measures a person's financial attitude related to values and beliefs related to various individual financial concepts. Financial attitude focuses on ability to control himself, believing in something that is considered good in finance, for example, believing that it is important to save money, it is important to make financial planning, be patient in facing financial problems and find ways to overcome them, risk tolerance, perceptions of risk and return

The formation of financial literacy is not only influenced by individual's financial knowledge, but also influenced by other factors, which are financial awareness and financial experience. Priyadharshini (2017) proves that the formation of good financial knowledge is influenced by financial awareness. Meanwhile, Knoll and Houts (2012) stated that in addition to financial knowledge, financial experiences make individuals financial literacy more well-literate.

## 1.3 Financial Awareness

Financial awareness is part of financial literacy (Mason and Wilson, 2000). To be financial literate, a person must be financially aware. Financial awareness is measured through the understanding of existing financial terms likely balance sheets, budgeting. Priyadharsini (2017) states that financial awareness is an important factor in financial literacy that forms or exerts influence on financial perceptions which ultimately influence decision-making related to retirement planning, insurance and utilizes available and optimal financial information. This financial awareness can be identified by knowing when someone has a list of items to be purchased when they want to shop, comparing prices before deciding to buy and awareness of the existence of complaints handling and consumer protection mechanisms, awareness of financial issues, awareness of financial risk. Awareness of consumer protection mechanisms is very important for the financial system, because bad experiences experienced by consumers without the assistance of solutions can result in a loss of public confidence in the financial system. In an increasingly global economic development, financial awareness is one of the elements needed to create financial inclusion. Grohmann et al. (2018) argue that high financial literacy can strengthen financial illusions.

Lack of community capacity to search and filter information can cause asymmetric information problems between depositors as principals and financial institutions as agents. The rapid of financial inclusion with the weak regulation and monitoring has a high risk of behavior moral hazard. The trapping of people in investment with the promise of high returns leading to fraud, due to lack of awareness among people in finding out about the company before investing. It is very important to raise the public's awareness of investment in official financial institutions such as banking, capital markets and non-bank financial institutions that have received formal permission. In addition, it is also important to be aware of the benefits of saving in these financial institutions, namely security and the flow of funds driving the economy. Some previous study already done by Nga et al. (2010); Palmer et al. (2010).

## 1.4 Financial experience

Financial experience related to ownership of financial products, experience of having financial records, conducting tax reporting, calculating net worth, saving experience on various investment instruments and experience of having an emergency fund. Someone who has a good financial experience also has good financial knowledge (Frijns et al. 2014). Research on financial experience in financial literacy has also been carried out by Dvorak and Hanley (2010).

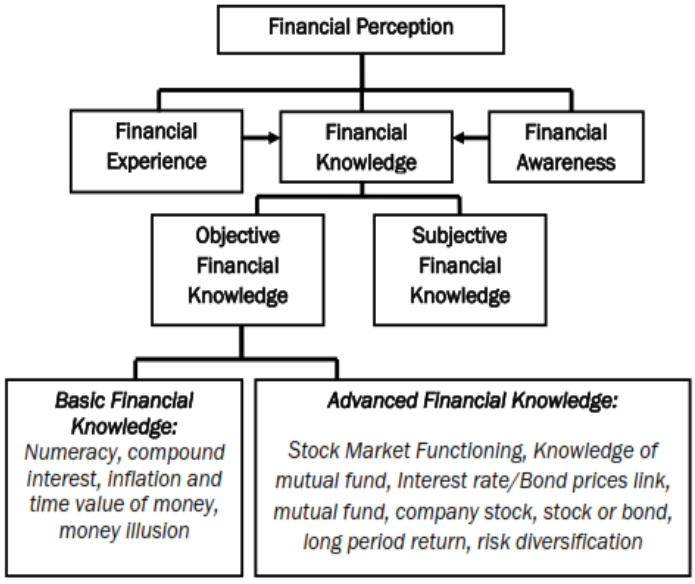


**Figure 1.** Conceptual Development of financial Perception Model

Source: Develop from Lusardi and Mitchell, 2010; Van Rooij et al., 2011; Woodyard, 2013.

Figure 1, shows that financial knowledge possessed by a person can be influenced by financial experience and financial awareness, and ultimately can form a good perception of finance. Financial perception can be a stimulus for someone to explore and sharpen one's financial skills such as the skills to make budgeting. Individuals who have good and skilled financial perceptions will improve one's financial skills. Someone who has good financial skills can influence how a person is able to determine his financial goals, which in turn will shape good financial behavior and appropriate decision-making to achieve financial well-being.

Woodyard (2013) proves that objective financial knowledge and subjective financial knowledge can form financial perceptions. Robb and Woodyard (2011) show that both objective and subjective financial knowledge influence financial behavior, with subjective knowledge having a greater relative impact. In addition to financial knowledge which describes the objective and subjective financial knowledge, financial perceptions are formed because the individual has self-awareness to things that are related to economic issues, both at micro and macro level. A person's financial experience is also a factor that shapes financial perceptions. Better financial experience will shape perceptions of financial knowledge that are getting better (Frijns et al. 2014).

## 1.4 Financial Behavior

Financial Behavior is an individual's behavior related to finance that can affect the well-being of the individual. Financial behavior is the integration of behavioral and cognitive psychological theory with economic and financial theory in explaining the motives of someone who behaves irrationally in financial decision-making. Previous research proves that there is a correlation between financial behavior and financial knowledge (de Bassa, 2013; Van Rooij et al., 2012). Another study conducted by Lianto and Elizabeth (2017) proved that financial knowledge and financial attitudes had no effect on financial behavior, while Humaira (2018) prove that financial knowledge and financial attitudes have a positive influence on financial behavior. There are four dimensions to measure financial behavior, namely consumption, cash flow management, savings and investment and debt management (Dew and Xiao, 2011).

## 1.5 Hypothesis

Based on the theories and previous research findings, the conceptual model and hypothesis are formulated in Figure 2 below:

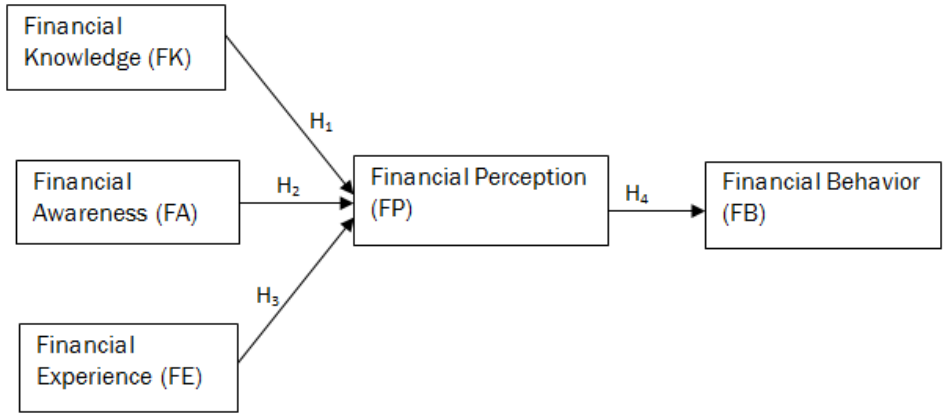


**Figure 2.** The Conceptual Model

And the hypotheses are:

$H_1$ : Financial knowledge has a positive effect on financial perception
$H_2$ : Financial awareness has a positive effect on financial perception
$H_3$ : Financial experience has a positive effect on financial perception
$H_4$ : Financial perception has a positive effect on financial behavior.

## 2. RESEARCH METHODOLOGY

The data used in this study are primary data. The data are collected by survey in Central Java, Indonesia. The data from survey will be analyzed using multivariate model (structural equation model) using Lisrel 8.80 package to answer the research objectives.

## 2.1. The Data

This study comprised 300 participants of lecturer in Central Java, Indonesia. Central Java is one of the province with high level of financial literacy (SNLKI, OJK,2017). Central Java also has some city with large student population and dozens of schools and universities. The sample consist of 59% lecturer in public University and 41% in private University, about 38% respondents as economics and business lecturer and 62 % as non-economics and business lecturer. The proportion of gender is 50% female and 50% male, which categorized in four groups of ages. The majority of the participants were 26-50 years old. Based on the educational background, 76% of the participants hold post graduate master's degree (S2) and 24% hold Ph.D (S3). Table 1 describes the demographic of respondent.

**Table 1.** Demographics of respondents

| *Demographics* | *Frequency* | *Percentage* |
|---|---|---|
| Category of University: | | |
| - Public | 178 | 59% |
| - Private | 122 | 41% |
| Field of scientific | | |
| - Economics and Business | 114 | 38% |
| - Non-Economics and Business | 186 | 62% |
| Gender | | |
| - Male | 150 | 50% |
| - Female | 150 | 50% |
| Age (years old) | | |
| - ≤ 25 | 6 | 2% |
| - 26 – 35 | 102 | 34% |
| - 36 – 50 | 117 | 39% |
| - ≥ 51 | 75 | 25% |
| Background of Education | | |
| - Master's | 229 | 76% |
| - Ph.D | 71 | 24% |

Sources: Survey Data

## 2.2 Questionnaire design

A comprehensive questionnaire was designed to cover the constructs of financial perception, financial knowledge, financial awareness, financial experience and financial behavior. The first construct: financial perceptions' ware measured by the participants' responses to four questions of objective financial knowledge (Robb and Woodyard, 2011):

- Time Value of Money: Suppose you get an inheritance of Rp.100 million today, while 3 years later, your brother receives an inheritance of Rp.100 million. Then, you should be richer than your brother.
- Compound Interest: Suppose you have Rp.1 million and save it in savings at an interest rate of 10% per year. If you have not taken the funds for 5 years, then the amount of money you have in the next 5 years is more than IDR 1.5 million
- Diversifications: Saving funds in stocks is more risky than saving in deposits
- Inflation: Suppose you save funds in a financial institution with an interest rate of 9% / year and the inflation rate is 12% / year. So, after 1 year, there are fewer items that can be bought with the fund than today.

The objective financial knowledge was measured by true or false questions. The correct answer will be calculated by mean percentage of correct scores and then be grouped into relatively high level of knowledge to relatively low knowledge (Danes and Hira, 1987; Volpe et al.,1996) , where 1 = very low and 5 = very high.

Table 2 shows the construct of subjective of financial knowledge, financial awareness, financial experience, financial perception and financial behavior were measured a five-points likert-scale where 1 is represented strongly disagree, and 5 is represented strongly agree.

**Table 2.** Instrument of Financial Awareness, Financial Experience, Financial Perception and Financial Behavior

| Indicators of the questions |
|---|
| Financial perceptions |
| 1. Perceived Math ability (FP1) |
| 2. Perceived of Risk and return (FP2) |
| 3.Perceived of financial matter (FP3) |
| Objective and Subjective Financial Knowledge |
| 1. Level of the objective financial knowledge: Time Value of Money, compound interest, diversification, inflation (FK1) |
| 2. Attitudes towards risk tolerance (FK2) |
| 3. financial records (FK3) |
| Financial Awareness |
| 1. Awareness in financial records is like a list before shopping (FA1) |
| 2. Awareness of documenting billing notes (FA2) |
| 3. Awareness of financial information is to compare several offers of financial products before deciding (FA3) |
| Financial Experience |
| 1. Experience in managing personal assets (FE1) |
| 2. Experience investing in the stock market (FE2) |
| 3. Investment experience in non-bank institutions (FE3) |
| Financial Behavior |
| 1. Pay bills on time (FB1) |
| 2. Investment diversification (FB2) |
| 3. Retirement investment (FB3) |

## 2.3 Construct Validity

Construct validity test used confirmatory Factor Analysis (CFA). Confirmatory factor analysis (CFA) is one of the most rigorous methodological approaches to testing for the validity of factorial structures within the framework of structural equation modeling (SEM) (Byrne, 2001). Construct validity is made up of the rule of thumb: (Hair et al., 2014, p. 605)

- Convergent Validity, it consists of factor loadings with a good rule of thumb is that standardized loading estimates should be 0 .5 or higher, and ideally 0.7 or higher.
- Construct Reliability and Average Variance Extracted (AVE). AVE should be 0.5 or greater to suggest adequate convergent validity, Construct reliability should be 0.7 or higher to indicate adequate convergence or internal consistency.

The average variance extracted (AVE) is: (Hair et al., 2014, p. 619)

$$AVE = \frac{\sum_{i=1}^{n} L_i^2}{n}$$

The Li represents the standardized factor loading, and i is the number of items Construct Reliability (CR) is: (Hair et al., 2014, p. 619)

$$CR = \frac{(\sum_{i=1}^{n} L_i)^2}{(\sum_{i=1}^{n} L_i)^2 + (\sum_{i=1}^{n} e_i)}$$

The Li represents the factor loadings (Li) for each construct and ei is the sum of the error variance terms for a construct.

## 2.4 Confirmatory Factor Analysis, Construct Reliability and Average Variance Extracted

The Convergent Validity, shows that all indicator of latent variable: financial knowledge, financial awareness, financial experience and financial behavior have standardized loading estimates equal to 0 .5 or higher. The result shows in table 3, below.

**Table 3.** CFA-Loading Factor for each latent variable.

| Variable | Indicators | T-Value | Loading Factor | Result |
|---|---|---|---|---|
| | | >1.96 | >0.5 | |
| | Financial perceptions | | | |
| | Perceived Math ability (FP1) | 14.46 | 0.78 | Valid |
| | Perceived of Risk and return (FP2) | 15.22 | 0.81 | Valid |
| | Perceived of financial matter (FP3) | 14.33 | 0.77 | Valid |
| | Objective and Subjective Financial Knowledge | | | |
| | Level of the objective financial knowledge: Time Value of Money, compound interest, diversification, inflation (FK1) | 10.84 | 0.68 | Valid |
| | Attitudes towards risk tolerance (FK2) | 11.17 | 0.71 | Valid |
| | financial records (FK3) | 10.80 | 0.68 | Valid |
| | Financial Awareness | | | |
| | Awareness in financial records is like a list before shopping (FA1) | 15.04 | 0.79 | Valid |
| | Awareness of documenting billing notes (FA2) | 14.94 | 0.78 | Valid |
| | Awareness of financial information is to compare several offers of financial products before deciding (FA3) | 16.55 | 0.85 | Valid |
| | Financial Experience | | | |
| | Experience in managing personal assets (FE1) | 16.02 | 0.83 | Valid |
| | Experience investing in the stock market (FE2) | 17.10 | 0.87 | Valid |
| | Investment experience in non-bank institutions (FE3) | 13.58 | 0.72 | Valid |
| | Financial Behavior | | | |
| | Pay bills on time (FB1) | 12.39 | 0.72 | Valid |
| | Investment diversification (FB2) | 15.53 | 0.90 | Valid |
| | Retirement investment (FB3) | 10.95 | 0.63 | Valid |

Source: Data Processing Result using Lisrel 8.80

Table 3 shows the estimations of loading factor for each latent variable. From the Table 3 it can be seen that all the latent variables is valid and have loading factor more than 0.5 (Hair et al.,2014:623).

**Table 4.** Goodness of Fits Measurement model

| *Variabel* | *P-Value (Criteria >0.05)* | *Goodness of fits* | *RMSEA (Citeria < 0.05)* | *Goodness of fits* |
|---|---|---|---|---|
| Financial perceptions | 1.00000 | Perfect fit | 0.000 | Perfect fit |
| Objective and Subjective Financial Knowledge | 1.00000 | Perfect fit | 0.000 | Perfect fit |
| Financial Awareness | 1.00000 | Perfect fit | 0.000 | Perfect fit |
| Financial Experience | 1.00000 | Perfect fit | 0.000 | Perfect fit |
| Financial Behavior | 1.00000 | Perfect fit | 0.000 | Perfect fit |

Source: Data Processing Result using Lisrel 8.80

Table 4 shows the goodness of fit for the measurement model using the criteria of chi-square and RMSEA. Based on the criteria of chi-square, the p-value of the chi-square for each latent variable categorized as a perfect fit. For example p-values of chi-square for financial perception, objective and subjective financial knowledge, financial awareness, financial experience and financial behavior are 1.000 (perfect fit). Based on the RMSEA criteria, each latent variable is also categorized perfect fit. RMSEA for financial perception, objective and subjective financial knowledge, financial awareness, financial experience and financial behavior are 0.000 (perfect fit).

Table 5. Construct Reliability (CR) and Average Variance Extracted (AVE)

| *Latent constructs* | *CR* | *AVE* |
|---|---|---|
| Financial knowledge | 0.73 | 0.50 |
| Financial Awareness | 0.85 | 0.65 |
| Financial Experience | 0.85 | 0.66 |
| Financial Perceptions | 0.83 | 0.62 |
| Financial Behavior | 0.80 | 0.58 |

Sources: Data process

Construct Validity could be conducted by considering the rule of thumb of confirmatory factor analysis. First, Standardized loading estimates for each indicator variable which is reflected latent construct must 0.5 or higher. Table 4 shows that all Standardized loading estimates the indicators variable is higher than 0.5 and its acceptable (Hair et al., 2014). Second, the value of Average Variance Extracted (AVE) should be 0.5 or greater to suggest adequate convergent validity. Table 5 shows the value of AVE is 0.5 and greater, its means that the construct explains more than a half of the variance of its indicators. Third, Construct reliability should be 0.7 or higher to indicate adequate convergence or internal consistency. Table 5 shows that the construct reliability all latent variable are higher than 0.7. Refers to table 5, this study shows that the measurement of each latent variable is reliable. Table 3 also shows that T- value of all indicators variable are more than T-Table= 1.96 (significant level =5%).

## 3. ANALYSIS

Structural Equation modeling (SEM) using Lisrel 8.80 program was used to analyze the data and answers the research objectives. Lisrel model is composed of two parts: 1) Measurement model is describes how the latent variables or constructs are measured by observed variables; 2).The Structural equation model describes the causal relation among the latent variables. As a statistical methodology that takes a confirmatory approach, the term structural equation modeling conveys two important aspects of the procedure: (a) measurement model, that the causal processes under study are represented by a series of structural equations, and (b) structural model, that these structural relations can be modeled pictorially to enable a clearer conceptualization of the theory under study (Byrne, 2010). There are three types of goodness-of-fit measurement: (1) absolute fit measures (assess the overall model fit, both structural and measurement together, with no adjustment for over-fitting); (2) incremental fit measures (compare the proposed model to a comparison model); and (3) parsimonious fit measures (adjust the measures of fit to compare models with different numbers of coefficients and determine the fit achieved by each coefficient) . An acceptable the measurement model fit to the data, be evaluated by several indicators in table 6.The measurement model of this study deals with the impact of financial literacy, financial experience, financially awareness toward financial behavior through financial perception.

## 3.1 Overall SEM Model Testing

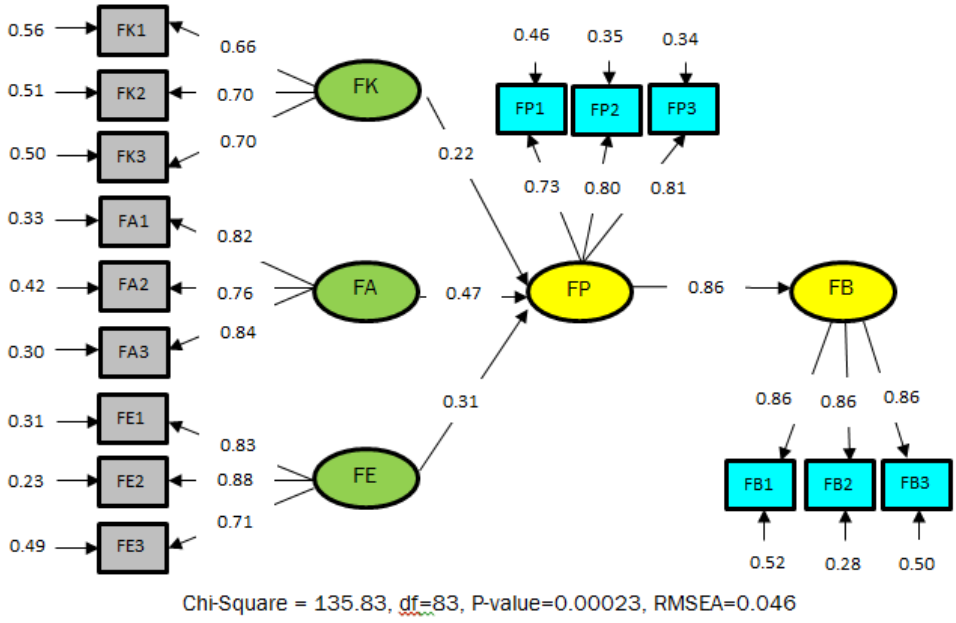


**Figure 3.** Structural Measurement Model-Standardized Solution

Source: Data Processing Result using Lisrel 8.80

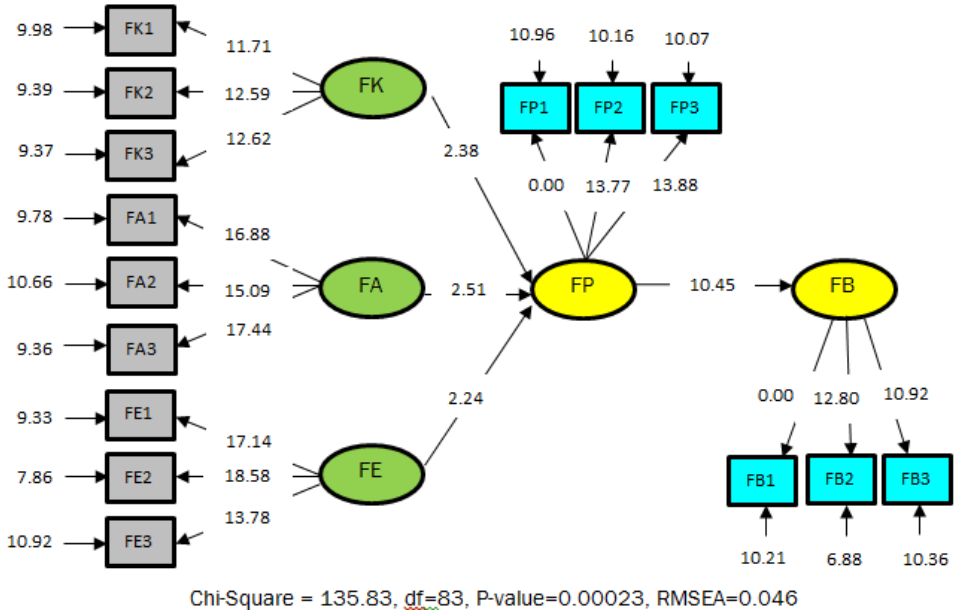


**Figure 4.** Structural Measurement Model-T-value

Source: Data Processing Result using Lisrel 8.80

In assessing the fit of parameters in the model, there are three aspects of concern: (a) the feasibility of the parameter estimates, (b) the appropriateness of the standard errors, and (c) the statistical significance of the parameter estimates (Byrne,2001). The results show that all indicators variables are good measurements of both constructs.

**Table 6.** Goodness of Fit Measurement

| *No* | *Statistics* | *Criteria indicator of Fit* | *Value* | *Result* |
|---|---|---|---|---|
| **1** | RMSEA | RMSEA<0.05 (Joreskog&Sorbom,1996) | 0.046 | *Good fit* |
| 2 | Chi- Square/df | Chi- Square/df ≤ 5 (Wheaton,1977) | 1.64 | *Good fit* |
| **3** | ECVI | ECVI | 0.70 | *Good fit* |
| | | ECVI Saturated | 0.80 | |
| | | ECVI Independence | 27.32 | |
| **4** | AIC | AIC | 209.83 | *Good fit* |
| | | AIC Saturated | 240.00 | |
| | | AIC Independence | 8167.59 | |
| **5** | NFI | NFI ≥ 0.90 | 0.98 | *Good fit* |
| **6** | CFI | CFI ≥ 0.90 | 0.99 | *Good fit* |
| **7** | NNFI | NNFI ≥ 0.90 | 0.99 | *Good fit* |
| **8** | IFI | IFI ≥ 0.90 | 0.99 | *Good fit* |
| **9** | RFI | RFI ≥ 0.90 | 0.98 | *Good fit* |
| **10** | GFI | GFI ≥ 0.90 | 0.94 | *Good fit* |
| **11** | AGFI | AGFI ≥ 0.90 | 0.92 | *Good fit* |
| **12** | PGFI | PGFI ≥ 0.60 | 0.65 | *Good fit* |
| **13** | PNFI | PNFI ≥ 0.090 | 0.78 | *Good fit* |

Source: Data Processing Result using Lisrel 8.80

Figure 3, shows that the path coefficient of financial knowledge, financial experience and financial awareness on financial perception is 0.22, 0.47 and 0.31.The path coefficient of financial perception on financial behavior is 0.85. Figure 4 shows result the examination of the correlation between latent variables (financial knowledge, financial awareness, financial experience, financial perception and financial knowledge) and the t-value show that the correlation is very high and the t-value exceeds the critical value of 1.96 (significant level =5%), indicating that the latent constructs are significant correlated with each other. The fit of the structural model is assessed and the results show in table 6 show that the model is appropriate as measurement model for the data set. Table 6 is also represented the output related to the hypothesized model and hypothesized model "fits," or adequately describes, the sample data.

## 3.2 Structural Model Testing

**Table 7.** Summary of Results Estimated parameters of the model

| *Parameters* | *Path coefficient* | *t* | $R^2$ |
|---|---|---|---|
| Financial Perception ← Financial knowledge | 0.22 | 2.38 | 0.90 |
| Financial Perception ← Financial awareness | 0.47 | 2.51 | |
| Financial Perception ← Financial awareness | 0.47 | 2.51 | |
| Financial Perception ← Financial experience | 0.31 | 2.24 | |
| Financial Behavior ← Financial perception | 0.85 | 10.45 | 0.71 |

Source*:* Lisrel 8.80 output

**Table 8.** Summary The magnitude of direct and indirect Effect

| Parameters | Direct effect | Indirect Effect through Financial Perception | Total |
|---|---|---|---|
| Financial Behavior ← Financial knowledge | - | 0.19 | 0.19 |
| Financial Behavior ← Financial Awareness | | 0.40 | 0.40 |
| Financial Behavior ← Financial experience | | 0.27 | 0.27 |
| Financial Behavior ← Financial perception | 0.85 | - | 0.85 |
| Financial Behavior ← Financial knowledge | - | 0.19 | 0.19 |

Source: Lisrel 8.80 output

Table 7.shows that the direct effect of financial perception on financial behavior is 0.85; the indirect effect of financial knowledge on financial behavior is 0.19; and the indirect effect of financial experience on financial behavior is 0.27. The indirect effect of financial awareness on financial behavior is 0.40. In the total effects of financial knowledge on financial behavior and financial awareness on financial behavior is 0.19 and 0.40. The effect of total financial experience on the financial behavior variable is 0.27. Table 7 and table 8 show that financial perception (FP) is influenced by financial knowledge (FK), financial awareness (FA) and financial experience (FE). Financial knowledge (FK) affects 0.22 ($0.22^2$ = 4.84%), Financial awareness (FA) affects 0.47 ($0.47^2$ = 22.09%) and financial experience (FE) affects 0.31 ($0.31^2$ = 9.61%). Simultaneous influence is 90%. The financial behavior (FB) is indirectly influenced by financial knowledge (FK), financial awareness (FA) and financial experience (FE). Financial knowledge (FK) affects 0.19 ($0.19^2$ = 3.61%), financial awareness (FA) affects 0.40 ($0.40^2$ = 16%) and financial experience (FE) affects 0.27 ($0.27^2$ = 7.29%). Financial Behavior (FB) is influenced by Financial Perception (FP) as simultaneous influence of $R^2$ = 71%.

From the model, 1 of the 2 hypotheses had been answered. Four hypotheses have a significant positive effect. Structural Equations (1):

$$FP = 0.22*FK + 0.47*FA + 0.31*FE, \text{Errorvar.} = 0.096 , R^2 = 0.90$$
$$(0.094) \quad (0.19) \quad (0.14) \quad (0.029)$$
$$2.38 \quad 2.51 \quad 2.24 \quad 3.26$$

From the above structural equation, it is known that the path coefficient of financial knowledge, financial experience and financial awareness on financial perception is 0.22, 0.47 and 0.31. Positive path coefficient values indicate that financial knowledge, financial experience and financial awareness have a positive effect on financial perception. In other words, the better financial knowledge, financial experience and financial awareness, the better the perception of finance will be. Likewise, the path coefficient of financial perception has a positive effect on financial behavior. The statistical value of the t test for the path coefficient of the financial knowledge, financial awareness and financial experience is t = 2.38, 2.51 and t = 2.24. The value of t table is based on the distribution of table t with free degrees df = n-k = 300-3 = 297 and the significance level α = 5% is t_table = 1.967. It can be concluded that the effect that occurs between financial knowledge, financial awareness and financial experience on financial perception is statistically significant. The coefficient of determination ($R^2$) is 0.90, meaning that financial knowledge, financial experience and financial awareness are able to explain financial perception by 90 %. The remaining 10% is explained by other variables. Structural Equations (2):

$$FB = 0.85*FP, \text{Errorvar.} = 0.29 , R^2 = 0.71$$
$$(0.081) \quad (0.059)$$
$$10.45 \quad 4.87$$

It is known that the path coefficient of financial perception is positive and indicates that the variables have a positive effect on financial behavior. In other words, the better perception the better the behavior will be. The t-test statistic value for the financial perception (t=10.45) is more than t table =1.967. Then, it can be concluded that the effect that occurred between the perception and the behavior was significant at the 5% significance level. It is known that the coefficient of determination ($R^2$) for the structural equation above is 0.71. It can be interpreted that 71% of perception is simultaneously able to explain (ups and downs) behavior by 71%,. The remaining 29% is explained by other variables.

## DISCUSSION AND CONCLUSIONS

How well individuals financial behavior inherent in the day to day of life depends on at least in part, on their financial knowledge, financial awareness, financial experience and financial perceptions. Empirically, this study has proven a significant positive impact of financial knowledge, financial awareness, financial experience and financial perception on financial behavior. These results are Empirically, proven previous studies (Robb and Woodyard, 2011; Woodyard, 2013) that showed a significant positive impact of financial knowledge, experience and awareness on financial perception and financial behavior . The finding tells us that financial knowledge, financial experience and financial awareness represents a basic form of financial literacy, in turn finally impact on financial perception and had a positive influence on saving behavior. People, who has a better understanding in financial concept and have awareness on how they manage financial information and have experience will act in a better way to manage the money financial knowledge possessed by a person can be influenced by financial experience and financial awareness, and ultimately can form a good perception, in turn, actual financial behavior depends on all (knowledge, awareness, experience and perception).

Based on the results of the research, it can be concluded that:

- Financial knowledge, financial awareness and financial experience have a positive effect on financial perception.
- Financial perception has positive effect on financial behavior.
- Coefficient determination test model 1 obtained a value of 0.90, which means the contribution of knowledge, awareness and experience of the financial perception is 90%; the remaining 10% is given by factors that are not explained in this model.
- Coefficient determination test model 2 obtained a value of 0.71, which means the contribution of financial perception of the financial behavior is 71%; the remaining 29% is given by factors that are not explained in this model.
- Financial perception is defined as a person's process in perceiving financial knowledge, awareness and experience that will be influence their behavior in finance.

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# Evaluation Framework of Seaports' Competitiveness Increasing Projects

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## ABSTRACT

The subject of research in this article is evaluation methods of seaport's competitiveness increasing investment projects. This paper develops evaluation framework for assessing investment projects through all the stages: since determining the need for investment to post-evaluation of the impact made. In the course of the analysis on the investment projects evaluation models the systematic, comparative and logical analysis of the scientific literature has been employed. The theoretical data processing method has been used to summarize and present conclusions and recommendations. It starts with the hypothesis that project evaluation holistic framework suggested by Zidane could be used for assessment of the competitiveness increasing projects in seaports. The article concluded that analysed holistic framework after its adoption and extension is suitable for evaluation of competitiveness increasing projects. The developed investment project evaluation framework can be used both in private and public seaports. It enables the decision makers to correctly assess the situation, the need for investments, the total amount of the capital needed, the implementation timeframe and project scale in accordance with investment project relevance; determine the payback period, cash flows and social welfare generated by the project, their net present value, IRR and discounted payback period. The model also enables to assess additional factors impacting on investment criteria: the effect of inflation on the cost of capital; working capital requirements; taxation; risk and uncertainty. Ex-post BCA allows learning about the accuracy and efficacy of ex-ante BCA and if the purpose of the project was reached in order to better the evaluation technique for future investment projects.

## INTRODUCTION

Maritime transport is hugely important for the modern global economy. The increasing development of economic globalization has led to a considerable increase in intercontinental exchanges, stimulating the use of ports and shipping companies with a cheap and quick way to reach most of Europe, Asia, Africa or North America (Ferreira et al., 2018, pp. 41-62). Maritime transport has a great importance to the modern global economy. The European Union is the world's largest trading

block, and 80% of its countries use shipping either to import or to export. There is a great concern for having appropriate networks to ensure the carried load's flow or drainage.

Carriers and seaports are two main components of the international supply chain (Talley et al., 2014, pp. 236-247; Popovic et al., 2017; Kot et al., 2018). Although containerisation has brought logistics and transportation into a new stage (Lam and Gu, 2016, pp. 266-274), several features determine the operation mode and efficiency of the goods transportation and handling.

The leading importance of the sea transport in the international traffic and the rapid growth of cargo transportation in containers (Tavasszy et al., 2011, pp. 1163-1172; Panova & Korovyakovsky, 2013, pp. 175-193; Yap & Lam, 2013, pp. 13-25; Ramos, 2014, pp. 32-41) determine the necessity to develop seaports and their infrastructure. The economies of countries that resort to sea transport as the primary means of global trade are considerably strengthened by the investments in the maritime, inland terminal and warehousing infrastructure.

For example, in Sweden, where sea transport is used for 90% of the country's international traffic, the construction and locations of dry ports were reasonably planned. Their development was determined by the analyses of goods flow, and mainly, by geographical factors. Notably, the economic activities and population are concentrated in the eastern part of the country, whereas the central maritime access, Gothenburg, is on the western coast (Roso et al., 2006, p. 47). Probably for that reason Sweden is one of the examples of outstanding dry ports' evolvement in Europe (Bergqvist et al., 2010, pp. 285-302).

In order to implement competitiveness increasing strategy in seaports various investment projects should be considered and evaluated to determine the most effective solutions. Various definitions of evaluation have been presented over the years. In this paper, the definition from OECD (2000), which defines evaluation as "*A systematic and objective assessment of an ongoing or completed project, program or policy, its design, implementation and results*" is taken into consideration. Seaports operate on a highly competitive global transport market. The sustainable competitiveness was the topic of research by Vojtovic et al. (2016), Koziuk et al. (2019) and Braja and Gemzik-Salwach (2019).

To retain its competitive position a port (terminal) must strengthen its competitive advantages in all fields of activity (Palmowski and Tarkowski, 2016, pp 61-74). In our previous research we created the evaluation model of seaports' performance that enabled assessing the financial situation of the organisation and determining its position in the market in relation to its competitors (Ignasiak-Szulc et al., 2018, pp. 571-579). The proposed economic model assesses the financial and economic status of the ports, and, based on the calculated evaluation index, allows determining the situation of a particular port in relation to its competitors and identifying correlations among various aspects of evaluation. The benchmarking approach used in the model conveys the main determinants in selecting the best suited investment projects.

Y. Zidane et al. (2015, pp. 409-416) emphasize the need to evaluate the project in at least two dimensions: accomplishing the result goal of the project (project delivery at the completion of the project according to plan) and accomplishing the effect goal (effects of the project, once it has been completed). The effects of the project can further be categorized into two dimensions: Effects (benefits) for the organization that undertakes the project and effects (benefits) for society. Therefore, there are three major levels of goals, based on which a project can be looked at and evaluated. When talking about evaluation of a project, it is relevant to look at, among other things, the degree of success (and/or failure) that is associated with the whole project endeavour.

How project success is defined, described and categorized contribute to make a base for discussing criteria for evaluation such as efficiency, effectiveness and so on (Ibid, pp. 409-416).

The hypothesis – project evaluation holistic framework suggested by Zidane et al. (2015) could be used for assessment of the competitiveness increasing projects in seaports.

The outline of this article is as follows: Section 2 includes a literature review on the investment projects evaluation models. Section 3 explains a deterministic model of cash flows, costs and results, as well as the consequence values of the payback period (PP) and net present value (NPV), depending upon project risks. Section 4 contains concluding comments, that is, the evaluation framework for seaport's competitiveness increasing investment projects.

## 1. LITERATURE REVIEW

C. Serra and M. Kunc (2015, pp. 53-66), referring to previous studies conducted by G. Prabhakar (2008, pp. 3-10), Yu et al. (2005, pp. 428-436), and L. Ika (2009, pp. 6-19) point out that there is no consensus on the definition of project success. However, different criteria are applied to define, describe and / or evaluate overall project success. For instance, A. Shenhar & D. Dvir (2007, pp. 1-288) talk about five dimensions (project efficiency, team satisfaction, impact on the customer, business success, preparing for the future). Concepts that are applied as criteria for evaluation, such as efficiency, effectiveness, sustainability, relevance and impact, can be compared to the three major levels of goals: result goals, effect goals and society goals.

For instance, achieving result goals is related to efficiency, and achieving effect goals and society goals is related to effectiveness, sustainability, relevance and impact in varying degrees based on the context (Zidane et al., 2015, pp. 409-416). According to N. Olsson (2006, pp. 66-74), a project's ability to produce its immediate outcome can be measured in terms of efficiency. He considers effectiveness as the measure of the long-term effects and as doing the right things. K. Samset (2003, pp. 1-233) defines efficiency as the degree to which project outputs have delivered as planned and in accordance with budget; if it could have been done cheaper, more quickly and / or with better quality.

He defines effectiveness as the extent to which the objective has been achieved. Impacts, as defined by OECD (2010, pp. 1-38), are the positive and / or negative changes produced by a development intervention (a project), directly or indirectly, intended or unintended. These impacts are measured by the local social, economic, environmental and other development indicators.

Project evaluation holistic framework suggested by Zidane et al. (2015, pp. 409-416) shows all the elements and their interdependencies, including the timing of their interactions. For example, relevance is measured from the time, where a "trigger" has earlier notified a "need". The concerned persons make the decision to identify those needs. Once they have identified the need, they will establish the goals and objectives of the project; estimate the feasibility; identify uncertainty; estimate cost and time.

The most common method discussed in the scientific literature to evaluate the project's feasibility is Benefit-Cost analyses. Decision-makers rely on the expected benefits and costs that a given project should generate throughout its lifetime when making their decisions. To help aggregate such benefits and costs into a single measure of project worthiness, seaport economists/planners regularly conduct ex-ante Benefit-Cost Analyses (BCAs). Ex-ante means that the analyses are an integrated part of the planning process and that the analyses are based on forecasts, which may or may not match the real outcomes. An ex-ante BCA proceeds by first evaluating the expected change in the benefits and costs of an undertaking compared to a "*do-nothing or do-minimum*" situation, and all the benefits and costs are measured in monetary terms (Odeck & Kjerkreit, 2019, pp. 277-294).

An ex-ante BCA further proceeds by comparing the discounted monetized benefits to the discounted costs. The result of such a comparison is the Net Present Value (NPV). If the NPV is positive, then the project is considered to be profitable from a socioeconomic perspective because its benefits exceed its costs; otherwise, the project is deemed unprofitable. In the early project phase ex-ante BCA is useful for demonstrating the potential that a project has at that early stage. The

decision where it is helpful is therefore the go-ahead decision to continue planning for different options for the same project.

The BCA is most useful for

- selecting the most appropriate alignment/option of the same project and
- selecting the appropriate projects from a pool of projects for funding/resource allocation when funds/resources are limited.

This class of analyses is the most common in the transportation literature, in which the major issue seems to be the allocation of funds. There has been criticism of using BCAs as appropriate tools for decision-making because a BCA does not include all factors worth considering in decision-making and some important impacts are not valued in monetary terms.

**Table 1.** Advantages and Disadvantages of the Five BCAs techniques

| *Technique* | *Definition* | *Advantages* | *Disadvantages* |
|---|---|---|---|
| Accounting rate of return (ARR) | Average accounting profit over the life of the project divided by the initial or average investment | - quick and easy to calculate, simple to use | - based on accounting profit rather than cash flows;<br>- a relative measure and so no account is taken of the size of the project;<br>- ignores timing of cash flows and the cost of capital. |
| Payback | The point where the cumulative value of a project's cash flows becomes positive | - considers liquidity;<br>- looks only on relevant cash flows. | - ignores the timing of cash flows;<br>- ignores cash flows that occur after the payback point;<br>- ignores the cost of capital, i.e. the time value of money. |
| Net present value (NPV) | The total present values of each of a project's cash flows, using a present value discount factor | - uses relevant cash flows;<br>- allows for the time value of money;<br>- absolute measure, and therefore useful for comparison. | - requires estimate of the cost of capital. |
| Internal rate of return (IRR) | A discount factor at which the NPV becomes zero | - Does not need the estimate of the cost of capital. | - no account is taken of the size of the project;<br>- it is difficult to use if changes in the cost of capital are forecast. |
| Discounted payback | The point where the cumulative value of a project's discounted cash flows becomes positive | - considers liquidity;<br>- looks only at relevant cash flows;<br>- allows for the time value of money. | - requires estimate of the cost of capital;<br>- ignores cash flows that occur after the payback point. |

Additional factors impacting on investment criteria calculations are: the effect of inflation on the cost of capital; working capital requirements; length of project; taxation and risk and uncertainty. After the implementation of the project some authors propose the ex-post evaluation (Boardman et al., 2011, pp. 69-84; Anguera, 2006, pp. 291-315; Taroux et al., 2005, p. 14; Meunier, 2010, pp. 1-16). They concluded that ex-ante and ex-post BCAs comparison studies are potentially the most useful studies for learning about the accuracy and efficacy of cost-benefit analysis for decision-makers and evaluators. Their major findings were that ex-post BCAs are difficult because

of the problem of replicating the reference situation, particularly regarding traffic, and that there are divergences between the forecasted benefits and costs and their actual outcomes. A. Boardman et al. (Ibid.) found that contrary to what might have been expected, the largest source of differences between ex-ante and ex-post BCA evaluations was not errors in forecasts or differences in the evaluation of intangible benefits but rather the major differences between the declared and actual construction costs of the project. That is, the largest errors arose from what most analysts would have thought were the most reliable figures entered into the BCA (Odeck & Kjerkreit, 2019, pp. 277-294). The most recent study (Kelly et al., 2015, pp. 83-91) reported ex-post BCA studies of projects across European countries.

They studied the project-level outcomes with respect to the BCAs of 10 large transport projects spread over eight countries. They compared the ex-ante and ex-post cost-benefit analyses and found that although much attention in the literature has been paid to the issue of optimism bias over the last decade, optimism bias remained prevalent. The ex-ante BCAs yielded significantly higher NPV results compared to the ex-post results. They also found a clear need to improve the quality and consistency of ex-ante analyses, particularly in the areas of capital cost estimation, travel demand modelling and risk analyses. As the literature review shows there are ample works regarding the evaluation of investment projects in transport sector in general. However, as the research showed there are only capacity (throughput of cargo) increasing, minimizing congestion projects case studies, and no general competitiveness increasing project evaluation frameworks designed specifically for seaports. Thus, this paper's purpose is to develop evaluation framework for seaport's competitiveness increasing investment projects.

## 2. RESEARCH METHODOLOGY

In the course of the analysis on the investment projects evaluation models the systematic, comparative and logical analysis of the scientific literature has been employed. The scientific literature was selected by relevance to the topic. The theoretical data processing method has been used to summarize and present conclusions. In our previous research we created the evaluation model of seaports' performance that enabled assessing the financial situation of the organisation and determining its position in the market in relation to its competitors (Ignasiak-Szulc et al*.,* 2018, pp. 571-579). The proposed economic model assesses the financial and economic status of the ports, and, based on the calculated evaluation index, allows determining the situation of a particular port in relation to its competitors and identifying correlations among various aspects of evaluation.

In this paper we adopt and extend the Project Evaluation Holistic Framework for seaports' competitiveness increasing projects. We incorporate the evaluation model of seaports' performance phase, as the "trigger", to identify the need for investment. The benchmarking approach used in the model conveys the main determinants in selecting the most relevant and effective investment decision. Also we adopt the ex-ante and ex-post BCAs techniques in the frame of determining the project's feasibility and projects success respectively.

## 3. RESULTS

The developed Framework for seaport's competitiveness increasing investment projects consists of six stages (see figure 1).

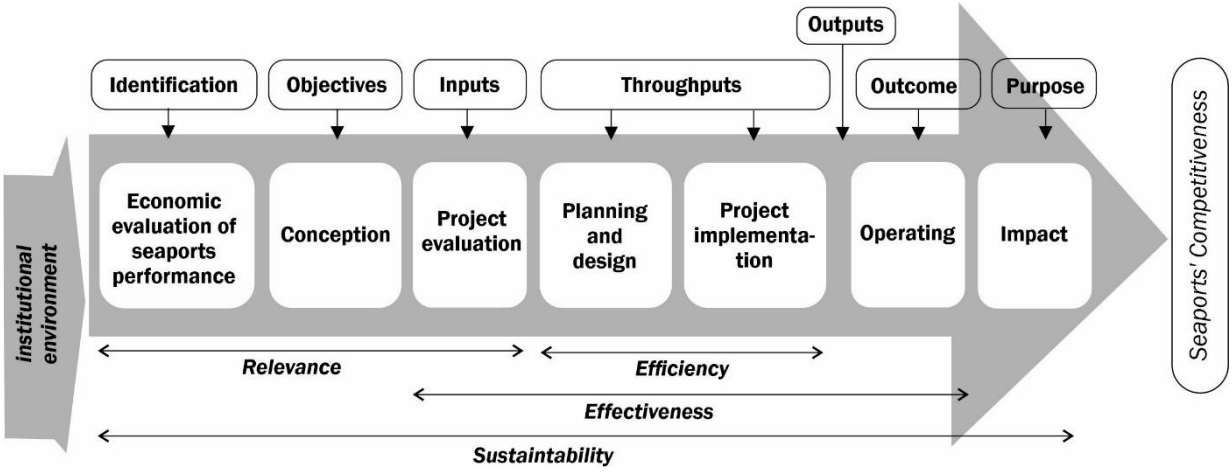


**Figure 1.** Seaport's competitiveness increasing investment projects evaluation framework

Source: created by the authors based on Project evaluation holistic framework suggested by Zidane et al., 2015, pp. 409-416; Draskovic, 2019; p. 229.

Economic evaluation of seaports performance stage identifies the need for investment and main determinants. The Conception stage consists of formulating the investment projects to satisfy the need. Project evaluation is performed with the help of Ex-ante BCA of suggested projects and/or investment alternatives (object, time scale, etc.). During this stage of project assessment the financial and socio-economic evaluation takes place:

- determining total investment cost;
- project implementation timeframe (relevance);
- CF generated by the project;
- payback;
- discount factor;
- NVP;
- IRR;
- discounted payback.

All calculations are made taking into consideration such factors as inflation, taxation, risk and uncertainty (optimistic, pessimistic, realistic scenarios). Total investment cost and generated CF are calculated using the model suggested by Balliauw & Matteo (2019, pp. 249-264). The model equations are summarised in Figure 2.

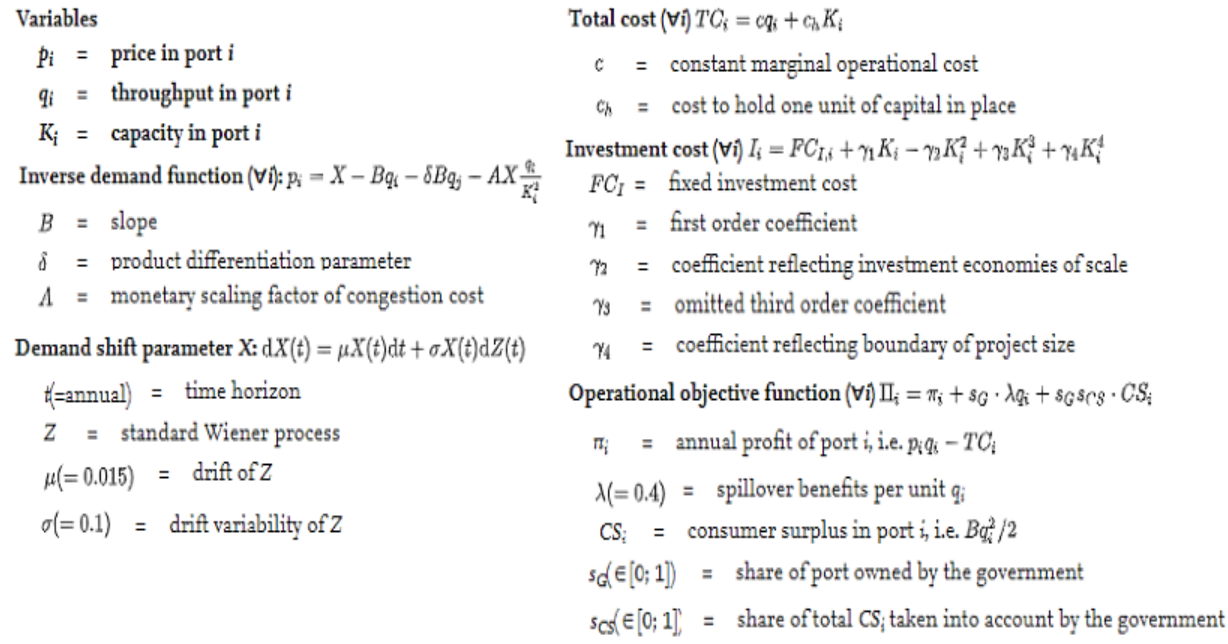


**Figure 2.** Balliauw & Matteo Model overview

Source: Balliauw & Matteo, 2019, pp. 249-264.

The product market's heterogeneity is expressed through the differentiation parameter δ in the inverse demand function, giving rise to the full price or gross willingness to pay, $\rho_i$, for port i at time t (Xiao et al., 2012, pp. 629-652; Kamoto & Okawa, 2014, pp. 503-522): $p_i(t) = X(t) - B_{q_i}(t) - ?\,?\,B_{q_j}(t) - AX\frac{q_i}{K_i^2}$ with X being the demand shift parameter, $q_i$ the throughput of port i and $q_j$ the throughput of port j ($j \neq i$) and $AX\frac{q_i}{K_i^2}$ being the congestion unit cost term. Depending on the location and services of the ports, parameter δ can vary between zero and one. In the case of an isolated port not experiencing competition from another port, e.g., a sole port on an island, δ would equal 0 and the model would simplify to a monopoly model. For two ports at the same location and offering the same services, δ would equal 1.

Since the situations with both private and public ports are considered, it is not sufficient to only consider annual profit $\pi_i = (p_i - c) \cdot q_i - c_h K_i$ (with c the marginal operational cost and $c_h$ the capital holding cost) maximisation, which is the objective of a private port. Governments also consider positive externalities or local spill over benefits per unit of throughput handled (e.g. employment and local industry growth), and consumer surplus in their social welfare ($SW_i$) maximisation (Xiao et al., 2012, pp. 629-652; Jiang et al., 2017, pp. 112-130). Social welfare generated by port i is calculated as the sum of the profit of port i, the spill over benefits $\lambda \cdot q_i$ and a share $s_{CS}$ of consumer surplus generated by port i ($CS_i$), since some governments only consider the part that is relevant for the region they govern.

Planning and design stage means choosing the best investment option and design of the selected project. During project implementation stage project management is the main focus, in order to implement the project in decided timeframe and not to exceed the budget. Operating stage determines the true outcome of the project and if the desired impact was reached. During this stage the ex-post BCA is performed in order to learn about the accuracy and efficacy of ex-ante BCA.

## CONCLUSIONS

In order to implement competitiveness increasing strategy in seaports various investment projects should be considered and evaluated to determine the most effective solutions. When talking about evaluation of a project, it is relevant to look at, among other things, the degree of success (and/or failure) that is associated with the whole project endeavour. This paper analyses the project evaluation methods and develops evaluation framework for seaport's competitiveness increasing investment projects.

The evaluation framework consists of six stages. Economic evaluation of seaports performance stage identifies the need for investment and main determinants. Taking into consideration that seaports operate in highly competitive environment it is important to determine the situation of a particular port in relation to its competitors and identify correlations among various aspects of evaluation. The benchmarking approach used in the model conveys the main determinants in selecting the most relevant and effective investment decision. The Conception stage consists of formulating the investment projects to satisfy the need. Project evaluation is performed with the help of Ex-ante BCA of suggested projects and/or investment alternatives (object, time scale, etc.). Planning and design stage means choosing the best investment option and design of the selected project. During project implementation stage project management is the main focus, in order to implement the project in decided timeframe and not to exceed the budget. Operating stage determines the true outcome of the project and if the desired impact was reached. During this stage the ex-post BCA is performed in order to learn about the accuracy and efficacy of ex-ante BCA.

The developed investment project evaluation framework can be used both in private and public seaports. It enables the decision makers to correctly assess the situation, the need for investments, the total amount of the capital needed, the implementation timeframe and project scale in accordance with investment project relevance; determine the payback period, cash flows and social welfare generated by the project, their net present value, IRR and discounted payback period. The model also enables to assess additional factors impacting on investment criteria: the effect of inflation on the cost of capital; working capital requirements; taxation; risk and uncertainty. Ex-post BCA allows learning about the accuracy and efficacy of ex-ante BCA and if the purpose of the project was reached in order to better the evaluation technique for future investment projects.

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# The Impact of Government Spending Spillovers on Regional Economic Growth

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## ABSTRACT

The purpose of this study is to analyze the spatial effects that occur on inter-provincial regional government expenditure on regional economic growth in Indonesia. Its analyzed data from 33 provinces in Indonesia for the 2007-2018 period. This study implements a spatial panel data model that can generate spillover effects on regional government expenditure models. The implementation of the spatial panel data model in this study uses the Spatial Durbin Model (SDM) which utilizes the Maximum Likelihood Estimation Approach. The results of this study indicate that regional internal effects of government expenditure, investment, and education variables on regional economic growth in Indonesia are positive and significant. Further analysis in the form of spatial effects on the model empirically reveals that the abundant effects of economic growth, government spending, investment, and education contribute positively to the economic growth of neighbouring regions. This result contributes to the interdependence of local government policies, which implies that every policy made by a local government correlates with other neighbouring local governments.

## INTRODUCTION

The relationship between fiscal policy and economic growth is one of the crucial issues to study in various countries. Some of the objectives of implementing fiscal policy are to maintain the stability of macroeconomic conditions, to encourage long-term economic growth, (Tanzi and Zee, 1997) and to increase a country's economic development (Easterly and Rebelo, 1993). The implementation of government policies through fiscal policies is shown by the existence of various forms of policies on the side of government revenues and expenditures, which are oriented towards maintaining the stability and sustainability of the economic activity. Government strategies and policies in intervening in the economy can be done through tax collection and spending distri-

bution (Glomm and Ravikumar, 1997). Various forms of government fiscal policy will have an impact on economic activity, thereby spurring the country's economic growth for the better.

Significant changes in the government system from centralization to decentralization in Indonesia in 1999 had a significant impact on the policies and management of local government budgets so that regions became the main actors in the process of regional development through local government expenditure policies. This has a significant impact on regional economic development and is one form of delegation of authority from the central to regional policy process (Brodjonegoro and Asanuma, 2000). Studies related to fiscal decentralization in Indonesia show that (Pepinsky and Wihardja, 2011) generally improves economic performance in Indonesia. The fiscal policy carried out by the government through state revenue and expenditure is not only carried out accumulatively through central government policy. Fiscal policies were undertaken by local governments also have an important role as a means of increasing economic activity that will have an impact on people's welfare.

The development of studies related to the issue of government spending is shown by several preliminary studies related to the effects of spending on the education sector (Al-Yousif, 2008), while the health sector (Wang, 2011). In addition, the social sector was analysed by (Bellettini and Ceroni, 2000; Lee and Chang, 2006), while military spending was explored by (Dritsakis, 2004; Chang, Huang and Yang, 2011; Alptekin and Levine, 2012). Other related studies on effectiveness and efficiency of government spending on economic growth (Chen *et al.*, 2017), optimal government investment and economic growth (Shen, Yang and Zanna, 2018), and the important role of government spending on economic growth in Low-Income Countries. The development of the study is shown by eliciting the effect of interaction between regions in the model of government spending shown by (Baicker, 2005) using state data in US, (Peltzman, 2016) using data on counties in the US, (Zheng *et al.*, 2013) and (Yu *et al.*, 2011) in China and (Ojede, Atems and Yamarik, 2018) in the United States.

Finally, the development of the application of spatial econometrics models in Indonesia was conducted by (Vidyattama, 2013) who explored the regional per capita income convergence in the era of decentralization in Indonesia, and (Aritenang, 2014) who addressed the convergence of economic growth between provinces in Indonesia before and after decentralization. However, initial studies conducted in Indonesia related to this matter have not specifically analyzed the effects of government expenditure overflows on economic growth. Therefore, based on a study conducted by (Ojede, Atems and Yamarik, 2018), this study aims to analyze the effects of fiscal policy represented through government spending by applying spatial modelling to observe the effects of neighbourly interactions modelled with the spatial econometrics approach so as to capture the effects of overflow of neighbouring regions in the model. This is implemented through an empirical study of spatial issues in regional expenditure policies in Indonesia that aims to become an initial empirical study on this issue using a spatial model.

## 1. LITERATURE REVIEW

In general, the correlation between government fiscal policies and the state of the country's economy are not only shown through the relation of aggregate state expenditure policies. Several studies related to the effects of fiscal policy on economic growth were carried out by analyzing fiscal structures (Easterly and Rebelo, 1993), fiscal decentralization and local economic growth (Zhang and Zou, 1998). In addition, some studies analyzed the structure of government expenditure and economic growth using the endogenous growth model (Park and Philippopoulos, 2003). The difference in fiscal structure is a form of government policy to choose the orientation of the largest and smallest expenditure that must be issued to fund various policies. Studies related to the effects of spending on the education sector were conducted by (Al-Yousif, 2008), while the health sector was addressed by (Wang, 2011). In addition, the social sector was analysed by

(Bellettini and Ceroni, 2000; Lee and Chang, 2006), while military spending was explored by (Chang, Huang and Yang, 2011; Alptekin and Levine, 2012). This shows that the analysis of the composition of government spending is an important determinant of economic growth.

The government expenditure studies are developed by dividing the composition of these expenditures into various forms, such as analysis (Gerking and Morgan, 1998) on the fiscal structure of the state to achieve state development policies. The composition of other fiscal structures is shown by (Dritsakis, 2004) analyzing military spending on growth. The structure of revenue and expenditure becomes an important aspect (Zagler and Durnecker, 2003), which will have an impact on long-term economic growth (Butkiewicz and Yanikkaya, 2011), effectiveness and efficiency of government spending on economic growth (Chen *et al.*, 2017), optimal government investment and economics growth (Shen, Yang and Zanna, 2018), and the important role of government spending on economic growth in Low-Income Countries. This identification shows the development of studies that are not focused on composition but rather emphasize the effectiveness and efficiency in management that affect economic growth.

Fiscal policy in developing countries is an important aspect because the government has a dominant role in driving the economy. The study by (Mundle, 1999) represents the issue of fiscal policy in developing countries in Asia, which indicates a policy transition that is not only focused on taxation policy but also related to the distribution of expenditures that are oriented towards economic growth. The political side is also an important factor in the distribution of government spending that drives the implementation of government democracy, which will have a positive impact on government spending on the healthy side (Laiprakobsup, 2019). Studies related to fiscal policy in Indonesia show (Vidyattama, 2010) that local government investment spending has an impact on regional economic growth. In this line, (Sriyana, 2016) analyzed the optimum size of government spending in Indonesia, while (Lewis, 2013) revealed that central government transfer funds to regions had an impact in stimulating local government capital expenditure.

The development of spatial models in economic analysis is an important aspect because interactions between regions cannot be excluded in the model. Some preliminary studies were conducted to analyze the determinants of economic growth by bringing up spatial aspects in the economic growth model as that conducted by (Rey, 2001) related to income distribution, (LeSage and Fischer, 2008) that analysed several models of economic growth by spurring spatial effects in the model, and a study by (Bai, Ma and Pan, 2012; Wenqing, 2013) using spatial models to analyze the factors that cause regional income growth. The study on the development of a determinant model of economic growth and its effects that specifically analyses the impact of government spending on neighbouring region was conducted by (Baicker, 2005) who analysed the effects of state spending that cause interstate spillovers and (Peltzman, 2016) who explored the effects of fiscal policy connectivity between states and localities. Some researches related to the development of spatial models were conducted by (Zheng *et al.*, 2013). Meanwhile, spatial effects of government infrastructure spending in China was conducted by (Yu *et al.*, 2011) that analyzed the main effects of public investment on growth with the model spatial, and (Ojede, Atems and Yamarik, 2018) explored the effects of an overflow of government spending on the state of economic growth in the United States. The follow-up study showed that the development of spatial models in the analysis of fiscal policy became something important to do.

# 1. RESEARCH METHOD

## 1.1 Data

This research is an empirical study that used secondary data as a basis for estimating models. The study used panel data of 33 provinces in Indonesia in the period of 2007-2018. All data used

in this study were obtained from the Indonesia Central Statistics Agency (BPS). Specifically, the variables used in this study were:

**Table 1.** Definitions of Variables

| *Variable* | *Symbol* | *Unit* | *Description* |
|---|---|---|---|
| Regional Gross Domestic Product | $\ln rgdp_{i,t}$ | Billions | Real GRDP per province based on 2010 constant prices. |
| Government Expenditures | $\ln ge_{i,t}$ | Billions | Total funds for the realization of expenditures to finance government activities in the span of one year. |
| Foreign Direct investment | $\ln fdi_{i,t}$ | Billions | Investment activity to conduct business in the territory of the Republic of Indonesia which is carried out by foreign investors, both those who use foreign capital fully, and those who are affiliated with domestic investors. |
| Numbers of Literacy | $lit\_rate_{i,t}$ | Percent | The proportion of the population aged 15 years and over who has the ability to read and write Latin letters and other letters compared to the population aged 15 years and over. |
| Population density | $pdens_{i,t}$ | Person/km$^2$ | Comparison of the number of inhabitants with the area based on certain units of area |

**Sources:** Indonesia Central Statistics Agency

## 1.2 Research Model

According to (Elhorst, 2014) the basic form of the spatial model may be divided into endogenous interaction effects, exogenous interaction effects, and interaction effects among error terms. On this basis, this study used the Spatial Autoregressive Model (SAR), Spatial Error Model (SEM) and Spatial Durbin Model (SDM) classification models.

### Non-Spatial Panel Model

The formation of the basic model is shown by the relationship between the basic factors forming economic growth (ln_rgdp) as indicated by government spending (ln_ge), investment (ln_fdi), education (lit_rate) and population (pdens).

$$\ln rgdp_{i,t} = \alpha_t + \beta_1 \ln ge_{i,t} + \beta_2 \ln fdi_{i,t} + \beta_3 lit\_rate_{i,t} + \beta_4 pdens_{j,t} + \mu_i + \upsilon_{i,t} \quad (1)$$

### SAR model

The Spatial Autoregressive model indicates the spatial aspects of the dependent value of the variable for the neighbouring area as shown in the following model:

$$\ln rgdp_{i,t} = \alpha_t + \rho \sum_{j=1}^{N} W_{ij} \ln rgdp_{j,t} + \beta_1 \ln ge_{i,t} + \beta_2 \ln fdi_{i,t} + \beta_3 lit\_rate_{i,t} + \beta_4 pdens_{i,t} + \mu_i + \upsilon_{i,t} \quad (2)$$

The value of $\sum_{j=1}^{N} W_{ij} \ln gdp_{j,t}$ is a neighbouring effect in the autoregressive model. Thus, the value of ρ is the estimated analysed value to capture the spillover effect of spatial conditions on the autoregressive model.

### SEM Model

The development of the Spatial Error Model shows the spatial relationship on the error as shown in the following model:

$$\ln rgdp_{i,t} = \alpha_t + \beta_1 \ln ge_{i,t} + \beta_2 \ln fdi_{i,t} + \beta_3 lit\_rate_{i,t} + \beta_4 pdens_{i,t} + \mu_i + \upsilon_{i,t} \quad (3)$$

Where

$$\upsilon_{i,t} = \lambda \sum_{j=1}^{N} W_{ij}\, \varepsilon_{jt} + \varepsilon_{i,t}$$

The value of $\sum_{j=1}^{N} W_{ij}\, \varepsilon_{j,t}$ is the neighbourly effect on the model error so that the value of λ is the estimated value analyzed to capture the spatial conditions in the error model.

### SDM Model

The neighbourly effect represented by the abundance effect is shown in the SDM model. This model has an overflow effect on the independent variable which is indicated by the coefficient value of θ.

$$\begin{aligned} \ln rgdp_{i,t} = {} & \alpha_t + \rho \sum_{j=1}^{N} W_{ij} \ln rgdp_{j,t} + \beta_1 \ln ge_{i,t} + \beta_2 \ln fdi_{i,t} + \beta_3 lit\_rate_{i,t} + \beta_4 pdens_{i,t} \\ & + \mu_i + \upsilon_{i,t} + \theta_1 \sum_{j=1}^{N} w_{ij} \ln ge_{j,t} + \theta_2 \sum_{j=1}^{N} w_{ij} \ln fdi_{j,t} + \theta_3 \sum_{j=1}^{N} w_{ij}\, lit\_rate_{j,t} \\ & + \theta_4 \sum_{j=1}^{N} w_{ij}\, pdens_{j,t} + \mu_i + \upsilon_{i,t} \end{aligned} \quad (4)$$

## 1.3 Weight Matrix

The use of weight matrices in spatial analysis is one important aspect (Lesage, 2008) to quantify connections between regions formed into a matrix to project relations between regions. Theoretically (Getis, 2009) the nature of this W matrix must be exogenous and include the number of neighbours, the same side length, and the same perimeter proportion. This study used the simplest form is the spatial weight matrix where an area is valued as a 'neighbour' when they border part of one another (binary contiguity matrix). According to the proximity criteria, the spatial weight matrix ($wij$) element is one if location $i$ is close to location $j$, and vice versa. To facilitate interpretation, the spatial weighting matrix is standardized so that the sum of the values for the elements in a row is one.

$$w_{ij} \begin{cases} w_{ij} = 0\,;\ if\ i = j \\ w_{ij} = 0\,;\ if\ i\ unshared\ border\ j \\ w_{ij} = 1\,;\ if\ i\ shared\ j \end{cases}$$

## 1.4 Testing Steps

Initial testing to show the spatial autocorrelation occurring in the data was conducted using Moran's I Statistics that indicate spatial autocorrelation in the data. Spatial model testing was done to choose the best spatial model using the specific to a general method, based on a specific

estimation model which then performed restrictions on the parameter values to get the best model. This second method applied the Wald test or common factor test to perform the model restriction test. This study used the estimated specific model of the Spatial Durbin Model (SDM). Then, the value of the restriction parameter was analyzed to provide a more general model, the Spatial Autoregressive (SAR) or Spatial Error Model (SEM). Based on (Lesage and Pace, 2009) the specification of the model can be done by testing with the hypothesis of $H_0: \theta = 0$ and $H_0: \theta + \rho\beta = 0$. If the Wald Test on the hypothesis results in $H_0: \theta = 0$ which conclude failing to reject $H_0$, the SDM model can be simplified into SAR, and if the testing result of $H_0: \theta + \rho\beta = 0$ which conclude a failure to reject $H_0$, the SDM model can be simplified to SEM.

The implementation of the spatial model in this research was not only done by incorporating spatial elements in the economic growth model but also by using the panel data method to implement the SAR, SEM and SDM models with random effects and fixed effects (Elhorst, 2014). Spatial panel model estimation was done using maximum likelihood estimation which was theoretically developed by (Elhorst, 2003) and further modified by (Kapoor, Kelejian and Prucha, 2007). Empirically, the application of the maximum likelihood estimation model for the spatial panel model used in this study is to apply the "xsmle" module (Belotti, Hughes and Mortari, 2017).

## 2. RESULTS AND DISCUSSION

The initial conditions of the data shown by regional data for 33 provinces in Indonesia during the 2007-2018 period are shown in Table 2. The initial analysis is depicted from the data description indicating the average, standard deviation, minimum and maximum of each variable. The descriptive analysis reveals that the well-distributed conditions of the data. The variables of economic growth, government expenditure, investment, education and population density highlights that the average value, standard deviation, minimum and maximum indicate data that are well distributed and there are no data values with the outlier conditions. The next step of the analysis was the analysis of the regional distribution of the main variables for two periods between the beginning and the end. This step, which is an important requirement in spatial analysis, was carried out by testing spatial autocorrelation using Moran's I statistics.

The following step was to analyze the distribution condition of the main variables, namely government spending and economic growth, which was represented through the distribution map for the period of 2007 and 2018. This was done as a means to illustrate the gap and increase in the composition between government spending and economic growth. A comparison of regional government spending conditions in Indonesia for the period between 2007 and 2018 is shown in Figure 1. It is indicated that in 2007 the high level of regional government expenditure in Indonesia was dominated by regions of Java, where almost all regions have relatively high levels of government expenditure. Meanwhile, the regional government spending on the island of Sumatra was relatively at the middle to a low level.

**Table 2.** Descriptive Statistic of the Data

| *Variable* | *Scope* | *Obs* | *Mean* | *Std. Dev.* | *Min* | *Max* |
|---|---|---|---|---|---|---|
| ln_rgdp | overall | 396 | 11.665 | 1.1831 | 9.421 | 14.367 |
| | between | | | 1.1823 | 9.770 | 14.041 |
| | within | | | 0.2023 | 11.185 | 12.126 |
| ln_ge | overall | 396 | 15.055 | 0.9754 | 12.805 | 18.081 |
| | between | | | 0.8381 | 13.786 | 17.281 |
| | within | | | 0.5182 | 13.306 | 16.156 |
| ln_fdi | overall | 396 | 4.842 | 2.3254 | -1.715 | 9.203 |
| | between | | | 1.7940 | 1.400 | 8.447 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | within | | | 1.5096 | -1.754 | 8.151 |
| lit_rate | overall | 396 | 94.204 | 5.7742 | 64.080 | 99.87 |
| | between | | | 5.6175 | 70.448 | 99.34 |
| | within | | | 1.6322 | 87.836 | 100.54 |
| pdens | overall | 396 | 710.340 | 2522.129 | 6.2654 | 15764.00 |
| | between | | | 2553.002 | 8.2087 | 14777.20 |
| | within | | | 157.548 | -1536.875 | 1697.138 |

Sources: Indonesia Central Statistics Agency, Processed

The government spending on the island of Kalimantan shows that East Kalimantan has a relatively high level of government expenditure, while other areas in Kalimantan are in the low range of government expenditure. A significant different trend can be seen from the distribution in the eastern parts of Indonesia which tends to have a relatively low level of local government expenditure. There have been slight changes and shifts in the distribution of government spending for 2018. This is indicated by the fact that the level of local government spending was still concentrated in Java. Another condition was shown by the concentration of government spending on the island of Sumatra, which was dominated by the western regions. Meanwhile, the middle area tends to be relatively fixed with a distribution in the middle range. Different results were shown by some regions in eastern Indonesia that tended to experience an increase in state spending.

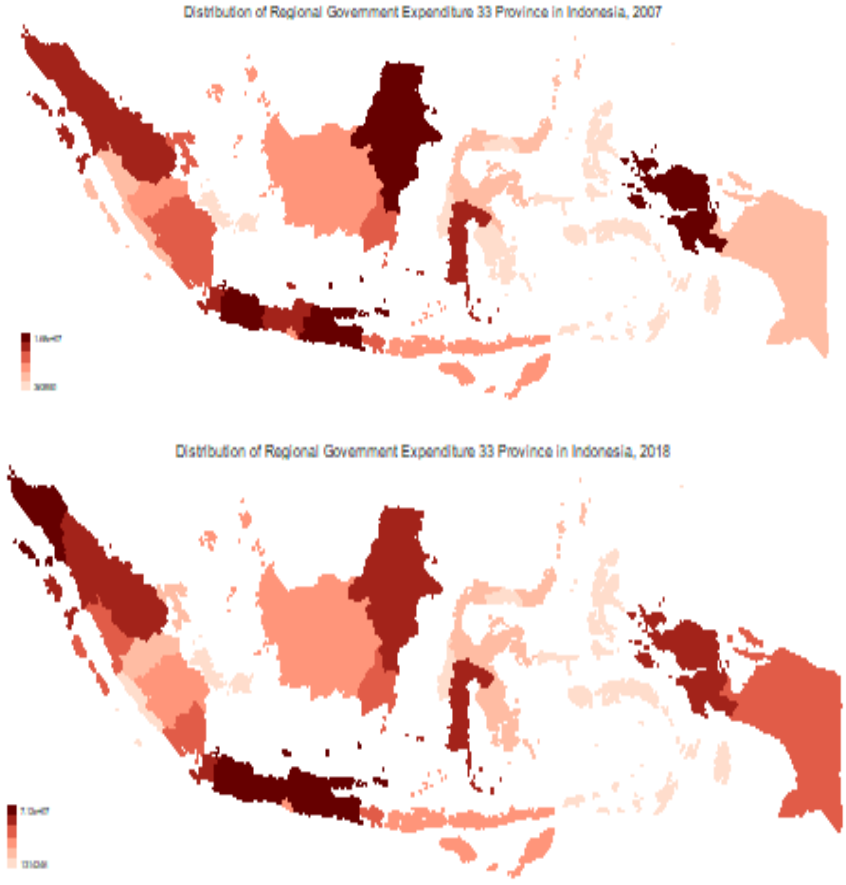
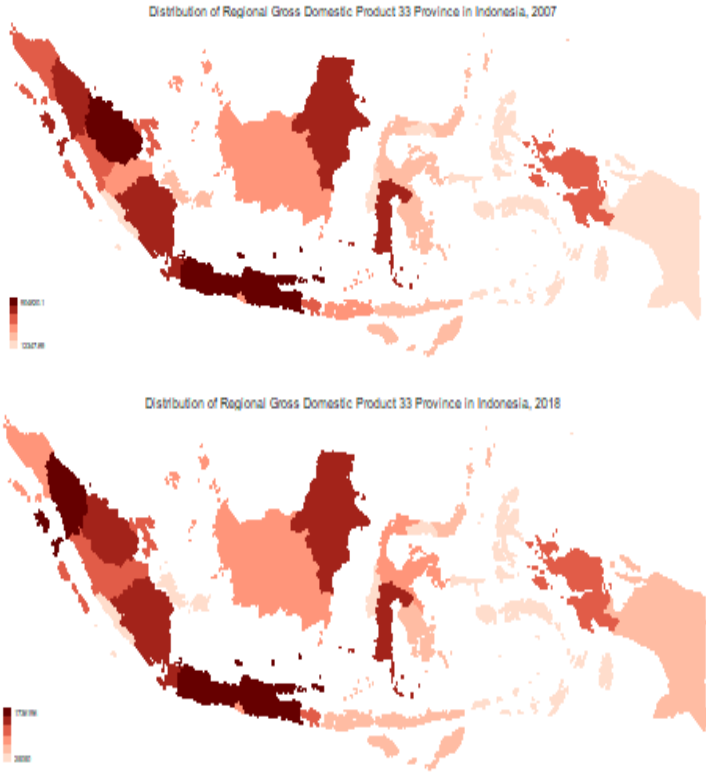



**Figure 1.** Distribution of Regional Government Spending in 33 Provinces of Indonesia

Sources: Indonesia Central Statistics Agency, Processed

The distribution of regional economic growth in Indonesia for the period between 2007 and 2018 is shown in figure 2. In 2007, the distribution of regional economic growth was not much different as compared to government spending. This was indicated by the high value of economic growth in almost all regions in Java and East Kalimantan islands. This condition shows that regions that have a relatively large tendency of government spending also have a large level of economic growth. In 2007, it was shown that most of the islands of Java showed high economic growth. Meanwhile, the central region on the island of Sumatra became the centre of growth. On the other hand, the growth centre in the eastern regions of Indonesia was shown by the South Sulawesi region. Similar conditions were highlighted in 2018, which showed a similar distribution as in 2007. The dominance of high growth rates was still dominated by Java and much of Sumatra, while eastern Indonesia relatively had low economic growth rates. This confirms (Hill, Resosudarmo and Vidyattama, 2008) which concluded that the Indonesian economic growth tends to be clustered and concentrated in Java.




Further analysis, which is an important step in spatial analysis, was to analyze the occurrence of spatial autocorrelation for the main variables used in the model because this is a prerequisite before spatial regression analysis was done in the model. The analytical tool used to see the relationship between variables in the spatial analysis was done by looking at the results of Moran's I statistics. The results of Moran 'I statistics for the two main variables in the study namely economic growth and government spending are shown in Table 3. The results show that in terms of economic growth variables, there is a positive and significant relationship for the whole year from 2007 to 2018. In other words, there is a tendency for regional groupings to have a high and low value in an area. Meanwhile, the same results were shown for government expenditure variables for 2007 to 2018 in that almost all years also showed positive and significant results of a positive spatial relationship in this variable. Based on this, the initial requirement of the data to have a spatial autocor-

relation is fulfilled, and thus making it possible to do further analysis to prove the spatial influence in the government expenditure model on economic growth.

**Table 3.** Moran's I Statistic

| *Year* | *Variables* | | | |
|---|---|---|---|---|
| | *Regional Growth* | | *Government Expenditure* | |
| | *I* | *p-values* | *I* | *p-values* |
| 2007 | 0.443 | 0.003 | 0.474 | 0.001 |
| 2008 | 0.444 | 0.003 | 0.105 | 0.212 |
| 2009 | 0.452 | 0.002 | 0.382 | 0.007 |
| 2010 | 0.443 | 0.003 | 0.38 | 0.007 |
| 2011 | 0.441 | 0.003 | 0.41 | 0.005 |
| 2012 | 0.442 | 0.003 | 0.397 | 0.006 |
| 2013 | 0.447 | 0.002 | 0.374 | 0.008 |
| 2014 | 0.448 | 0.002 | 0.495 | 0.001 |
| 2015 | 0.453 | 0.002 | 0.506 | 0.001 |
| 2016 | 0.46 | 0.002 | 0.53 | 0.000 |
| 2017 | 0.461 | 0.002 | 0.498 | 0.001 |
| 2018 | 0.467 | 0.002 | 0.515 | 0.001 |

Sources: Indonesia Central Statistics Agency, Processed

## 2.1 Non-Spatial Model of Government Spending on Economic Growth

Further analysis was done by modelling the effect of government spending on economic growth with a model without spatial interaction. It was followed by analyzing the existence of spatial relationships in the model. The results of the non-spatial model are shown in Table 4, which uses the non-spatial panel model approach for three models, namely common effect, random effect and fixed effect. The model specification was done by conducting initial testing on non-spatial models of LM tests to examine the common and random effects models that show significant results with a probability of 0.000. On this basis, the random effect model was chosen. Then, it was followed by an F-test to analyze the choice between the models of common and fixed effects that show significant results with a probability of 0.000, on which basis the fixed effect model was chosen. The further test to choose between random effects and fixed effects was done by performing a hausman test which showed significant results because it had a probability value of 0.0014. This indicated that the best model for non-spatial models was the fixed effect model. Based on the initial analysis, the best model that can be interpreted in the non-spatial model was the fixed effect model.

**Table 4.** Result of Non-Spatial Model

| VARIABLES | Dependent Variable: ln_rgdp | | |
|---|---|---|---|
| | Common | Random | Fixed |
| ln_ge | 0.775*** | 0.236*** | 0.217*** |
| | (0.0467) | (0.0157) | (0.0145) |
| ln_fdi | 0.127*** | 0.0300*** | 0.0289*** |
| | (0.0188) | (0.00398) | (0.00354) |

| | | | | | |
|---|---|---|---|---|---|
| lit_rate | -0.00761 | | 0.0227*** | | 0.0288*** |
| | (0.00567) | | (0.00451) | | (0.00422) |
| pdens | 2.93e-05** | | 0.000116*** | | 0.000102*** |
| | (1.40e-05) | | (2.31e-05) | | (2.76e-05) |
| Constant | 0.0759 | | 5.752*** | | 5.467*** |
| | (0.901) | | (0.324) | | (0.286) |
| Chow Test | | | | | |
| F-test | | | 668.68 | | |
| Prob>F | | | 0.0000 | | |
| LM-Test | | | | | |
| Chibar | | 852.46 | | | |
| Prob | | 0.0000 | | | |
| Hausman | | | | | |
| Chi2 | | | | 17.76 | |
| Prob>chi2 | | | | 0.0014 | |
| Observations | 396 | | 396 | | 396 |
| R-squared | 0.734 | | 0.5092 | | 0.844 |
| Number of ID_Prov | 33 | | 33 | | 33 |

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Sources: Indonesia Central Statistics Agency, Processed

The specifications of the non-spatial model highlight that the fixed effects model is the best model to be interpreted. The results of the fixed effect model show that all variables, namely government spending, investment, education and population have a positive and significant value at the level of 1 percent. The coefficient value of government expenditure that is equal to 0.217 indicates the value of the magnitude of the effect if an increase in government spending has implications for regional economic growth in Indonesia. These results are in line with the research by (Zagler and Durnecker, 2003) and (Shen, Yang and Zanna, 2018) related to cases in developing countries but not in line with (Vidyattama, 2010) which concluded the negative effects of government spending on economic growth. This insinuates that the local government is one of the actors who has a central role in spurring economic growth by making the right expenditure according to its appropriate portion.

A positive coefficient value of 0.0289 is indicated by investment variables with a slighter degree of implications as compared to the effects of government spending. These results are in line with studies of (Li and Liu, 2005) and (Anwar and Nguyen, 2014). The investment effect empirically shows that the regional economic growth in Indonesia is also supported by foreign factors in terms of investment from outside parties. The effects of the control variables of education and population density with coefficients of 0.0288 and 0.000102, respectively, indicate that the positive contribution of the two variables to economic growth is relatively smaller than the value of government spending.

## 2.2 Spatial Model of Government Expenditure on Economic Growth

The next analysis step of the model was done by taking into account the external conditions of the region or the effects of interactions between regions namely the spatial autoregressive effects or spatial effects on other variables. This is indicated from the regional interaction factor as one form of development in the spatial model. The results of this relationship are shown in table 4 which illustrates the spatial models in several forms, namely the spatial autoregressive model (SAR), spatial error model (SEM) and spatial durbin model (SDM). The spatial relations concept was

simply applied by the concept of neighbourliness as a condition where regions share the same boundary area. On this basis, this model used the weight matrix contiguity.

Model specifications were performed to find out the best model to be interpreted in a spatial model. The first model specification was carried out to specify the appropriate spatial model using the general to a specific approach. This test uses a wald test as a means to restrict general models. The test was based on the Spatial Durbin Model (SDM) in accordance with the steps indicated by (Lesage and Pace, 2009) with a hypothesis if the wald test rejects the null hypothesis that $\theta + \rho\beta = 0$, the SEM model is used and if the Wald test rejects the null hypothesis that $\theta = 0$, the model chosen is the SAR model. Based on the results of the Wald test in table 4 for the hypothesis of $\theta + \rho\beta = 0$, the p-value is 0.000, which rejects the null hypothesis. In other words, the model selected is SDM. Based on the Wald test for the hypothesis of $\theta = 0$, the p-value is 0,000, thus rejecting the null hypothesis, so the best model is the SDM model. The next step was to conduct a test to choose the random effect and fixed-effect models using the Hausman Test based on the SDM model. The results of the Hausman test for the SDM model obtained a p-value of 0,000 which rejects the null hypothesis. Therefore, the best model that can be interpreted is the SDM model with fixed effects.

**Table 5.** Results of Spatial Model

| *VARIABLES* | *Dependent Variable: ln_rgdp* | | | | | |
|---|---|---|---|---|---|---|
| | *SAR RE* | *SAR FE* | *SEM RE* | *SEM FE* | *SDM RE* | *SDM FE* |
| ln_ge | 0.165*** | 0.147*** | 0.189*** | 0.183*** | 0.163*** | 0.151*** |
| | (0.0137) | (0.0126) | (0.0158) | (0.0152) | (0.0142) | (0.0132) |
| ln_fdi | 0.0227*** | 0.0207*** | 0.0258*** | 0.0253*** | 0.0196*** | 0.0195*** |
| | (0.00306) | (0.00285) | (0.00344) | (0.00329) | (0.00325) | (0.00302) |
| lit_rate | 0.0261*** | 0.0260*** | 0.0238*** | 0.0250*** | 0.0270*** | 0.0252*** |
| | (0.00352) | (0.00332) | (0.00393) | (0.00378) | (0.00365) | (0.00343) |
| pdens | 7.45e-05*** | 6.71e-05*** | 0.000103*** | 9.60e-05*** | 7.76e-05*** | 7.23e-05*** |
| | (2.26e-05) | (2.18e-05) | (2.30e-05) | (2.34e-05) | (2.28e-05) | (2.21e-05) |
| Constant | 4.044*** | | 6.382*** | | 4.564*** | |
| | (0.368) | | (0.353) | | (0.397) | |
| rho | 0.267*** | 0.348*** | | | 0.218*** | 0.341*** |
| | (0.0305) | (0.0267) | | | (0.0475) | (0.0455) |
| lambda | | | 0.428*** | 0.442*** | | |
| | | | (0.0611) | (0.0582) | | |
| Wln_ge | | | | | 0.0110 | -0.0111 |
| | | | | | (0.0182) | (0.0173) |
| Wln_pma | | | | | 0.0128*** | 0.00481 |
| | | | | | (0.00481) | (0.00451) |
| Wlit_rate | | | | | -0.00367 | 0.00230 |
| | | | | | (0.00463) | (0.00443) |
| Wpdens | | | | | -9.28e-06 | -2.72e-05 |
| | | | | | (3.36e-05) | (3.21e-05) |
| Hausman | | | | | | |
| Chi2 | 22.07 | | 0.13 | | 16.50 | |
| Prob>chi2 | 0.0003 | | 0.9980 | | 0.0002 | |
| Wald Test | | | | | | |
| $\rho = 0$ | 76.73 | 169.94 | | | 21.00 | 56.20 |
| | 0.0000 | 0.0000 | | | 0.0000 | 0.0000 |
| $\lambda = 0$ | | | 49.07 | 57.57 | | |
| | | | 0.0000 | 0.0000 | | |
| $\theta + \rho\beta = 0$ | | | | | 9.10 | 7.90 |
| | | | | | 0.0026 | 0.0049 |
| Observations | 396 | 396 | 396 | 396 | 396 | 396 |

| | | | | | | |
|---|---|---|---|---|---|---|
| R-squared | 0.287 | 0.324 | 0.477 | 0.473 | 0.319 | 0.310 |
| Number of Cross ID | 33 | 33 | 33 | 33 | 33 | 33 |

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Sources: Indonesia Central Statistics Agency, Processed

The estimation results shown in Table 5 for the fixed effect SDM model column indicate a spatial autoregressive effect that represents an abundance of economic growth. The empirical results show that the estimated coefficient value for the economic growth of the neighbouring region ($\rho$) shows positive and significant results of 0.341. This is an indication that when the neighbouring region experiences an increase in economic growth, it will increase the economic growth of the neighbouring region. These results confirm the results of the study by (LeSage and Fischer, 2008) which showed the existence of autoregressive spatial effects in the model. This has an impact on the role of the government in creating regional economic growth centres that are expected to support economic growth in the neighbouring regions.

## 2.3 Interprovincial Spatial Effect in All-Region

Based on the results of the model specifications, the SDM model with fixed effects is the appropriate basis for interpreting the results of spatial model analysis. Spatial regression results for the SDM FE model show two main results, namely the direct effect representing the internal effects of the area and the indirect effect that shows the effect of spatial interaction with neighbouring regions. Based on (Elhorst and Vega, 2013) the results of spatial effects of abundance between regions referring to the fact that the value of regional internal effects and neighbourly abundance effects on the SDM model is not shown by the parameter coefficient values ($\beta$ and $\theta$) on the SDM model, but are indicated by the continued estimated value which produces the value of direct effect. This is the value of the effect arising from the internal variables of the area, while the indirect effect is an external effect or abundance of neighbourliness and the total effect is the accumulated value of direct and indirect effects. The estimation results of non-spatial effects caused by regional internal factors are in line with the results shown in Table 4. The results of regional internal effects highlight that government spending, investment, education and population density are positive and statistically significant. In general, the results of spatial effects represented through the presence of external effects from neighbouring regions are determined by the positive and significant value of the variable of government expenditure, investment, and education, while population density has no external impact.

**Table 6.** The Spatial Effect

| *VARIABLES* | *Direct Effect* | *Indirect Effect* | *Total Effect* |
|---|---|---|---|
| ln_ge | 0.1571*** | 0.0431*** | 0.2001*** |
| | (0.0128) | (0.0149) | (0.0201) |
| ln_fdi | 0.0211*** | 0.0120*** | 0.0330*** |
| | (0.00305) | (0.00413) | (0.00520) |
| lit_rate | 0.0269*** | 0.0116*** | 0.0385*** |
| | (0.00328) | (0.00408) | (0.00562) |
| ln_pdens | 7.09e-05*** | -4.89e-06 | 6.61e-05 |
| | (2.32e-05) | (3.40e-05) | (4.73e-05) |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Sources: Indonesia Central Statistics Agency, Processed

Table 6 reveals the direct, indirect, and total effects of the SDM model estimation indicating that the influence of government spending variables on economic growth has a direct effect of a positive and significant result of 0.1570, while the indirect effect also indicates the positive and significant value of 0.0431. This shows the tendency that the influence of government spending on regional economic growth is dominated by internal effects caused by the region amounting to 78.5% of the total effects and external effects or abundance of government spending that is equal to 21.5% of the total effects. In other words, it is conclusive that the expenditure of neighbouring regional governments has a positive contribution to the economic growth of other regions so that the increasing economic growth in a region is also determined by the fiscal policies of other regions. The results of this study are in line with and confirm the results of the study by (Baicker, 2005) and (Ojede, Atems and Yamarik, 2018), which specifically show indirect effects for productive government spending on neighbouring regions.

The effect of investment variables on economic growth shows that there is a positive and significant direct effect with a value of 0.0211, while the indirect effect value indicates a value that is also positive and significant at 0.0120. This highlights that the internal effect of the investment area contributed to 63.93%, and the effect of the abundance originating from the investment in the neighbouring region contributed to 36.37%. These results confirm the results of the previous research conducted by (Ouyang and Fu, 2012), which revealed the existence of interstate spill over for FDI. This condition shows the important role of investment, which not only can increase the internal economic growth of the region but also can encourage the economic growth of the neighbouring regions.

The effect of the education variable on economic growth indicates that there is a positive and significant direct effect with a value of 0.0269, while the indirect effect also indicates a positive and significant value at 0.0116. This shows that the internal effects of the education area contributed 69.87% and the effect of the abundance of education derived from the neighbouring regions contributed to 30.13%. These results confirm the study conducted by (Ramos, Suriñach and Artís, 2010) related to the effects of abundant human capital on regional economic growth. This condition insinuates that urban areas tend to have residents with higher levels of education that will spur the migration process to neighbouring regions. As a result, this will increase the productivity of neighbouring regions. A different result is shown by population density variables that lead to statistically insignificant results. On this basis, it is conclusive that population density does not have an internal and external impact on regional economic growth.

## 2.4 Interprovincial Spatial Effect Within Region

There is a tendency that spatial interactions will occur between regions with geographical proximity. Therefore, to have a more in-depth analysis of the spatial effects between provinces in a particular region, 33 provinces in Indonesia will be divided into 5 large regions based on the areas of islands surrounding these regions. Estimates in the 5 island areas are based on the previous model specifications indicating that the best model to use is the SDM model with fixed effects. Hence, the estimation results in the 5 regions are based on the results of spatial effects, namely direct, indirect and total effect. The estimation results are shown in Table 7, which shows a comparison of results between provinces in terms of a national scale and between provinces in each region for the 5 major regions in Indonesia.

**Table 7.** Comparation of Spatial Effect for All Regions and 5 Regions in Indonesia

| VARIABLES | Indonesia | | | Sumatera | | | Jawa and Bali | | |
|---|---|---|---|---|---|---|---|---|---|
| | Direct Effect | Indirect Effect | Total Effect | Direct Effect | Indirect Effect | Total Effect | Direct Effect | Indirect Effect | Total Effect |
| ln_ge | 0.1571*** | 0.0431*** | 0.2001*** | 0.0717*** | -0.0231 | 0.0486* | 0.217*** | 0.119*** | 0.337*** |
| | (0.0128) | (0.0149) | (0.0201) | (0.0207) | (0.0215) | (0.0294) | (0.0222) | (0.0319) | (0.0345) |
| ln_fdi | 0.0211*** | 0.0120*** | 0.0330*** | 0.0250*** | 0.00624 | 0.0312*** | -0.0270*** | -0.0231** | -0.0501*** |
| | (0.00305) | (0.00413) | (0.00520) | (0.00626) | (0.00867) | (0.0105) | (0.00553) | (0.0106) | (0.0141) |
| lit_rate | 0.0269*** | 0.0116*** | 0.0385*** | 0.0889*** | 0.0288*** | 0.118*** | 0.0384*** | -0.0250*** | 0.0134 |
| | (0.00328) | (0.00408) | (0.00562) | (0.0100) | (0.0111) | (0.0107) | (0.00502) | (0.00903) | (0.00976) |
| pdens | 7.09e-05*** | -4.89e-06 | 6.61e-05 | 1.90e-07 | -0.000116** | -0.000115 | 5.97e-05*** | 6.81e-06 | 6.65e-05* |
| | (2.32e-05) | (3.40e-05) | (4.73e-05) | (5.92e-05) | (4.82e-05) | (8.05e-05) | (1.42e-05) | (2.74e-05) | (3.85e-05) |
| Observation | 396 | 396 | 396 | 120 | 120 | 120 | 84 | 84 | 84 |
| Group | 33 | 33 | 33 | 10 | 10 | 10 | 7 | 7 | 7 |
| VARIABLES | Kalimantan | | | Sulawesi | | | NT, Maluku and Papua | | |
| | Direct Effect | Indirect Effect | Total Effect | Direct Effect | Indirect Effect | Total Effect | Direct Effect | Indirect Effect | Total Effect |
| ln_ge | 0.167*** | -0.0686* | 0.0982*** | 0.0722*** | 0.189*** | 0.261*** | 0.240*** | 0.0295 | 0.270*** |
| | (0.0314) | (0.0390) | (0.0339) | (0.0220) | (0.0481) | (0.0621) | (0.0365) | (0.0382) | (0.0464) |
| ln_fdi | 0.00580 | 0.0153** | 0.0211*** | 0.0105*** | 0.0285*** | 0.0390*** | 0.0262*** | 0.000964 | 0.0272*** |
| | (0.00590) | (0.00774) | (0.00594) | (0.00349) | (0.00777) | (0.00960) | (0.00680) | (0.00470) | (0.00641) |
| lit_rate | -0.0223 | 0.0595** | 0.0372** | 0.00547 | 0.0265** | 0.0319*** | 0.00931 | 0.000799 | 0.0101** |
| | (0.0216) | (0.0263) | (0.0181) | (0.00524) | (0.0111) | (0.0124) | (0.00574) | (0.00274) | (0.00499) |
| pdens | 0.00344 | 0.0193*** | 0.0227*** | 0.00128 | 0.00391 | 0.00519 | -0.00213 | -0.0102 | -0.0123 |
| | (0.00282) | (0.00420) | (0.00394) | (0.00192) | (0.00374) | (0.00527) | (0.00692) | (0.0303) | (0.0271) |
| Observation | 48 | 48 | 48 | 72 | 72 | 72 | 72 | 72 | 72 |
| Group | 4 | 4 | 4 | 6 | 6 | 6 | 6 | 6 | 6 |

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Sources: Indonesia Central Statistics Agency, Processed

Table 7 reveals that not every region shows the effect of an overflow of regional government expenditure that has an impact on regional economic growth. Significant results that have had the effect of an overflow of regional government spending on regional economic growth are shown in the regions of Java and Bali, Kalimantan, and Sulawesi. This contribution indicates that the greater level of distribution of government spending in some of these regions will encourage better economic growth in the neighbouring regions. This effect denotes that identification of the centre of economic activity for a particular region in a limited area is something that is important to do. This will have an impact on all aspects of the regional economy and that will consequently have a continuous implication on neighbouring regions.

The overflow effect on other variables is shown by investment variables, which tend to have implications for regions outside the economic centre in Indonesia, namely the island of Java. Significant results and positive implications for the effects of this investment overflow are shown in Kalimantan and Sulawesi islands, which empirically indicate that these areas are regions that have a dominant level of natural resources. As a result, these investments tend to have an impact on the mining sector. The island of Java shows significant results but have a negative effect, which means that the grouping of regions that have a relatively small value of investment tends to have a significant impact, while regions that have large investment values tend not to have a significant impact in the grouping of a particular region.

Another variable that indicates the effects of abundance between regions within a region in Indonesia is the educational variable. The effects of educational abundance show that four out of five regions in Indonesia experiencing an abundant effect of education on economic growth. This confirms that mobilization of the population and the attractiveness of certain regions in terms of economic conditions are key factors that contribute to interregional development. Other overflow effects that show significant value on regional economic growth are shown by the results of significant population density for Sumatra and Kalimantan. A significantly different result compared to other regions is shown by the eastern regions of Indonesia which does not show any abundant effects that have implications on the neighbouring regions.

## CONCLUSION

The analysis of non-spatial effects and spatial effects on economic growth models that focus on the effects of an overflow of government spending on regional economic growth in Indonesia empirically proves the role of government spending on regional economic growth in Indonesia both non-spatially and spatially. The analysis on the non-spatial model indicates that the contribution of government policies through government spending has a significant effect on increasing regional economic growth in Indonesia. In addition, the effects of investment and education also have a significant role to encourage regional economic growth. The contribution of population density is not empirically proven to affect regional economic growth in Indonesia.

Empirical results from the spatial analysis indicate that there are interdependencies between regions, which actually occur due to interactions between them. The results of the analysis highlight that the effects of neighbourliness shown from the effects of an abundance of economic growth, government spending, investment, education, and population contributed significantly to regional economic growth in Indonesia. This shows that when a region carries out regional policies related to government spending, it will have a significant impact on its neighbouring regions. In addition, an investment from the external parties will also spur the internal growth of the related region and the economic growth of its neighbouring regions. The effect of education is shown by the classification of the quality and quantity of the region inhabitants who have an increasingly good level of education. Therefore, certain areas such as urban areas will experience a more signif-

icant increase in the economic growth since it is closely related to the education level of its population that will certainly contribute to the economic growth of the neighbouring regions.

Inter-provincial effects of policy and economic growth in a particular region become one form of analysis to show intra-regional effects of policy and economic growth that are empirically important because the effects of regional interactions tend to cluster at the nearest boundary. Empirical results show that the effects of overflowing government spending on regional economic growth occur only in a few regions, namely Java and Bali, Kalimantan and Sulawesi. This pinpoints that a region that has a high level of distribution of government spending will have an impact on a high level of regional economic growth. It is no wonder that there are few regions that tend to have a higher level of economic growth that dominates the interaction that will have an impact on the overflow of other regions.

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# Viral Marketing for Cultural Product: The Role of Emotion and Cultural Awareness to Influence Purchasing Intention

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## ABSTRACT

Marketing communication tools evolve and this trend enables the marketers to design and implement powerful but still affordable marketing communication programs. Viral marketing plays an important role to communicate product offerings ranging from digital products, services, and tangible products. Previous studies investigated the role of emotion in viral marketing to increase brand awareness and intention to forward the message. In particular, the continuum of emotion (i.e., positive and negative emotion) distinguishes the effect of viral marketing on consumer behavior through a lack of consensus on its robustness. This study extends the discussion the role of emotion in the context of viral marketing especially for a cultural product namely Batik. Based on the nature of cultural products, this study examines the role of emotion to enhance viral marketing towards consumer decisions. In particular, its role to boost the effect of cultural awareness as intervening variable between viral marketing and consumer decision for cultural products. The proposed model fills the gap from previous studies by taking into account the role of emotion and cultural awareness in the viral marketing model.

## INTRODUCTION

Marketing communication has shifted from traditional media such as tv commercials, radio, newspapers and etc. particularly since the inception of marketing communication through the internet (Khajeheian & Mirahmadi, 2015). Marketing communication tools evolve and this trend enables the marketers to design and implement powerful but still affordable marketing communication programs. This opportunity allows a company especially a small-scale company to elevate its product in the marketplace through broader international exposure (Odhiambo, 2012) and an efficient distribution channel (Kuswantoro et al., 2012). In the current era, internet marketing has

been the main platform to conduct marketing activities especially for a small-scale company (Mokhtar, 2015: Deraz & Gebrekidan, 2018). Among various internet marketing tools is the use of viral marketing (Hirvijärvi, 2017). This approach is characterized by a form of co-operation between marketer and all the parties concerned to distribute marketing messages to the marketplace like a viral or virus (Sohn et al., 2013). The impetus of social media allows the increased use of viral marketing to communicate product offerings (Miller & Lammas, 2010). The diffusion of marketing messages through their networks is based on the notion that the messages are interesting as well as beneficial (Akyol, 2013).

Viral marketing plays an important role to communicate product offerings ranging from digital products (Wardana & Pradana, 2016), service (Khuong & Thanh,2016), and tangible products (Agam, 2017). Specifically, marketers also have made use of viral marketing for cultural products. The cultural product includes but not limited to various products such as film, music, book, magazine publishing, TV, radio, and fashion (Magno, 2017). Some success stories of exploiting viral marketing strategy for cultural product are in the case of online shop brands (Wardhana & Pradana, 2016) although, there is also failure-story such as in the case of PSP video game system and Mc Donald's Campaign (Hakimey & Yazdanifard, 2014) Therefore, the marketers attempt to investigate factors that may contribute to the effectiveness of viral marketing particularly for cultural product. One of the most discussed factors is the role of emotion to enhance the effectiveness of viral marketing (Binggeser et al., 2014). Previous studies investigated the role of emotion in viral marketing to increase brand awareness (Sharma & Sharma 2015; Parker 2015) and intention to forward the message (Botha & Reyneke, 2013). In particular, the continuum of emotion (i.e., positive and negative emotion) distinguishes the effect of viral marketing on consumer behavior through a lack of consensus on its robustness. (Eckler & Bolls, 2011; Lindebaum & Jordan, 2012; Roy, 2011).

Regardless of the lack of consensus, emotional connection potentially triggers customer willingness to disseminate the viral content in forms of video, picture, and article (Eckler & Kuntum-Kuntum, 2011). Marketers consider to include emotion cue to arouse the effects of viral content on consumer attitude and behavior (Berger & Milkman, 2012). This study extends the discussion of the role of emotion in the context of viral marketing especially for a cultural product namely Batik. UNESCO recognized Batik as a Masterpiece of Oral and Intangible Heritage of Humanity in 2009 (UNESCO, 2009) and this recognition is certainly critical for Indonesia due to an effort from another country to claim Batik as its own heritage (Clark, 2013). Such a claim might arouse emotion which drives consumers to activate their cognitive and conative elements towards the viral content associated with a cultural product such as Batik.

As to a cognitive element, viral marketing creates awareness towards cultural aspects. The increased cultural awareness indicates that consumers have better consumer knowledge and understanding towards cultural aspects both the way of thinking and behaving of people from different cultures (Buckley, et al 2006). Increased cultural awareness is in turn to influence consumer behavior (Tunkari, 2017). Interestingly, the role of cultural awareness has been rarely discussed in previous studies on viral marketing for the cultural product, as another form of cultural aspects. Cultural product is characterized by more intangible, less utilitarian value and more subjective in the assessment of experience quality than other product (Magno, 2017). Based on the nature of cultural products, this study examines the role of emotion to enhance viral marketing towards consumer decisions. In particular, its role to boost the effect of cultural awareness as an intervening variable between viral marketing and consumer decision for cultural products (i.e., Batik). The proposed model fills the gap from previous studies by taking into account the role of emotion and cultural awareness into viral marketing model.

# 1. RESEARCH BACKGROUND AND THEORETICAL FOUNDATION

## 1.1 Viral Marketing

The popularity of viral marketing has been identified over the past decade (Cruz & Fill, 2008; Botha & Reyneke, 2013). This popularity has raised questions about important components that cause a piece of media, such as video, ~~to~~ become viral. The study of tactics used in videos to engage the best audience to be motivated to watch and share videos has also gained popularity (Teixeira et al., 2012; Libert & Tynski, 2013). Viral Marketing was first introduced by Tim Draper and Steve Jurvetson of the Venture Capital Company, Draper Fisher Jurvetson in 1996 when describing marketing strategies via free e-mail Hotmail (Pasa, 2011). The term "viral marketing" describes the phenomenon where consumers share and spread marketing relevant information, originally sent intentionally by marketers to stimulate and utilize word-of-mouth (WOM) (Van der Lans et al., 2010). Gobert (2006), argues the concept of viral marketing is quite simple because viral marketing is a derivative of word of mouth using internet media. This strategy is done by sending messages about popular products, usually sent to friends or colleagues. The message by itself will promote the brand of a product through other intermediaries.

Viral marketing is expected to have a multi-effect because multiple people who receive messages can deliver to dozens or even hundreds of other internet users. This is where the marketing virus enters, the process of encouraging and exchanging positive information about certain brand products by consumers and all digital fields or buyers' environments (Helm, 2000; Wiedermann, 2007; Dobele, 2005; Grifoni, 2012). Angel and Sexsmith (2009) said viral marketing success can be measured from two sides. both quantitatively and qualitatively. Quantitative measurements are focused on website traffic, hit rates, click-throughs, time spent online, comments, and so on. While the measurement is qualitatively seen from the symptoms of the desires of consumers as well as the quality and benefits of the interactions that occur. While viral marketing success, according to Fisher (2009), also includes measurements of visitor uniqueness, level of interaction, relevant actions are taken, measures of conversation intensity, message credibility, freshness, and relevance. This measurement explains that the success of viral marketing is not only on whether there is an attachment between the communicator and the communicant but also how they attach themselves to one another.

The growth of social media contributes to the effectiveness of viral marketing (Hafeez, 2015). According to Solis (2007) research, social media has created a new culture in the process of disseminating information. Social media has facilitated and improved information flow by making it easier to spread useful information to many people (Smith & Zook, 2011) Social media is formed when users can easily participate, share and create content. Dann and Dann's research (2011) illustrated how social media is formed based on three interconnected elements, namely social interaction, content, and communication media. With the existence of social media in the midst of society, information disclosure and cross-referral opinions become very easy to occur. Everyone is free to express their views and judgments about anything. Viral marketing is spread thanks to people's natural motives to communicate and inform others in their networks about things they find interesting or useful (Akyol, 2013).

In line with previous research, Kaplan & Haenlein (2011) said viral marketing must meet 3 criteria to be fulfilled, which are as follows: (1) Media and people who act to deliver the message being campaigned. This person must have a fairly extensive and trusted social network and media that is easily accessible to everyone. (2) Messages or invitations to the campaign that is easy to remember and inspire people to follow. (3) A supportive environment and the right time to launch a viral marketing program.

## 1.2 Cultural Awareness

The principle of the task of gaining an understanding of cultural awareness is to collect information about the culture and transform it through additions in providing progressive meaning as an understanding of culture. Cultural awareness is the ability of a person to look outside himself and be aware of cultural values, cultural habits that enter (Vacc et al., 2003). Wunderle (2006) stated that cultural awareness (cultural awareness) as an ability to recognize and understand the influence of culture on human values and behavior. Implications of cultural awareness on understanding the need to consider culture, important factors in dealing with certain situations. The formation of cultural awareness in individuals is something that just happens. Cultural awareness occurs through various things and involves a variety of factors including perception and emotion (Ferguson, 2008).

## 1.3 Purchasing Intention

Purchase behavior intentions refer to buying actions that might be carried out by consumers after exposure to stimuli, for example, viral marketing messages (Robbins et al., 2016). This is widely documented in the literature that viral marketing strategies are very important for consumer behavior (ie purchase intentions, product advocacy, referrals) (Zernigah & Sohail, 2012). The intention of customer buying behavior is important in this research because it is considered as a measure of the effectiveness of viral marketing strategies. Dasari et al. (2010) examined the intention of consumers to buy products marketed through viral bidding to buy marketed viral products. Purchase intention can measure the likelihood of a consumer to buy a product, and the higher the purchase intention, the higher the consumer's willingness to buy a product.

Perera and Dharmadasa (2016) say the intention is considered to capture motivational factors that influence behavior, in viral marketing studies, it is very important to look at interpersonal communication motives that encourage individuals to engage in viral marketing. According to (Schiffman & Kanuk, 2007) said that purchase intentions occur due to external influences namely the emergence of a need for a product, product introduction, and information evaluation are things that can lead to a consumer purchase intention. Before making a purchase, consumers collect product information based on personal experience. When the amount of information reaches a certain level, the consumer starts the assessment and evaluation process and makes a purchasing decision after comparison and assessment.

## 1.4 Emotion

Richard Buchanan in Urgen (2006) defines emotions as the ability to have feelings that arise until the point of consciousness turns into a powerful product and directs people to the possibility of making decisions. Emotions influence one's decisions, social relations, communication and well-being in an undeniable way. Because products are objects that people choose and experience emotions determine an important part of evaluation, choice, and experience. Consumers do not look for products/services that meet rational needs and processes, but for objects that are central to symbolic, psychological and cultural meanings, sources of feelings, relationships, and emotions (Consoli, 2010). Much of the research developed about emotions in sharing content via e-mail, social media, or instant messaging applications comes from the field of viral marketing. Because the emotional appeal of content can affect consumers, (Eckler & Kuntum-Kuntum, 2011). Among the research available in this field and in viral marketing, emotions are being researched thoroughly because they influence the interest of the viewer in a subject, influence the potential for sharing messages, affect social interaction, communication, and information sharing online (Chakrabarti & Berthon, 2012; Teixeira et al., 2012; Phelps et al., 2004). We know that advertisements that use emotional content produce more connections between consumers and brands than those based

on the rational argument (Micu & Plummer, 2010).

Research on the main emotions found in viral marketing was conducted by Libert and Tynski (2013), which concluded that the strong emotions generated in messages will contribute to the possibility of sharing advertising messages. Emotions in viral marketing are subjective towards an object. At least one of the six emotions (ie, surprise, joy, sadness, anger, fear and disgust) must be the basis of a viral marketing strategy, as long as it is relevant to the brand, product or message (Lindgreen & Vanhamme, 2005). This means that the emotions found in advertisements may be under one of the eight parts of the emotional wheel of Plutchik (2003) and can cause videos to go viral. Their findings show conclusions that are similar to the conclusions of the study found by Teixeira et al. (2012).

## 1.5 Model and hypotheses

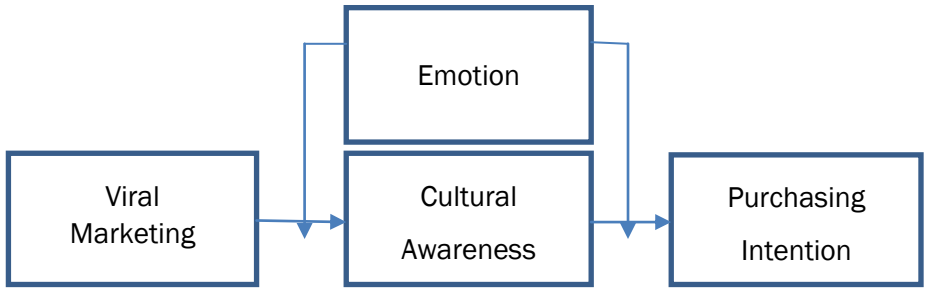


**Figure 1.** The Research's Model

## 2. METHODS

In this study, the design used was true experiments. True experiments are the best choice (Nahartyo & Utami, 2015). This design requires randomization, control over manipulation and the presence of a comparison group or control group. Experimental research was chosen because it is the most powerful research method and can describe the influence between independent variables and dependent variables clearly because it makes it possible to carry out controls with a relatively high level in a situation. This control is intended so that researchers can say with confidence that the independent variables cause changes in the dependent variable (Shaughnessy et al., 2007). The experimental design in this study were three groups, each of which had different conditions: the experimental group that received the first manipulation, the second group that received the second manipulation, and the third group without manipulation.

The experimental process requires standard operating procedures (SOP), this SOP guides the researcher and all parties involved in the research. The SOP helps researchers to ensure that the experimental design is carried out in an orderly manner so that it can provide maximum benefit. In this study, the researchers arranged in detail step by step the experimental procedures carried out. In conducting experiments, researchers will conduct experiments conducted electronically on the subject of the experiment. The following are the stages of experiments conducted by researchers: 1) Researchers spread website links to the subjects of the experiment on various social media. 2) Experimental subjects interested in participating can click directly to the link and start working on the instructions. 3) After the experimental subject has finished working on the simulation, the computer program automatically thanks the subject 4) The researcher checks the simulation results electronically (database)

## 2.1 Research context and data collection

Sampling was conducted from 17 January 2019 to 25 January 2019, positive video content was conducted from 17 January 2019 to 25 January 2019 with 334 respondents participating, negative video content collected. from 18 January 2019 to 25 January 2019 the number of respondents collected was 390 respondents who participated so that the total number of respondents who participated in this study were 724 respondents but those who met the criteria as a sample were 588 respondents.

## 2.2 Research Instruments Test

After the respondent watches a video with neutral, positive and negative content that will be tested for effectiveness on Purchase Intention according to the specified procedure, then the respondent's answer data to the research questionnaire has been collected. Furthermore, the questionnaire and the respondent's answer to the instrument must then be tested, namely the validity and reliability test as follows:

# 3. RESULTS

## 3.1. Validity test

Based on the predetermined research methodology, the following are the results of the analysis of convergent validity tests (Convergent Validity) using SmartPLS 3.0:

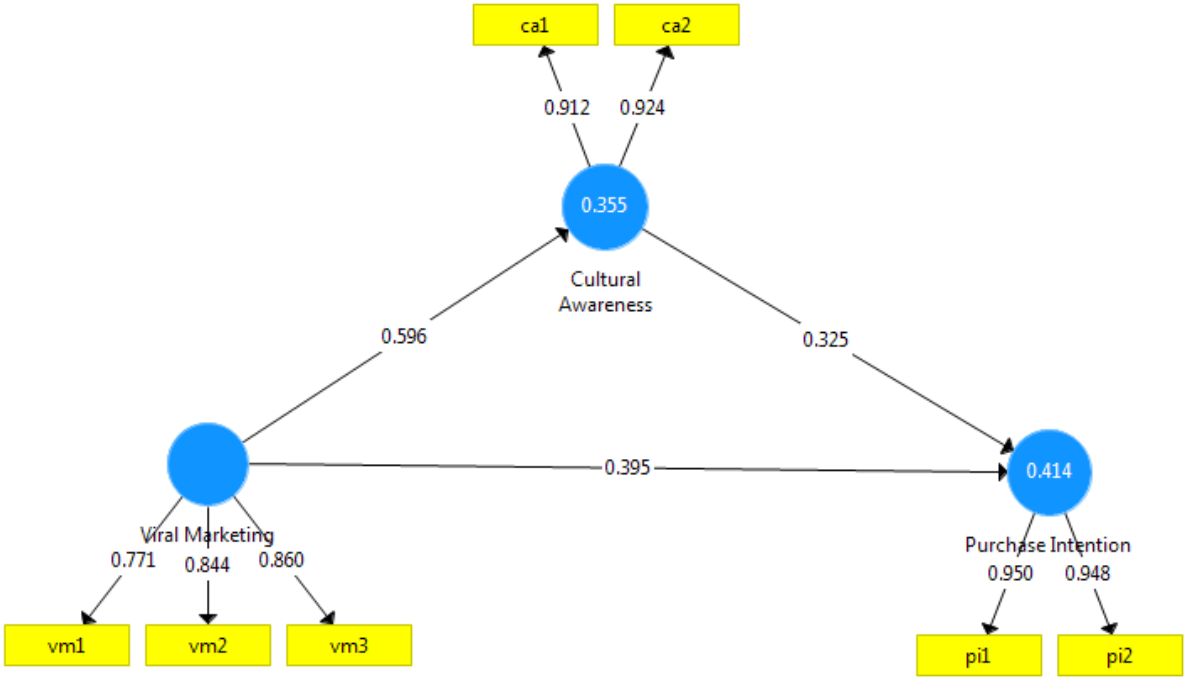


**Figure 2.** Convergent Validity Factor Loadings

Based on Figure 4.1 above, it can be concluded in the table below that the convergent validity of each indicator in this study is as follows:

**Table 1.** Interpretation of Convergent Validity

| *Variable* | *Indicator* | *Value Factor Loading* | *Conclusion* |
|---|---|---|---|
| Viral Marketing | Message | 0,771 | Valid |
| | Messanger | 0,844 | Valid |
| | Environment | 0,860 | Valid |
| Cultural Awareness | Information | 0,912 | Valid |
| | Understanding | 0,924 | Valid |
| Purchase Intention | Purchase intention | 0,950 | Valid |
| | Purchase recommendation | 0,948 | Valid |

Source: Authors research

Based on the Table above, it is known that all indicators have a loading factor value of more than 0.60 (Ghozali, 2015) so that all indicators are valid. It is known that the Viral Marketing indicators namely vm1, vm2, and vm3 have a loading factor value of more than 0.60 so that the questionnaire is valid, Cultural Awareness indicators namely ca1, and ca2 have a loading factor value of more than 0.60 so that the questionnaire is valid, and indicators Purchase Intentions namely pi1, and pi2 have a loading factor value of more than 0.60 so that the questionnaire is valid.

## 3.2 Convergent Validity Test

Based on the predetermined research methodology, the following are the results of the Average Variance Extracted (AVE) of each variable in this study as follows:

**Table 2.** Interpretation of Average Variance Extracted (AVE)

| *Variable* | *AVE* | *Value Recommendation* | *Conclusion* |
|---|---|---|---|
| Viral Marketing | 0,682 | > 0,60 | Valid |
| Cultural Awareness | 0,843 | > 0,60 | Valid |
| Purchase Intention | 0,900 | > 0,60 | Valid |

Source: Authors research

Based on Table above, it is known that the Viral Marketing variable has an Average Variance Extracted (AVE) value of 0.680 more than 0.60 so that the Viral Marketing variable is valid, the Cultural Awareness variable has an Average Variance Extracted (AVE) value of 0.850 greater than 0.60 so the Cultural Awareness variable is valid, and the Purchase Intention variable has an Average Variance Extracted (AVE) value of 0.898 over 0.60 so that the Purchase Intention variable is valid.4

## 3.3. Reliability Test

Based on the predetermined research methodology, the following are the results of the composite reliability of each variable in this study as follows:

**Table 3.** Interpretation of Composite Reliability

| *Variable* | *Composite Reliability Value* | *Recommendation Value* | *Conclusion* |
|---|---|---|---|
| Viral Marketing | 0,865 | > 0,70 | Reliable |
| Cultural Awareness | 0,915 | > 0,70 | Reliable |
| Purchase Intention | 0,948 | > 0,70 | Reliable |

Source: Authors research

Based on Table above, it is known that the Viral Marketing variable has a Composite reliability value of 0.864 greater than 0.60 so that the Viral Marketing variable is reliable, the Cultural Awareness variable has a Composite reliability value of 0.919 greater than 0.60 so the Cultural Awareness variable is reliable, and Purchase Intention variable has Composite reliability value of 0.946 more than 0.60 so that the Purchase Intention variable is reliable.

## 3.4 Cronbach's Alpha Test

Based on the predetermined research methodology, the following are the results of the composite reliability of each variable in this study as follows:

**Table 4.** Cronbach's Alpha interpretation

| *Variable* | *Cronbach's Alpha Value* | *Value Recommendation* | *Conclusion* |
|---|---|---|---|
| Viral Marketing | 0,770 | > 0,70 | Reliable |
| Cultural Awareness | 0,814 | > 0,70 | Reliable |
| Purchase Intention | 0,889 | > 0,70 | Reliable |

Source: Authors research

Based on Table above, it is known that the Viral Marketing variable has a Cronbach's Alphabet value of 0.765 greater than 0.60 so that the Viral Marketing variable is reliable, the Cultural Awareness variable has a Cronbach's Alpha value of 0.824 greater than 0.60 so that the Cultural Awareness variable is reliable, and the Purchase variable Intention has a Cronbach's Alpha value of 0.886 over 0.60 so that the Purchase Intention variable is reliable.

## 3.5 Common Bias Method Test

Common Test Bias Method or common method variance is about variants that might occur as a result of the measurement method, not because of the constructs that measure represent. Data collected from the same respondents for predictor and criterion variables using a single method and or at the same point in time may have a part of the variant for which measurement items share similarities. This is because it is more concerned with the method of data collection rather than the relationship of hypotheses in the proposed research model. The Bias method, if any, causes measurement errors that negatively affect the validity of the conclusions drawn. The calculation results show that the VIF value is less than 5 (<5), then the variable is avoided from BIAS.

**Table 5.** Common Method Variance

| | *Cultural Awareness* | *Purchase Intention* |
|---|---|---|
| Cultural Awareness | | 1,551 |
| Purchase Intention | | |
| Viral Marketing | 1,000 | 1,551 |

Source: Authors research

## 3.6 Hypothesis testing

After passing the validity and reliability test of the research instrument, the next step is to test the research hypothesis. Following are the results of hypothesis testing using SmartPLS 3.0 software:

**Table 6.** Research Hypothesis Test Positive Emotions

| | *Original Sample (O)* | *Sample Mean (M)* | *Standard Error (STERR)* | *T Statistics (O/STERR)* | *P Values* |
|---|---|---|---|---|---|
| Viral Marketing -> Cultural Awareness | 0,594 | 0,599 | 0,049 | 12,013 | 0,000 |
| Viral Marketing -> Purchase Intention | 0,362 | 0,363 | 0,070 | 5,185 | 0,000 |
| Cultural Awareness -> Purchase Intention | 0,365 | 0,362 | 0,068 | 5,337 | 0,000 |

Source: Authors research

**Table 7.** Research Hypothesis Test Negative Emotions

| | *Original Sample (O)* | *Sample Mean (M)* | *Standard Error (STERR)* | *T Statistics (\|O/STERR\|)* | *P Values* |
|---|---|---|---|---|---|
| Viral Marketing -> Cultural Awareness | 0,598 | 0,605 | 0,044 | 13,604 | 0,000 |
| Viral Marketing -> Purchase Intention | 0,424 | 0,420 | 0,060 | 7,018 | 0,000 |
| Cultural Awareness -> Purchase Intention | 0,290 | 0,293 | 0,073 | 3,983 | 0,000 |

Source: Authors research

Based on tables 6 and 7, it can be concluded in the table below that the hypothesis test for each variable in this study is as follows:

**Table 8.** Interpretation of Hiphoteses Testing

| *Variables* | *Video* | *p-Value* | *Interpretation* | *Result* |
|---|---|---|---|---|
| Viral Marketing -> Cultural Awareness | Positive | 0,000 | Significant | Hypothesis Accepted |
| | Negative | 0,000 | Significant | Hypothesis Accepted |
| Viral Marketing -> Purchase Intention | Positive | 0,000 | Significant | Hypothesis Accepted |
| | Negative | 0,000 | Significant | Hypothesis Accepted |
| Cultural Awareness -> Purchase Intention | Positive | 0,000 | Significant | Hypothesis Accepted |
| | Negative | 0,000 | Significant | Hypothesis Accepted |

Source: Authors research

Based on Table 8, it is known that the viral marketing variable against cultural awareness on positive and negative videos, has a p-value of 0,000 which is less than 0.05 so that the viral marketing variable Against Cultural Awareness has a significant effect, Viral marketing seeks to increase awareness or adoption of a product with taking advantage of the network of relationships among consumer-awareness or the spread of adoption from consumer to consumer (Hill et al., 2008). Messages with a cultural approach from a viral marketing program are believed to be instruments that can influence cultural awareness in the recipient of the message. Messages with a cultural approach from a viral marketing program are believed to be instruments that can influence cultural awareness in the recipient of the message. According to Berger and Milkman (2012), they share usually contain useful information such as news, articles, coupons and so on. When the audience shares digital messages, there is another factor, namely, the audience wants to feel equality for what they feel to others. As empirical research has shown, a successful viral marketing campaign must consist of emotional messages that motivate consumers to spread messages on their social networks (Dobele et al., 2007).

Viral marketing variable against purchase intention there is positive and negative videos having a p-value of 0,000,0,000 which is less than 0.05 so that the Viral Marketing variable against Purchase Intention has a significant effect. Purchase intention behavior refers to buying actions that might be carried out by consumers after exposure to stimuli, for example viral marketing messages (Robbins et al., 2016). This is widely documented in the literature that viral marketing strategies are very important for consumer behavior (ie purchase intentions, product advocacy, referrals) (Zernigah & Sohail, 2012). The intention of customer buying behavior is important in this research because it is considered as a measure of the effectiveness of viral marketing strategies. Therefore, it is important to understand how consumer attitudes towards viral marketing are related to consumer purchase intentions. Ghosh in Wei (2014) tries to combine several studies of purchasing behavior with the consumer decision-making process and it is evident that when consumers choose a product, the final decision depends on their intentions. As a result, most marketers think consumers' purchase intentions are effective techniques for predicting purchases.

The Cultural Awareness variable on Purchase Intention on positive and negative videos has a p-value of 0,000 which is less than 0.05 so that the Cultural Awareness variable on Purchase Intention has a significant effect. This shows that purchase intention means that consumers prefer to buy products or services because he finds that he needs a certain product or service, or even an attitude towards a product and product perception. Behavior can be seen as a key point for predicting consumer buying behavior as well as their subjective intentions (Keller, 2001). In other words, buying intention means the consumer will buy the product once again after he evaluates a product and knows that the product is worth buying. While consumers choose one particular product, the final decision about accepting a product to buy or reject depends on consumer intentions.

The intention to buy is a decision worthy of being studied by marketers and it may be closely related to consumer attitudes towards marketing.

## 3.7 Moderating Test Smith-Satterthwait

### 3.7.1 Moderating Test Emotion Viral Marketing Terhadap Cultural Awareness

Emotion does not moderate Viral Marketing Against Cultural Awareness. Emotion is one of the important factors in the process of having cultural awareness. The message will evoke an emotional response from the audience. Emotional content in a message tends to transfer emotional stimuli to the viewers and evoke their emotions and feelings (Royo-Vela, 2005). Viral marketing utilizing emotions to create relationships with their customers so the message must be persuasive and motivate the viewers (Kaplan & Haenlein, 2011). Success in viral marketing can be influenced by emotions that arise due to consumer responses or perceptions after watching a viral marketing program.

In this study, the emotions that emerge towards the viral marketing program are not able to influence the recipient of the message. This is based on several aspects namely according to cultural background, past experiences, values adopted and news that develops in the acceptance of the viral marketing program. different as in the study conducted by Chu (2011). Emotion in viral marketing is subjective to an object that can be obtained from the process of hearing, seeing and feeling. Fowers & Davidov (in Thompkins et al., 2006) said the formation of cultural awareness in individuals is something that does not just happen. However, through various things and involving a variety of factors including perception and emotion, awareness will be formed so that it must be done repeatedly and continuously.

### 3.7.2 Moderating Test Emotion from Cultural Awareness of Purchase Intention

Emotions are an important aspect of interaction and sharing online, and individuals are more interested in experience rather than products, the study of understanding emotions in advertising is increasingly popular in the field of marketing (Chakrabarti & Berthon, 2012). Previous authors have suggested that emotions in advertising are one of the main contributors in making video advertisements viral because they involve the audience when emotions are at stake (Teixeira et al., 2012, Phelps et Al., 2004).

According to Schiffman and Kanuk (2007), purchase intentions occur due to external influences namely the emergence of a need for a product, product introduction, and information evaluation are things that can lead to a consumer purchase intention. In this study, the message with the cultural approach of the viral marketing program is not able to be an instrument that can influence cultural awareness in the recipient of the message in order to get to know more closely the cultural products offered. Viral messages are sent to people who might have an interest in the message when people receive a viral marketing message they are encouraged to forward the message.

### 3.7.3 Intervening Sobel Test

Purchase behavior intentions refer to buying actions that might be carried out by consumers after exposure to stimuli, for example, viral marketing messages (Robbins et al., 2016). This is widely documented in the literature that viral marketing strategies are very important for consumer behavior (ie purchase intentions, product advocacy, referrals) (Zernigah & Sohail, 2012).

The intention of customer buying behavior is important in this research because it is considered as a measure of the effectiveness of viral marketing strategies. In this research message with a cultural approach from the viral marketing program is believed to be an instrument that can influence cultural awareness in the recipient of the message in order to get to know more about the cultural products offered. Viral messages are sent to people who might have an interest in the message when people receive a viral marketing message they are encouraged to forward the message.

## 5. DISCUSSION

A new concept that can be raised in this research is that viral marketing can create cultural awareness. This research has proven that the process of delivering messages through viral marketing can foster cultural awareness by rebuilding knowledge and the love of national culture through cyberspace. This is in line with the opinion of Buckley et al. (2006) which shows that increasing cultural awareness will show that consumers have better consumer knowledge and understanding of cultural aspects both ways of thinking and behavior of people from different cultures. The results of this study enrich the results with the opinion of Ferguson (2008) who said that the formation of cultural awareness in individuals is something that does not just happen. However, through various things and involving a variety of factors including perception and emotion, awareness will be formed. In cultural awareness of understanding the need to consider culture, namely important factors in dealing with certain situations. At a basic level, cultural awareness is information, giving meaning to humanity to know about the culture. Moalosi et al. (2010) imply that cultural capital must be contextualized and realized across different generations in a purposeful and appropriate manner.

This research is in line with Chu's (2011) research which says the emotion that arises towards the viral marketing program is based on several aspects namely according to cultural background, past experience, values adopted and news that develops in acceptance viral marketing program. Based on the findings in the field that the formation of cultural awareness in individuals is something that does not just happen. However, through various things and involving a variety of factors including perception and emotion, awareness will be formed (Thompkins et al., 2006).

As a result of research, researchers convey similar things from several researchers who have previously observed that cultural values also influence purchase intentions (Rajagopal, 2011). Purchase intention can be considered as the possibility that consumers will also plan or be willing to buy certain products or services in the future. According to (Schiffman and Kanuk, 2007) said that purchase intentions occur due to external influences namely the emergence of a need for a product, product introduction, and information evaluation are things that can lead to a consumer purchase intention. This research confirms the theoretical arguments of Perera and Dharmadasa (2016) that viral marketing has a relationship with purchase intentions because the intention is influenced by motivational factors that influence behavior, in viral marketing studies, it is very important to look at interpersonal communication motives that encourage individuals to engage in viral marketing. Previous researchers have determined that trust is a very important factor in consumer purchase intentions. Trivedi et al. (2017) say that consumers will actively search for products if they are notified about it through a viral message. When the amount of information reaches a certain level, the consumer starts the assessment and evaluation process and makes a purchasing decision after comparison and assessment.

## CONCLUSION

The use of viral marketing, especially social media, provides an opportunity for the public and offers space for audiences to not only stop being passive spectators but to participate, share and respond (comments, retweets, favorites, or likes). The use of viral marketing to spread culture is also felt to be quite effective in reaching the community because in its application the process of disseminating information using social media is very fast and does not recognize time and distance and can save costs. Messaging with a cultural approach from a viral marketing program is believed to be an instrument that can influence cultural awareness in the recipient of the message in order to get to know more closely the cultural products offered.

This experimental research design has limitations that are the wider scope of the population, as well as more samples with longer sampling times. So that future research is expected to broaden the scope of the population and get more samples by adding time in sampling in order to provide more specific research results. The design of this experimental research also has a weakness that researchers cannot investigate the effects of treatment interactions because they do not have groups without pretest so that they cannot investigate the effects of the interaction of the treatment with the pretest. In experimental research, this tends to be done over a short period of time. For future research, it is expected to be able to use the pretest-posttest control group design in this design. It can be understood that the researcher conducts a test or measurement before conducting the treatment (pre-test) and after treatment (post-test).

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# Capital Structure Determinants of Construction Firms: Does Firm Size Moderate the Results?

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ABSTRACT

Firstly, this paper highlights how the firm-specific factors and external macroeconomic variables affect the capital structure. Secondly, it highlights the effect of firm-specific factors and external macroeconomic variables on capital structure with the firm size as the moderating variable. The population of this study is construction companies listed on the Indonesia Stock Exchange. By employing the purposive sampling method, we used 30 data panels as the research sample covering the period from 2009 to 2014. To analyze the data, we used Moderated Regression Analysis. The research results showed that the factors which significantly determine the capital structure are profitability, liquidity, inflation, and GDP. Meanwhile, tangibility does not affect the capital structure. When the firm size is included as the moderating variable, the tangibility factor, profitability, inflation, and GDP significantly affect the capital structure. Meanwhile, the liquidity factor does not affect the capital structure.

## INTRODUCTION

The main goal of every company is to maximize the welfare of the owners, commonly known as the firm value (Widyaningsih et al., 2017). So, in making any decision, the firm should carefully consider many factors in order to maximize the firm value. According to Soekarno et al. (2016) the composition of debt and equity should be maintained so it will minimize the cost of capital to a certain level. Thus, it will maximize the investment value leading to the firm value. Therefore, to maximize the shareholder value, companies must be able to determine an optimal proportion of debt and equity as the main financing sources. Financing decision and investment decision are the decisions in the company activities to increase shareholder value. To perform investment and operating activities, companies require capital or funding. Therefore, in the financial management, capital is a vital variable. The company's source of capital can be from within or outside the com-

pany. The capital from within the company is the owner equity and retained earnings, while the capital from outside the company is debt. The combination of these two sources of financing is known as the capital structure.

According to Chiang et al. (2010), the research on the capital structure has long been one of the main topics of the corporate finance researchers. Although the research number in this field is quite extensive, only a few relevant literature found in the field of construction. Meanwhile, the increasing infrastructure development in Indonesia makes the construction sector progress fast enough, alluring to the local and international construction firms. The construction sector is still attractive because it is closely related to the infrastructure sector. In 2015, the construction market was projected to grow by 14.26% (worth 446 IDR trillion[1]) and in 2018 it is projected to grow to 451 IDR trillion[2], making this sector to be one of the most promising sectors. Drobetz & Wanzenried (2006) stated that in determining the debt policy, the main purpose of the company is not only to minimize the weighted average cost of capital (WACC), but also to achieve financial flexibility. Leverage becomes a proxy for capital structure in various studies (Al Ani & Al Amri, 2015; Rossi, 2014; Wahab & Ramli, 2014; Sheikh & Wang, 2011; Omran & Pointon, 2009; Al-Najjar & Taylor, 2008; Eriotis et al., 2007). Therefore, the important point that must be considered by the company is seeking the determinants of capital structure.

There are several capital structure theories which explain the preference and behavior of the companies in accordance with their corporate financing. Among the well-known theories are the Pecking Order Theory and the Trade-Off Theory. The first was founded by Myers & Majluf (1984) and based on the information asymmetry between investors and company managers. This theory does not suggest an optimal capital structure as a target, but the company should use the preference for using internal and not external sources as a starting point. The second theory is the Trade-Off theory which came from the debate of Miller and Modigliani theorem (Modigliani & Miller, 1963). The corporate income tax is added to the irrelevance of the original theory which in turn creates a profit for the debt. Trade-Off theory assumes that the company trades the profits, cost of debt and equity. This theory seeks an optimal capital structure by taking into account the tax benefits, bankruptcy costs and agency costs. Those theories above help us to understand the nature of the company's capital structure and identify the internal and external factors.

The goal of achieving an optimal capital structure can be hampered by many factors. The option whether to use debt or equity is affected by several factors. Several factors have been identified in the literature called as the firm-specific factors. These are the tangibility of assets, profitability, liquidity, and others (Al Ani & Al Amri, 2015; Alipour et al., 2015; Alom, 2013; Bhayani, 2005), external macroeconomic variables such as inflation, gross domestic product, and others (Khanna et al., 2015; Muthama et al., 2013; Hanousek & Shamshur, 2011), and both firm-specific factors as well as external macroeconomic variables (Chadha & Sharma, 2015; Baltacı & Ayaydın, 2014; Bayrakdaroglu et al., 2013). In addition, the firm life cycle also determines the firm capital structure, specifically its leverage level (Nidar & Utomo, 2017). It is important for companies to interpret these factors and how they affect the capital structure decision.

There has been a long debate about the importance or influence of the company characteristics and macroeconomic variables on capital structure, in which both of these factors play a more dominant role in achieving a goal of optimal capital structure. The literature shows that there is no general consensus on how the company characteristics and macroeconomic variables affect capital structure. Chadha & Sharma (2015) empirically found that tangibility of assets correlate significantly as the major determinants of capital structure in the manufacturing sector of India. Alipour et al. (2015) found that profitability is an important determinant of capital structure of Iranian companies. Malinic et al. (2013) on the other hand highlighted the significance of two debt ratios.

[1] Available at http://www.republika.co.id/berita/ekonomi/makro/15/03/10/nkyndp-tahun-ini-sektor-konstruksi-diproyeksi-tumbuh-rp-446-triliun, accessed Mar 3, 2018

[2] Available at https://finance.detik.com/infrastruktur/3815604/pengusaha-pasar-konstruksi-ri-diproyeksi-capai-rp-451-t-di-2018, accessed Mar 3, 2018

Lemma & Negash (2013) found that there is a correlation between inflation and leverage. The recent literature related to the influence of GDP on leverage was conducted by (Cook & Tang, 2010). Drobetz & Wanzenried (2006) in their research found that the changes in the capital structure have relationship with firm size. The role of firm size in forming an optimal leverage indicates that this variable also affects capital structure of the company. In addition, they stated that this condition may occur because large companies will get more attention from analysts, so the information regarding the companies is available extensively. Thus, it will minimize the asymmetric information between shareholders and company managers. In addition, an extensive information about the company will make it easier for the company to access necessary financing. Such convenience and benefits reduce the cost to make adjustments. If we connect it with the Trade-Off theory (Myers & Majluf, 1984), the little adjustment costs will accelerate the company to make adjustments. Therefore, the firm size is regarded as a moderator between leverage and independent variables in the empirical model.

This research aims to first study the factors which influence capital structure. These factors are firm-specific factors (tangibility, profitability, liquidity) and external macroeconomic variables (inflation, GDP). Secondly, this research aims to examine whether the firm size moderates the capital structure determinants of construction companies listed on the Indonesia Stock Exchange covering the period of six years (2009-2014).

## 1. METHODS

The population of this study is construction companies listed on Indonesia Stock Exchange (IDX) publishing the full financial statements. In 2014, there were nine construction companies listed on IDX. Sample selection is done by utilizing purposive sampling method. This method is chosen to obtain representative sample in accordance with predetermined criteria. The first criteria for the sample in this study is the construction companies listed on Indonesia Stock Exchange in 2009-2014. The second criteria is they must have published full financial statements for six years, i.e. 2009-2014. The companies which were delisted from the Indonesia Stock Exchange in the period 2009 to 2014 are not included in the sample. There were five companies in accordance with the criteria explained earlier. The variables used in this study can be seen in Table 1.

**Table 1.** Research Variables

| *Variables* | *Code* | *Measure* | *Empirical Evidence* |
|---|---|---|---|
| Capital Structure | LEV | Total debt / total assets | (Al Ani & Al Amri, 2015; Alipour et al., 2015; Sheikh & Wang, 2011) |
| Tangibility | TANG | Fixed assets / total assets | (Alipour et al., 2015; Chadha & Sharma, 2015; Al Ani & Al Amri, 2015) |
| Profitability | PROF | EBIT / total assets | (Alipour et al., 2015; Chadha & Sharma, 2015; Al Ani & Al Amri, 2015) |
| Liquidity | LIQ | Current assets / current liabilities | (Alipour et al., 2015; Chadha & Sharma, 2015; Mouamer, 2011) |
| Inflation | INF | Consumer Price Index (CPI) | (Chadha & Sharma, 2015; Baltacı & Ayaydın, 2014; Lemma & Negash, 2013) |
| GDP | GDP | Real GDP | (Chadha & Sharma, 2015; Baltacı & Ayaydın, 2014; Lemma & Negash, 2013) |
| Firm Size | SIZE | Natural logarithm of total assets | (Alipour et al., 2015; Chadha & Sharma, 2015; Al Ani & Al Amri, 2015) |

To test the hypothesis, we use Moderated Regression Analysis (MRA). This regression model is a specialized application of multiple linear regression which in the regression equation contains an element of interaction (Suteja et al., 2017). The models used in this study are as follows:

$$LEVit = \alpha 0 - \beta 1TANGit + \beta 2PROFit - \beta 3LIQit + \beta 4INFit + \beta 5GDPit + \varepsilon it \ldots (1)$$

$$LEVit = \alpha 0 + \beta 1TANGit + \beta 2PROFit + \beta 3LIQit + \beta 4INFit + \beta 5GDPit + \beta 6SIZEit + \beta 7TANGit * SIZEit + \beta 8PROFit * SIZEit + \beta 9LIQit * SIZEit + \beta 10INFit * SIZEit + \beta 11GDPit * SIZEit + \varepsilon it \ldots (2)$$

## 2. RESULTS AND DISCUSSION

An optimal capital structure is the main focus of this research. A sample consisting of five companies with a 6-year observation period (2009-2014) results in 30 panel data. The results in Table 2 indicate that the variable of tangibility or asset structure of the company has a negative effect on capital structure, but it is not statistically significant. This means, the test results in model 1 are in line with the research of Lemma & Negash (2013) stating that the tangibility has a negative effect on the capital structure. This indicates that the company offers its asset structure to obtain either the long-term or short-term financing. However, hypothesis 1 stating that tangibility negatively affects capital structure is not accepted because statistically, the t-calculated value is in the area of rejecting the hypothesis. The test results of profitability showed that profitability has a positive effect on the capital structure and it is significant at 1% significance level. This result is in line with Alipour et al. (2015); Chadha & Sharma (2015); Liang et al., (2014), who proved that profitability has a positive and significant impact. In other words, the second hypothesis proposed in this study is accepted.

**Table 2.** Test Results of t-Statistic for Model 1

| *No.* | *Variable* | *t-calculated value* | *t-table* | *Information* |
|---|---|---|---|---|
| 1 | TANG | -0.346889 | (α = 1 percent) 2.787436<br>(α = 5 percent) 2.059539<br>(α = 10 percent)1.708141 | Not Significant |
| 2 | PROF | 4.76595 | | Significant*** |
| 3 | LIQ | -11.30452 | | Significant*** |
| 4 | INF | -2.550627 | | Significant** |
| 5 | GDP | -1.9964 | | Significant* |

Source: Data processing using EViews 9.0

Note: *) significant at α = 10 percent
**) significant at α = 5 percent
***) significant at α = 1 percent

Based on empirical data, it is shown that the variable of liquidity has a negative and significant effect on dependent variable with significance level of 1%. This proves that the hypothesis stating that liquidity has a significant and negative effect on the capital structure is accepted. Companies with a good and optimal liquidity certainly have a lot of cash inflows so they would prefer to use cash flows for financing every investment rather than using outside resources of funding (debt). This result is in line with Malinic et al. (2013); Eriotis et al. (2007). Based on the test results, it is found that inflation variable has a negative and significant effect on the dependent variable with significance level of 5%. Or it can be said that the hypothesis is accepted. This empirical result is in line with Baltacı & Ayaydın (2014); Chipeta & Mbululu (2013); Bayrakdaroglu et al. (2013), stating that the high inflation rate makes the company more careful in determining the source of funding. In addition, to reduce the risk, the companies tend to use internal financing rather than debt. Empirical results in Table 2 indicate that GDP growth has a negative and significant effect on the de-

pendent variable with the significance level of 10%, or in other words the hypothesis 5 is accepted. This result is in line with Ukaegbu & Oino (2014); Bayrakdaroglu et al. (2013) stating that when a country's economic growth, reflected through the GDP increases, the companies within that country will make adjustments to that change leading to the non-optimal capital structure.

From Table 3 we know that the hypotheses stating 'the firm size weakens the negative effect of tangibility on the capital structure' is accepted at a significance level of 1%. This finding is consistent with the research results of Soekarno et al. (2016) stating that a large company will have the opportunity and access to bind the market through the economies of scale that it has. In addition, the company with a large scale has the opportunity to improve its capital structure. In other words, the larger the firm size is, the smaller the negative impact of the asset management of the company's capital structure becomes. The subsequent test results showed that the firm size is able to weaken the negative influence of profitability on the capital structure, or it can be said that hypothesis is accepted at the 5% significance level. The result is consistent with Alipour et al. (2015); Chadha & Sharma (2015); Rossi (2014), stating that the large firm size will provide an opportunity for that company to be able to choose its source of financing. The notion behind this is, the company with a large number of assets gains the confidence from investors to obtain financing through debt. In other words, the company with a large asset structure will have a relatively higher leverage level.

**Table 3.** Test Results of t-Statistic for Model 2

| *No.* | *Variable* | *t-calculated value* | *t-table* | *Description* |
|---|---|---|---|---|
| 1 | TANG | 4.690734 | (α = 1 percent) 2.84534<br>(α = 5 percent) 2.085963<br>(α = 10 percent) 1.724718 | Significant*** |
| 2 | PROF | -2.209774 | | Significant** |
| 3 | LIQ | -1.376279 | | Not Significant |
| 4 | INF | 3.525123 | | Significant*** |
| 5 | GDP | 2.523777 | | Significant** |
| 6 | TANG * SIZE | -4.468533 | | Significant*** |
| 7 | PROF *SIZE | 2.510232 | | Significant** |
| 8 | LIQ * SIZE | 0.829283 | | Not significant |
| 9 | INF * SIZE | -3.633406 | | Significant*** |
| 10 | GDP * SIZE | -2.386106 | | Significant** |

Source: Data processing using EViews 9.0

Note: *) significant at α = 10 percent

**) significant at α = 5 percent

***) significant at α = 1 percent

The liquidity test interacted with the firm size on capital structure shows empirical results that hypothesis is not accepted. Thus, this implies that the Pecking Order theory prevails because when the firm liquidity is good (high), that firm will chose internal source of financing instead of using debt. In other words, the moderating effect of firm size is not real when the firm liquidity is in an excellent condition. This result is in line Alipour et al. (2015); Malinic et al. (2013); Eriotis et al. (2007). They found that when the firm liquidity proxied by the current ratio, quick acid ratio and working capital ratio is high, the firm would prefer to finance its investments using its current assets instead of using outside financing (debt).

The test of moderating effect of firm size and inflation rate on capital structure shows empirical results that the firm size is able to weaken the negative influence of inflation on the capital structure. In other words, the hypothesis is accepted. According to the Agency Theory, the large firm size will result in adjustment cost when the inflation increases. Inflation will lead to uncertain

economic circumstance and under this condition, the company will tend to choose debt as a financing alternative. This result is consistent with Baltacı & Ayaydın (2014); Chipeta & Mbululu (2013).

The test of the moderating effect of firm size and GDP on the capital structure shows that the firm size is able to weaken the negative effect of GDP on capital structure. So, the hypothesis is accepted. This means the asset of a firm indicating the firm size shall have an effect in deciding the firm capital structure, as long as the economic condition reflected in GDP is in good condition. If the GDP increases, the firms tend to choose the internal source of capital than the leverage. This result is in line with Ukaegbu & Oino (2014); Bayrakdaroglu et al. (2013).

## CONCLUSION

In making the financing decision, the decision makers such as managers, board of directors and investors should consider the determinants of capital structure. The factors significantly affect the capital structure are profitability, liquidity, inflation and GDP. Meanwhile, the factor which statistically does not affect the capital structure significantly is tangibility. Of the factors significantly affecting the capital structure, only profitability which affects the capital structure positively. It means, if the profitability increases, the capital structure also increases, vice versa. Inversely, liquidity, inflation, and GDP have a negative effect on capital structure. The variables affecting the capital structure significantly through firm size as the moderating variable are tangibility, profitability, inflation and GDP. Meanwhile, liquidity has insignificant effect on the capital structure.

The results of this research can become the input for the management of construction firms, this research is useful as it can be the input in determining the appropriate capital structure. The management should maintain the leverage level to a certain limit. Thus, the management should pay a close attention to the firm size when deciding the financing decision in order to reduce the risk of capital shortage. To the investors, this research is beneficial in determining the investment choice so they can maximize the returns. The firms with a mid-level of debt shall give a higher return to the investors. Thus, the investors may consider the firm-specific factors and external macroeconomic variables.

The sample used in this research is only the construction firms listed on the Indonesian Stock Exchange. So, the further research may be conducted by using other industries to explore more information regarding the effect of the variables affecting the capital structure. The further research may also be conducted by using other proxies or adding more variables, sample size and research period to get a better result.

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# Economic and Mathematical Modeling of the Shocks Impact on the Russian Economy Stability

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## ABSTRACT

The identification and analysis of structural trends and the close monitoring of macroeconomic and financial vulnerabilities can improve economic resilience to shocks. This research modeled the effects of exogenous and endogenous economic shocks on the stability of the Russian Federation's economic system. Granger test results uncovered that the key internal, external, and global economic shocks affecting Russia's economic stability are productive, monetary, and budget policy shocks, foreign exchange shocks, and oil price shocks. A spectral analysis confirmed the absence of structural changes in the Russian economy from 2000 to 2018, which was regarded as the basis of representativeness of the chosen study period. Vector autoregression models were used to determine specific shock effects on the aforementioned stability, and elasticity indicators were calculated to characterize the response of the Russian economy to economic impulses (shocks). The calculation enabled us to classify types of shock by priority. The results can serve as reference in developing domestic and foreign economic policies intended to prevent or minimize the impact of external negative shocks on the economy of Russia. They can also be adopted as guidelines in formulating measures of Russian economic growth stimulation.

# INTRODUCTION

Economic shocks are the basic factors contributing to economic instability in a country (Jiang et al., 2019; Yang, 2019; Bonciani and van Roye, 2016). These occurrences result in long economic recessions in systemically important countries and partner nations, and they diminish the activities of traditional export economies or cause uncertainty in these dealings (Bonciani and van Roye, 2016; Ong and Sato, 2018). In the context of emerging globalization, the effects of shocks are substantially exacerbated given the gradual elimination of borders among national economies. Shock events occur unexpectedly and are therefore extremely difficult or even impossible to predict (Ong and Sato, 2018); clearly identifying a given shock itself is unattainable. The unsystematic character of economic shocks makes it impossible for an economic system to definitively pinpoint their consequences as the extent and the scope of the process depend on specific conditions. In general, any type of economic shock can take on a wide range of values (Jiang et al., 2019; Yang, 2019). A specific category of shocks are macroeconomic ones, which are probabilistic, as recognized by numerous economists (Kornstad, Nymoen and Skjerpen, 2012; Schiaffino, Crespo and Heymann, 2017), including O.J. Blanchard. The author indicated that the causes of shocks include changes in consumer sentiment, a decline in investment demand, a decrease in monetary demand, lost productivity, and oil price collapse (Blanchard and Milesi-Ferretti, 2011; Blanchard and Summers, 2017).

Similar to most economies in the world, Russia is substantially influenced by systemically important countries, whose economic changes affect the global economy in general and Russian economic stability in particular. Among these nations, the main trade partners of Russia are as follows:

- China – Russia's main strategic partner (The trade turnover is 15.74% of Russia's total foreign trade turnover, according to the references of 2018)
- Germany – 8.66% of Russia's total foreign trade turnover
- Netherlands – 6.85% Russia's total foreign trade turnover
- Belarus – 4.94% Russia's total foreign trade turnover

Russia also entered into trade partnerships with member states of the European Union (EU) (42.7% of foreign trade turnover) and the Asia-Pacific Economic Cooperation (APEC) (31.0%) in 2018 and 2019, respectively. According to US news and world reports, the Russian economy is likewise affected by the most influential countries in the world, namely, the US, the UK, France, Japan, Israel, Saudi Arabia, and South Korea (The World's 25 Most Powerful Countries Official Rating, 2019). Issues worth highlighting are the fact that the Russian economy is typified by a developing market and that a remarkable share of raw material exports are less resistant to external shocks than are the exports of developed economies (Abegunde and Stanciole, 2008; Bouwmeester and Oosterhaven, 2017). Russia is characterized by an economic structure and a financial market that are less diversified and less developed than those of other nations, respectively (Ankudinov, Ibragimov and Lebedev, 2017; Ono, 2017). To begin with, external shocks affect the country's commodity sector, budget revenues, and foreign currency liquidity (Korotin et al., 2019). As reported by the International Monetary Fund (IMF), the annual negative effect of sanctions on the growth of the Russian GDP from 2014 to 2018 averaged 0.2 percentage points. The greatest damage to economic growth was caused by a drop in oil prices, which averaged at 0.65 percentage points. Russia's annual GDP growth averaged at 0.5%. Had it not been for economic shocks, the average annual growth in the country could have reached 1.7% (Russian Federation, 2019, 2019). These developments reflect the need to examine the influence of external shocks using not only classical approaches to economic policy implementation but also fundamentally new techniques. A country can fortify its resilience to shocks by strengthening policy that deals with long-term problems and vulnerabilities that can cause expensive shocks. It can also develop economic measures designed to offset shock factors and accelerate recovery.

In consideration of the above-mentioned issues, this study modeled the effects of exogenous and endogenous economic shocks on the stability of the Russian economic system. The research substantiated the reliability and completeness of an exogenous and endogenous shock sample used to trace the development of the Russian economy. The characteristics of shock effects were determined, and indicators that embody the response of the Russian economy to economic impulses (shocks) were introduced. The rest of the paper is structured as follows: Section 2 presents a review of the literature, and Section 3 outlines the factors explored in this work, the hypotheses formulated, and the research methodology. Section 4 describes the data collection, and Section 5 presents the data analysis and discusses the results. Section 6 provides the conclusions, and Section 7 consists of recommendations.

## 1. LITERATURE REVIEW

Nowadays, in terms of studies of economic cycles, one approach is widely used to determine the results of a random impact on the economic system, the so-called impulses, or shocks, which destabilize the economy and cause response effects (Mishchenko, 2014). The types of economic shocks are divided into:

- Internal, shocks that occurred within the country;
- External, shocks that are correlated to the economic development of foreign countries and groups, as well as to the financial market (Almansouretal, 2015; Andrade and Zachariadis, 2016; Civcir and Varoglu, 2019);
- Global, shocks formed in global markets (Andrade and Zachariadis, 2016; Civcir and Varoglu, 2019).

There is a wide range of economic shocks that influence the sustainability of economic development, namely, shocks that involve the real and financial sectors of the economy, labor, external and global factors (Ankudinov, Ibragimov and Lebedev, 2017; Ono, 2017).

The ambiguity of shock phenomena justifies the dialectical approach to formulate the essence of shocks. Shocks must be regarded as a form of influence from an external factor that influences economic integrity in both negative and positive ways (Minsky, 1982; Carriero, Galvao and Marcellino, 2017). H. Minsky declared that a positive aspect is the clear advantages of the exogenous push for the macroeconomic system. The magnitude of external influence can improve economic prospects for at least one sector of the economy (Minsky, 1982). This helps to catalyze economic growth, as in the example of Japanese economic leadership, the “East Asian miracle,” and the “New American Economy” (Minsky, 1982). However, the dual nature of the shocks impact on economic sustainability should be noted. Thus, in Russia the signs of a “Dutch disease” have been observed. The negative effect of positive shocks comes out in national currency strengthening. This leads to the prioritizing of the commodity sector at the expense of the manufacturing sector. For example, the constant increase in oil prices at the beginning of the century contributed to the dependence of the national economy on oil exports (Pönkä and Zheng, 2019). Moreover, in this period, despite the Russian GDP growth, the quality of economic growth was not improving. Thus, the short-term positive effects of economic shocks do not contribute to positive results over the longer term (Carriero, Galvao and Marcellino, 2017). The duality and uncertainty of economic shocks impact economic stability. Therefore, it is a necessity to study their assessment and identification.

There is some ambiguity in the literature about the definition. Some researchers use the term *shock* to mean *innovation* (i.e. the residuals from a Vector Autoregression Model (VAR)) or *instrument*. Sims (1980) regarded *innovations* as macroeconomic *shocks*, despite claiming to be atheoretical. Other researchers used the word *shock* to mean *instrument* (e.g. Cochrane, 2004). In this work, we regard *shocks*, *VARinnovations*, and *instruments* as different concepts, although their identification may equate them in many cases. Shocks are most closely related to the structural

disturbances in a system of simultaneous equations. We accept the concept of shocks as developed by such researchers as O. Blanchard and M. Watson (1986), and B. Bernanke (1986).

The research of large-scale econometric and single - equation models, conducted from 1940 to 1970, determined fiscal and monetary policy shocks (Ramey, 2015). In the 1980s, there were two important innovations observed that fundamentally changed the essence of the research. First, Sims's work "Macroeconomics and Reality" (1980) revolutionized the study of systems controlled by random pulses by introducing vector autoregression (VAR). Sims's VARs connected the innovations to a linear system and macroeconomic shocks. This method made it easier to identify assumptions and impulse response functions, as well as to do innovation accounting using the decomposition of forecast error. A second important innovation was the extension beyond political shocks to accommodate important non-political shocks, such as technological ones (Kydland and Prescott, 1982). These innovations contributed to a number of studies of shocks and their consequences.

There are a lot of other approaches. It is worth noting the SVAR model with restrictions on the signs of the vectors of impulse response, namely sign restricted SVAR (hereinafter SR-SVAR). Some researchers devoted their works to the influence of monetary policy and demand shocks on various macroeconomic indicators using SR-SVAR (Uhlig, 2005; Mountford and Uhlig, 2009; Enders, Müller and Scholl, 2011; Vargas-Silva, 2008; Mallick and Sousa (2013). The shock of monetary policy and the changes of financial conditions in the eurozone are analyzed in the framework of SR-SVAR. The analysis results indicate the important role of financial shocks in the dynamics of real variables. The same authors conducted a similar study on the role of monetary policy in developing countries, including Russia (Mallick and Sousa, 2012). They came to the conclusion that tough policies can stabilize inflation, although its basic effect is a decreased output.

Another significant study was conducted by Sanchez (Sanchez, 2007). He highlights premium shock risk. In his work, Sanchez comes to controversial conclusion: external shocks do not affect developing economies as much as internal ones. He explains that the methodology of the model deals with unexpected shocks, bit not just changes. The features of the impact of shocks on the stability of the economy are considered in this study on the example of Russia, as a country with a developing market, commodity economy, and a narrow differentiation of production.

## 2. METHODS AND MATERIALS

The methodological basis of the study was a vector autoregression model implemented with a time series reduced to stationarity according to the results of the cause-effect relationship determination. The use of the vector autoregression model is caused by the necessity to take into account autocorrelation and time lag of variables. To verify the stationarity of the time series, the advanced Dickey-Fuller method was used in the EViews 10.0 software package. Stationarity of the time series provides the use of VAR for analyzing the shock effect on the stability of Russian economy. The Granger causality test was used to determine the cause-effect relationship between the indicators and their statistical significance. According to the calculations and the selected structure of shocks (internal, external, and global) that impact the economic stability of Russia, the VAR is developed:

$$\begin{cases} (Y_k)_t = A_0 + A_1(Y_k)_{t-l} + A_2(X_i\_C)_{t-l} + \varepsilon_t & (1) \\ (Y_k)_t = A_0 + A_1(Y_k)_{t-l} + A_2(X_i\_C_j)_{t-l} + \varepsilon_t & (2) \\ (Y_k)_t = A_0 + A_1(Y_k)_{t-l} + A_2(Z_i)_{t-l} + \varepsilon_t & (3) \end{cases}$$

Where:

$(Y_k)_t$ - - dependent variable vector that characterizes the economic stability of Russia. Vector of the composite indicator of function (1) takes on value of functions (2)-(3) - $Y\_C$, $X_i\_C$;

$A_0$ – vector of constants;
$A_1$ – matrix coefficient for lag values of the composite;
$A_2$ – matrix of coefficients for lag values of variables describing the shock effect on the stability of the economy;
$(X_i\_C)_t$, $(X_i\_C_j)_t$, $(Z_i)_t$ – vector of variables describing the shocks effect on the stability of the economy;
$\varepsilon_t$ – model error;
$t - l$ – time lag, $l = \overline{1,2}$.

The presented functions form a decomposition of the model of the internal shocks ($X_i\_C$) impact on the economic stability of Russia - function (1); decomposition of the model of the external shocks ($X_i\_C_j$) impact on the economic stability of Russia - function (2); decomposition of the model of the global shocks ($Z_i$) impact on the economic stability of Russia - function (3).

According to the factors studied, the vector of endogenous model variables is formed like the following: $(X_i\_C)_t$ is vector of the time series values of internal *i* pulse variables in Russia, $i = \overline{1,7}$; $(X_i\_C_j)_t$ isvector of the time series values of external *i*pulse variables in other countries $C_j$, $i = \overline{1,7}$, $j = \overline{1,11}$; $(Z_i)_t$ is vector of the time series values of global *i*pulse variables, $i = \overline{1,2}$.

In function system (1)-(3) vector of variables are used: *b, c* = $\left[(Y_k)_t, (X_i\_C)_t, (X_i\_C_j)_t, (Z_i)_t\right]$, that satisfy the conditions: $b_t = \alpha_0 + \sum \alpha_j \cdot b_{t-l} + \sum \beta_j \cdot c_{t-l} + \varepsilon_t$, for$\beta_j \neq 0$. Where*b*, *c* are dependent and independent variables respectively; $\alpha_0$, $\alpha_j$, $\beta_j$ are regression coefficient; $\varepsilon_t$ is an error.

## 3. DATA

To describe the impact of external economic shocks on the stability of the Russian economy, the index of the real GDP of Russia in millions of US dollars (Y) was used as the resultant indicator for 2000-2018 with quarterly detailing of indicators. The use of a real variable adjusted for the deflator made it possible to offset the growth of GDP due to an increase in the price level. The variable calculated using the indicator values in millions of US dollars allowed taking the devaluation / revaluation factor of the national currency into account . The use of relative indicator (index) made it possible to commensurate the data and improve the reliability of the results. Besides, the use of the index values allowed us to level the seasonal component, which appears in quarter study, by finding indices (growth rates) of the indicator relative to the same period (quarter) of the previous year.

The industrial production index in millions of US dollars (X1) was used for the analysis of the production shock impact on the Russian economy. For the analysis of the impact of the monetary market and the corresponding shock, the authors used the weighted average interest rate of loans that were revealed by credit institutions to non-financial organizations in the national currency, % (X2). The consumer price index (X3) was used for the analysis of the price shock impact. For the analysis of the impact of the internal shocks on economic sustainability, the authors used the following indicators of fiscal policy: the unemployment rate for citizens aged 15 and older, % (X4) and the ratio of external debt to GDP in millions of US dollars (X5).

The impact of a foreign trade shock was estimated through the ratio of the current account of the balance of payments to the GDP in millions of US dollars (X6). A decrease in this indicator will lead to a further decrease in GDP due to a decrease in exports. The effect of the exchange rate and the effects of the currency shock are reflected in the national currency to US dollar index (X7). The representativeness of the indicators list (X1-X7) for the period from 2000 to 2018 for the analysis of the shocks impact is confirmed with the multivariate factor analysis. The factorization proportion

was 86.4%, which means that the introduced scorecard is meaningful (a sufficient level of 80%) (Menke, 2018).

Sanctions against Russia were regarded by the IMF for the period from 2014 to 2018 as one of the most influential shocks (the IMF decomposed Russia's economic growth into external shocks, 2019). However, the authors did not consider them in the study, since their influence is reflected in indicators X1-X7. The indicators X1-X7 for the period from 2000 to 2018 for the countries of the greatest impact on Russian economy development are characterized with a high coefficient of variation due to the difference in levels and pace of economic development (61-88% for the EU, EAEU, BRICS, CIS, and 73-92% for APEC). This contributes to the heterogeneity of the sample. Therefore, the indicators X1-X7 of external shocks that impact the stability of the Russian economy were used for the following countries: China (C1), Germany (C2), Netherlands (C3), Belarus (C4), the United Kingdom (C5), France (C6), Japan (C7), Israel (C8), Saudi Arabia (C9), South Korea (C10); for the USA (C11) were used indicators X1-X6.

In addition to external shocks, the global economy is also influencing the Russian economy, namely: the oil prices shock (the Brent crude oil price index, calculated in US dollars (Z1)) and gas prices shock (the world index for natural gas prices, calculated in US dollars (Z2)). The application of these global factors is based on the fuel and energy specialization of Russia in world markets and this sector dominance in domestic economy. All the indicators (Y, X1-X7, Z1-Z2) are presented by relative variables. It provides the commensurability of the indicators and the adequacy of the modeling results. The time period of the study is from 2000 to 2018. The indicators of external and global factors for these years were applied in the research.

## 4. RESULTS

To identify structural changes in the Russian economy for the period from 2000 to 2018, which affects the selection of research methodology, the dynamics of the real GDP index (y) is analyzed and a spectral analysis is carried out. During this period, the Russian economy has a distinct decline from the 1st quarter of 2000 to the 3rd quarter of 2001 (Figure 1a) and stable values during the subsequent period. The results are confirmed by the polynomial trend line of the 6th degree, which does not distinguish periods of index recession and growth from the 3rd quarter of 2002. The dynamics of the real GDP index is reflected in the trend line and is confirmed by the approximation coefficient of 0.8776, which is higher than the boundary value of 0.75.

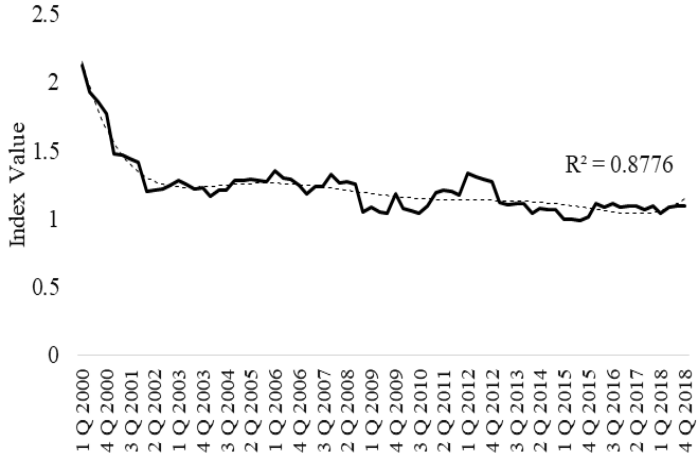


**Figure 1a.** The dynamics of the Russian real GDP index

| | Spectral analysis No. of cases: 76 | | | | | | |
|---|---|---|---|---|---|---|---|
| | Frequency | Period | Cosine Coeffs | Sine Coeffs | Periodogram | Density | Hamming Weights |
| 0 | 0.000 | | 0.000 | 0.000 | 0.000 | 0.144 | 0.036 |
| 1 | 0.013 | 76.00 | 0.069 | -0.051 | 0.277 | 0.191 | 0.241 |
| 2 | 0.026 | 38.00 | 0.062 | -0.014 | 0.154 | 0.271 | 0.446 |
| 3 | 0.039 | 25.33 | 0.121 | -0.004 | 0.561 | 0.305 | 0.241 |
| 4 | 0.053 | 19.00 | 0.012 | 0.009 | 0.008 | 0.186 | 0.036 |
| 5 | 0.066 | 15.20 | 0.043 | 0.050 | 0.166 | 0.108 | |
| 6 | 0.079 | 12.67 | 0.028 | 0.015 | 0.038 | 0.079 | |
| 7 | 0.092 | 10.87 | 0.032 | 0.034 | 0.081 | 0.069 | |
| 8 | 0.105 | 9.50 | 0.019 | 0.039 | 0.072 | 0.056 | |
| 9 | 0.118 | 8.444 | 0.017 | -0.006 | 0.012 | 0.029 | |

**Figure 1b.** Spectral analysis of the dynamics of the Russian real GDP index

Spectral analysis results confirm the absence of cycles in the indicator development. A period with statistically significant indicator "Periodogram" (Periodogram Values) has not been identified (Figure 1b). The absence of cycles in the Russian economy development and the distinct tendency to decline or rise at certain time intervals indicates the absence of structural changes. This fact made it possible to use the indicated period (2000-2018) as the modeling period for the study.

Table 1 introduces the results of the analysis of the data series for stationarity using the extended Dickey-Fuller test. The table shows significant statistics at p = 0.05 for the indicators Y, X1-X7, and Z1-Z2.

**Table 1.** Extended Dickey-Fuller test of the data series for stationarity

| Indicator | *C* | *C1* | *C2* | *C3* | *C4* | *C5* | *C6* | *C7* | *C8* | *C9* | *C10* | *C11* | *W* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| y | 0.023 * (I, 1)** | 0.008 (I, 2) | 0.039 (I, 0) | 0.008 (I, 0) | 0.040 (I, 1) | 0.000 (I, 0) | 0.025 (I, 1) | 0.004 (I, 0) | 0.000 (I, 1) | 0.002 (I, 0) | 0.038 (I, 1) | 0.019 (I, 2) | - |
| X1 | 0.026 (I, 0) | 0.009 (I, 0) | 0.028 (I, 1) | 0.019 (I, 0) | 0.008 (I, 1) | 0.019 (I, 0) | 0.031 (I, 0) | 0.002 (I, 1) | 0.019 (I, 0) | 0.034 (I, 0) | 0.002 (I, 1) | 0.009 (I, 1) | - |
| X2 | 0.009 (I, 0) | 0.008 (I, 1) | 0.034 (I, 0) | 0.034 (I, 0) | 0.004 (I, 1) | 0.013 (I, 0) | 0.024 (I, 0) | 0.011 (I, 0) | 0.027 (I, 0) | 0.025 (I, 0) | 0.006 (I, 0) | 0.004 (I, 1) | - |
| X3 | 0.037 (I, 0) | 0.005 (I, 0) | 0.008 (I, 0) | 0.006 (I, 0) | 0.011 (I, 1) | 0.029 (I, 0) | 0.005 (I, 1) | 0.022 (I, 0) | 0.005 (I, 0) | 0.018 (I, 0) | 0.014 (I, 0) | 0.041 (I, 1) | - |
| X4 | 0.007 (I, 0) | 0.013 (I, 1) | 0.001 (I, 0) | 0.008 (I, 1) | 0.019 (I, 1) | 0.007 (I, 1) | 0.004 (I, 1) | 0.008 (I, 1) | 0.011 (I, 0) | 0.019 (I, 0) | 0.018 (I, 0) | 0.022 (I, 1) | - |
| X5 | 0.012 (I, 0) | 0.007 (I, 1) | 0.013 (I, 0) | 0.008 (I, 0) | 0.007 (I, 1) | 0.001 (I, 1) | 0.007 (I, 0) | 0.004 (I, 0) | 0.009 (I, 0) | 0.008 (I, 0) | 0.020 (I, 0) | 0.037 (I, 1) | - |
| X6 | 0.029 (I, 1) | 0.001 (I, 1) | 0.000 (I, 1) | 0.014 (I, 0) | 0.004 (I, 1) | 0.006 (I, 0) | 0.001 (I, 0) | 0.016 (I, 0) | 0.004 (I, 0) | 0.015 (I, 0) | 0.005 (I, 0) | 0.027 (I, 1) | - |
| X7 | 0.037 (I, 2) | 0.006 (I, 1) | 0.009 (I, 1) | 0.024 (I, 1) | 0.029 (I, 2) | 0.033 (I, 1) | 0.031 (I, 1) | 0.011 (I, 1) | 0.016 (I, 1) | 0.023 (I, 1) | 0.034 (I, 1) | - | - |
| Z1 | - | - | - | - | - | - | - | - | - | - | - | - | 0.018 (I, 2) |
| Z2 | - | - | - | - | - | - | - | - | - | - | - | - | 0.029 (I, 2) |

*Explanation of Symbols:*
* - the probability of accepting the null hypothesis that the time series is not stationary;
** - specification for time series stationarity;

I – Intersep – time series specification relative to a constant;
0 – level; 1 – the 1st; 2 – the 2ndrow difference;
C - Russia, C1 - China, C2 - Germany, C3 - Netherlands, C4 - Belarus, C5 – the Great Britain, C6 - France, C7 - Japan, C8 - Israel, C9 - Saudi Arabia, C10 - South Korea, C11 – the USA, W – World

The t-Statistic values indicate the stationarity of the following time series:

- Originaltimeseries (Y forthecountries C2-C3, C5, C7, and C9; X2 forthecountries C2-C3, C5-C7, and C9-C10; X1 forthecountries C, C1, C3, C5-C6, and C8-C9; X2 for C, C2-C3, and C5-C10; X3 for C, C1-C3, C5, and C7-C10; X4 for C, C2, and C8-C10; X5 for C, C2-C3, and C6-C10; X6 for C3, and C5-C10) .
- Integratedfirst-orderseries (Y for C, C4, C6, C8, and C10; X1 for C2, C4, C7, and C10-C11; X2 for C1, C4, and C11; X3 for C4, C6, and C11; X4 for C1, C3-C7, and C11; X5 for C1, C4-C5, and C11; X6 for C, C1-C2, C4, and C11; X7 for C1-C3, and C5-C10) .
- Second-order series (Y for C2 and C11; X7 for C and C4; Z1 and Z2).

Thus, these indicators can be applied in the study of the shocks' impact on the economic stability of Russia. The Granger causality test was conducted to identify causal relations between shock factors that impact the stability of the Russian economy. The lag selection (L = 1, … 4) is determined by the use of quarterly data in the study. Table 2 introduces statistics that are significant at p = 0.05, which indicate the influence of factors (external and global) on the economic stability of Russia.

**Table 2.** The Granger causality test, reflecting the impact of world economic shocks on the economic stability of Russia

| Causal Direction | Influencing Country | | | Causal Direction | Influencing Country | | |
|---|---|---|---|---|---|---|---|
| | *C* | *C1* | *C11* | | *C* | *C1* | *W* |
| $X1^1 \rightarrow y^2$ | 0.033, L=1 | $0.028^3$, $L=2^4$ | - | X6 → Y | 0.035, L=1 | - | - |
| X1 → X1 | - | 0.011, L=2 | - | X7 → Y | 0.038, L=1 | 0.020, L=2 | - |
| X1 → X5 | - | 0.020, L=2 | - | X7 → X1 | - | 0.030, L=2 | - |
| X1 → X6 | - | 0.011, L=2 | - | X7 → X5 | - | 0.021, L=2 | - |
| X1 → X7 | - | 0.009, L=2 | - | X7 → X6 | - | 0.020, L=2 | - |
| X2 → Y | 0.038, L=1 | - | 0.031, L=2 | X7 → X7 | - | 0.029, L=2 | - |
| X2 → X1 | - | - | 0.017, L=2 | Z1 → Y | - | - | 0.009, L=1 |
| X2 → X5 | - | - | 0.011, L=2 | Z1 → X1 | - | - | 0.013, L=1 |
| X2 → X6 | - | - | 0.017, L=2 | Z1 → X5 | - | - | 0.001, L=2 |
| X2 → X7 | - | - | 0.014, L=2 | Z1 → X6 | - | - | 0.011, L=1 |
| X5 → Y | 0.049, L=1 | - | - | Z1 → X7 | - | - | 0.005, L=1 |

*Explanation of Symbols:*
1 – indicator for countries C1-C11, influencing the economic stability of Russia;
2 – indicator for Russia, which is influenced by external and global factors;
3 - the minimal (significant) probability of accepting the hypothesis that a causal relationship is insignificant with the lags under consideration;
4 - time lag providing the indicated probability

Table 2 introduces the cause-and-effect relations that are statistically significant with a confidence interval of 95%. They reflect the impact of internal, external and global shocks on the economic stability of Russia. The analysis showed that the Russian economy is most vulnerable to

production, monetary and credit shocks, budget policy shocks, foreign trade, foreign exchange and oil prices shocks. The Granger test revealed statistically significant impact of these shocks on Russia's economic stability. Currently, the impact of price and unemployment shocks is not significant. This is caused by more significant influence of world prices for goods, services and currency than domestic prices, and by a significant share of unreported employment. According to the geopolitical criterion, the stability of the Russian economy is most significantly influenced by global shocks - Z1, for which the probability of accepting the hypothesis on the cause-effect relation insignificance comprises (0.001-0.013). The probability of a hypothesis rejection by external shocks is (0.009-0.031). The highest probability (0.033-0.049) suggests that there is a less significant impact of internal shocks on the stability of the Russian economy. Russian economy is most influenced by China (production and currency shocks) and the United States (monetary shock). The impact of other factors on the economic stability of Russia is not so statistically insignificant at p = 0.05. All external shocks introduced in the Table 2, demonstrate the impact on the economic stability of Russia with a lag of 2 quarters. A faster reaction is observed to the changes in internal and global factors and comprises 1 quarter. Figure 2 shows the impulse responses of the Russian real GDP index (Y_C) to internal economic shocks and the elasticity values (E) of changes in the real GDP index influenced by shocks, calculated with VAR models. Elasticity is shown in Fig. 2-5, calculated as the change in the resulting indicator, expressed in%, caused by an increase in the pulse value by 1%. Elasticity (Figures 2-5) is calculated as the change in the resultant indicator, expressed in%, and caused by an increase in the pulse value by 1%.

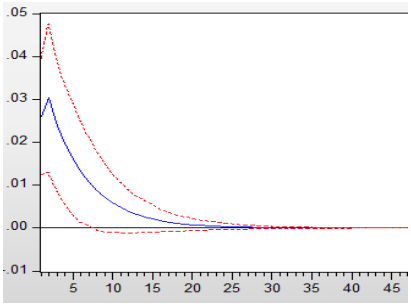

**Figure 2a**. The response of Y_C to the pulse X1_C, E = 0.07.

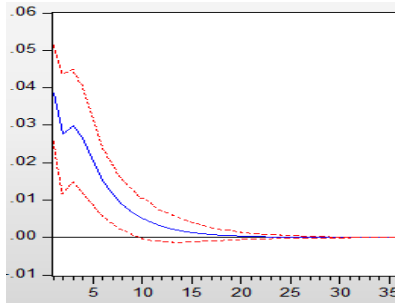

**Figure 2b**. The response of Y_C to the pulse X2_C, E = 0.04.

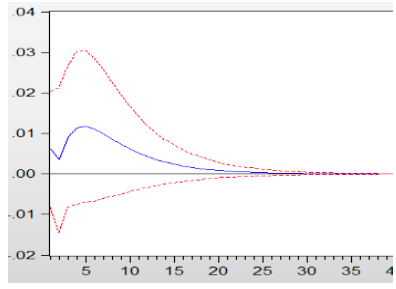

**Figure 2c**. The response of Y_C to the pulse X5_C, E = -0.05.

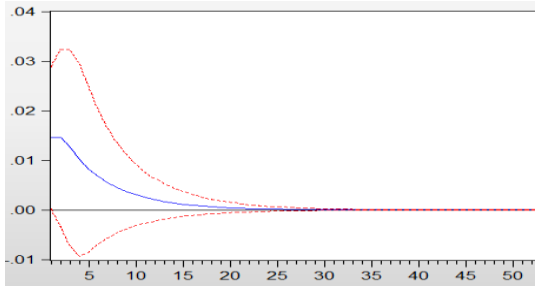

**Figure 2d.** The response of Y_C to the pulse X6_C, E = 0.07.

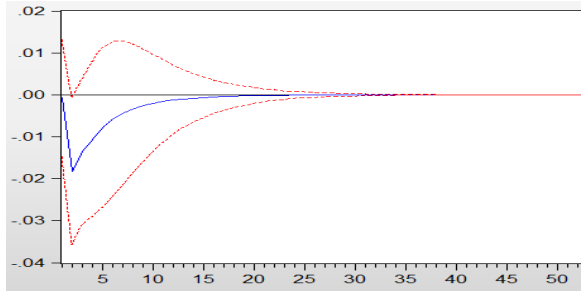

**Figure 2e.** The response of Y_C to the pulse X7_C, E = -0.04.

**Figure 2**. The response of the Russian of real GDP index (Y_S) to internal impulses

The calculated elasticity indicators reveal a positive impact on economic stability and the dynamics of the real GDP of Russia of the following internal impulses: as an increase in the industrial production index, an increase in the money market rate, an increase in the ratio of the current balance of payments to GDP and a negative effect of the increase in the ratio of external debt to GDP, ruble devaluation. The transmission mechanism of the influence of the Chinese economy on the

Russian economy is realized through production (indicator X1) and currency (indicator X7) shocks (Figure 3).

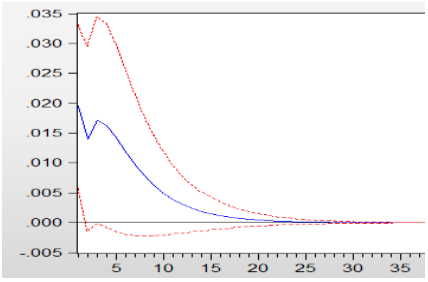

**Figure 3a.** The response of У_C to the pulse X1_C1, E = 0.14

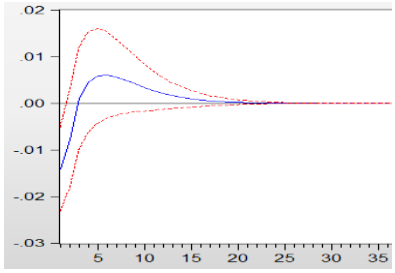

**Figure 3b.** The response of X1_C, to the pulse X1_C1, E = 0.11

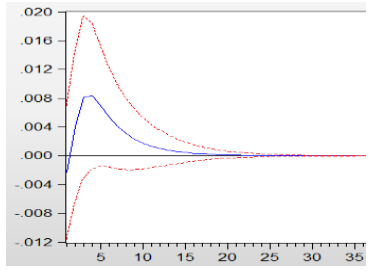

**Figure 3c.** The response of X5_C to the pulse X1_C1, E=-0.29

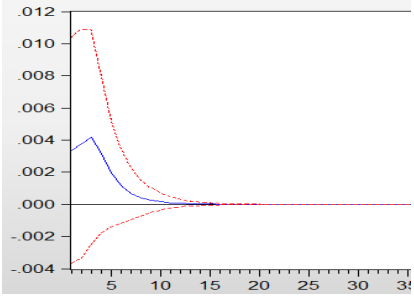

**Figure 3d.** The response of X6_C to the pulse X1_C1, E=0.32

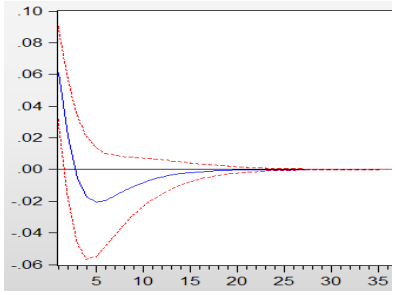

**Figure 3e.** The response of X7_C to the pulse X1_C1, E=-0.08

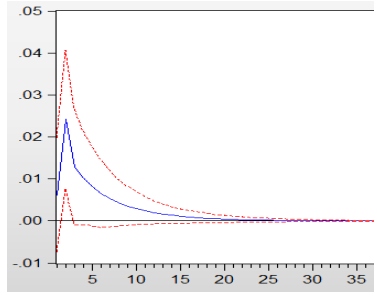

**Figure 3f.** The response У_C to the pulse X7_C1, E=-0.13

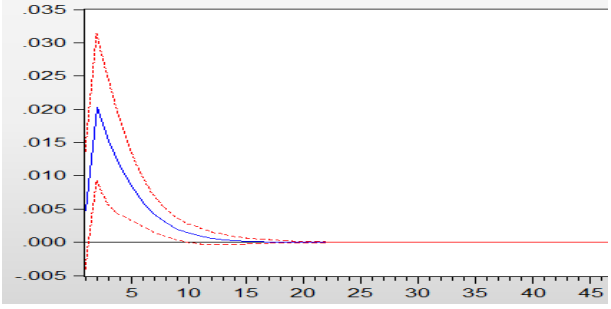

**Figure 3g.** The response of X1_C to the pulse X7_C1, E=-0.10

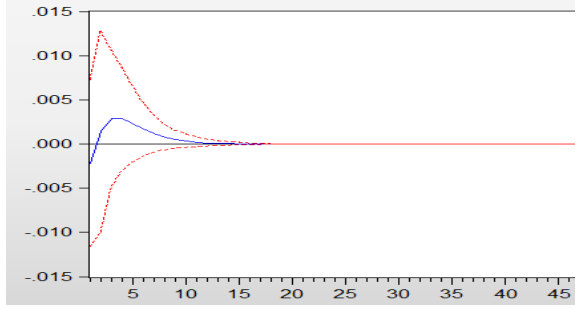

**Figure 3h.** The response of X5_C to the pulse X7_C1, E=0.25

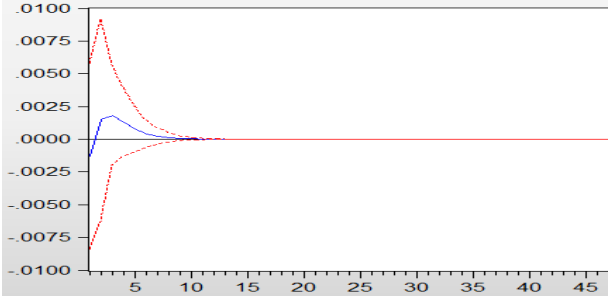

**Figure 3i.** The response of X6_C to the pulse X7_C1, E=-0.44

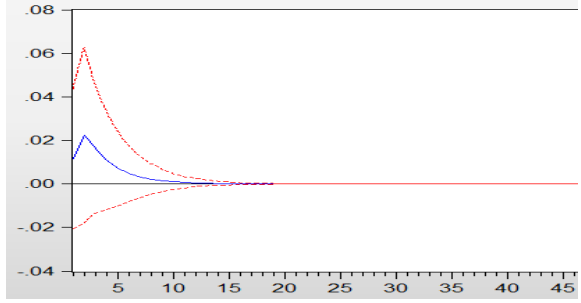

**Figure 3j.**The response of the X7_C to the pulse X7_C1, E=0.10

**Figure 3.** The response of indicators of economic stability of Russia (У _S, X1_C, X5_C, X6_C, X7_C) to external impulses of the Chinese economy

The reaction of the Russian economy to the production shock is expressed through the trade channel, by means of the changes in the external consumption of energy resources. Decrease in China's industrial production (X1_C) contributes to:

- A decrease in demand for Russian oil products.
- A decrease in the current account balance of payments caused by a decrease in exports (X6_C).
- Production decline (X1_C).
- Reduction of the filling of the budget revenues, which causes the increase of debt burden (X5_C).
- Devaluation of the ruble exchange rate (X7_C) caused by reduction of the dollar supply.
- A decrease in China's industrial production index by 1% contributes to:
- A decrease in Russia's industrial production index by 0.11%.
- An increase in the ratio of the external debt to GDP by 0.29%.
- A decrease in the ratio of current account balance of payments by 0.32%.
- Ruble devaluation by 0.08% percentage points
- The total decline in the real GDP index was estimated as 0.14%.

Currency shock, i.e. a Yuan rate change, using the example of devaluation, contributes to appreciation of imports. As a result, China is trying to reduce its volume. Reducing importation of goods and services reduces Russia's export earnings, balance of payments, production, and GDP. Besides, it leads to an increase in the ratio of external debt to GDP. As a result of modeling, it was found that Yuan devaluation by 1% contributes to a decrease in the production index of Russia by 0.10%, an increase in the ratio of external debt to GDP by 0.25%, a decrease in the ratio of current account balance of payments by 0.44%, and ruble devaluation by 0.10%. The total decline in the real GDP index was estimated as 0.13%. The US impact on Russian economy stability is significantly determined by a monetary shock (Figure 4).

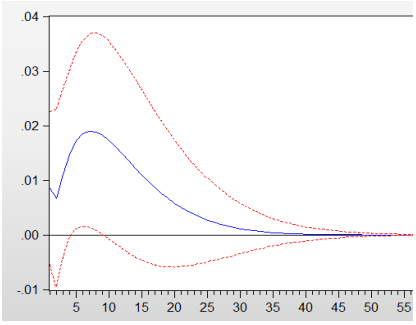

**Figure 4a**. The response of Y_C to the pulse X2_C11, E = -0.11

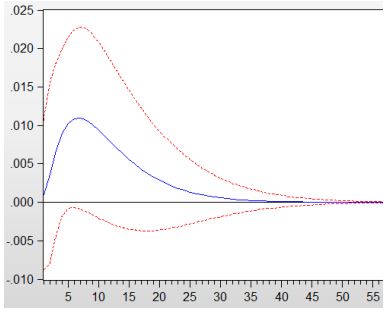

**Figure 4b.**The response of X1_C to the pulse X2_C11, E=-0.09

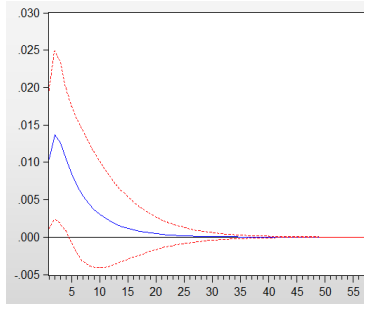

**Figure 4c.** The response of X5_C to the pulse X2_C11, E=0.12

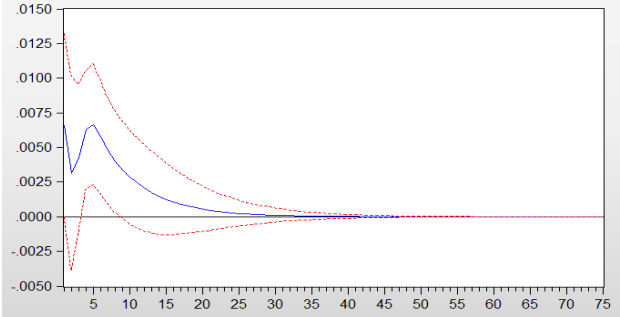

**Figure 4d.**The response of X6_C to the pulse X2_C11, E=-0.11

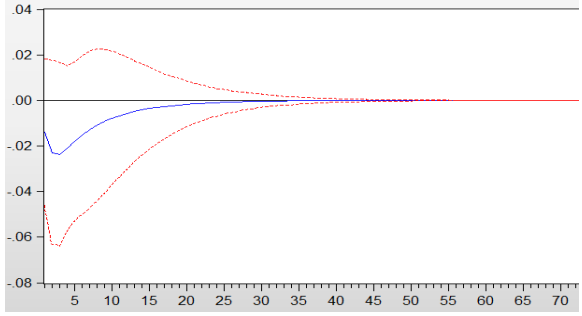

**Figure 4e.**The response of X7_C to the pulse X2_C11, E=0.08

**Figure 4**. The response of indicators of Russian economy stability to external impulses from the United States

An increase in the US money market rate leads to a revaluation of the dollar and lower oil prices, which affects the Russian economy. The US increase in the average weighted interest rate on loans by 1% contributes to:

- A decrease in Russia's production index by 0.09%;
- An increase in the ratio of external debt to GDP by 0.12%;
- A decrease in the ratio of current transactions of the balance of payments by 0.11%;
- Ruble devaluation by 0.08%;
- A decrease in the real GDP index by 0.11%.

The study showed the most significant impact on the Russian economy by the oil prices shock, determined by the world prices for Brent oil (Z1). This factor is based on the systemic function of the fuel and energy complex for the Russian economy, in particular, for the oil market (Figure 5).

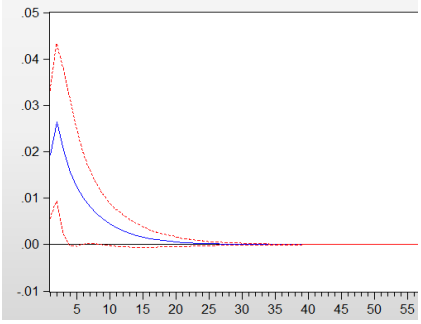

**Figure 5a**. The response of Y_C to the pulse Z1, E=0.21

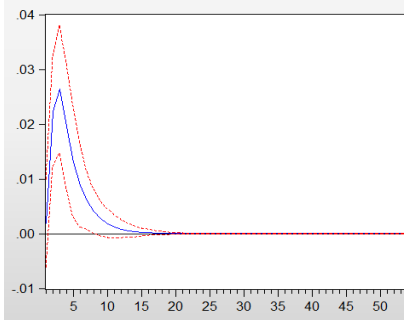

**Figure 5b**. The response of X1_C to the pulse Z1, E=0.16

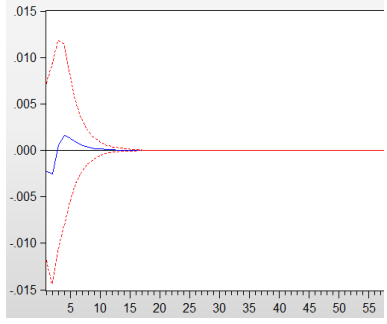

**Figure 5c.**The response of X5_C to the pulse Z1, E=-0.42

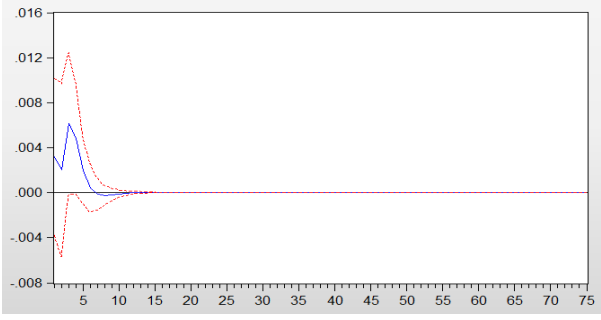

**Figure 5d.**The response of X6_C to the pulse Z1, E=0.60

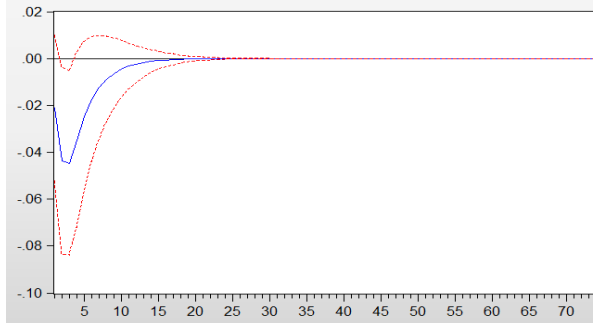

**Figure 5e.**The response of X7_C to the pulse Z1, E=-0.11

**Figure 5**. The response of indicators of Russian economy stability to global impulses

A decrease in world prices by 1% affects the following aspects:

- Oil exports and GDP (a decrease of 0.21%) due to exports decrease;
- Current account of the balance of payments (decrease of X6 by 0.6%);
- Production (decrease of X1 by 0.16%);
- Reduces the filling of the budget revenues, that leads to debt burden increase (an increase of X5 by 0.42%);
- Ruble devaluation (by 0.11%) due to the prolongation of the dollar decline.

The calculated indicators of elasticity for global shocks modulo exceed the values of the corresponding indicators for internal and external shocks. This indicates the greatest degree of dependence of the Russian economy stability on world oil prices. The smallest impact on the real GDP index is performed by internal shocks. The change in the real GDP index influenced by the internal

shocks is in the range 0.04-0.07, index influenced by the external shocks is in the range 0.11-0.14, and indexes influenced by global shocks comprise 0.21%.

## 5. DISCUSSION

The study was based on the development of a vector autoregressive model. As a result, it was possible to determine the character and priority of the shock's impact on the stability of Russian economy. In addition, the authors analyzed the features of the shocks' impact on the countries whose economic development significantly influences the global economy and whose external positions, if deviated in conditions of perfect competition and unstable price regulation, bring risks for the global economy. The applied approach to assessing the shocks' impact on economic stability has some key differences from well-known studies on this issue (Cochrane, 2004; Watson, 2012). Firstly, the time frame of the study is from 2000 to 2018. Thus, it includes the period of the first reaction of the Russian economy to the sanctions, and the succeeding quarters. Therefore, two crises were covered (the crisis of 2008–2009 and the crisis after 2013–2014). Since the period of crisis is characterized by the most significant shocks, we got the opportunity to conduct a natural experiment, resulting in more accurate estimates of the impact. Secondly, the sample of the external and internal shocks' influence on the Russian economy met the following characteristics:

- It should be exogenous in relation to the other current and lagged endogenous variables in the model.
- It should not correlate with other exogenous shocks.
- It must represent either unforeseen movements in exogenous variables or forecast future movements in exogenous variables.

The study conducted by the authors is significantly different to the current research (Mallick and Sousa, 2012; Mountford and Uhlig, 2009). Thus, it was possible to estimate the empirical components of the shocks and identify the causal relations of exogenous shocks.

It is worth highlighting that the presented approach to the assessment of macroeconomic impulses' impact on the economic stability made it possible to refute the theory that external shocks do not influence developing economies as much as the internal ones (Sanchez, 2007). The authors used the Granger causality test to prove empirically that a high probability (0.033-0.049) confirms that there is a less significant impact of internal shocks on the stability of the Russian economy. The results of the study proved the fact that the Russian economy is the most vulnerable to global shock – namely, world oil prices. This confirms the hypothesis that price fluctuations of raw materials are becoming one of the main sources of macroeconomic volatility in resource countries (Pönkä and Zheng, 2019).

The results of the study can be useful for the prevention of serious recessions and crises, and should be an integral part of the strategy of the Russian Federation to improve economic stability. The presented approach for the assessment of the economic shocks' impact is complemented with other monitoring tools and in-depth assessments that provide a holistic view of risks to the country. Countries without significant domestic or external imbalances can also be influenced by external shocks through spillovers and distribution via trade, financial and confidence channels. Nevertheless, the aim of the study is to identify the character and priority of the shocks' impact on the stability of a particular country. Therefore, due to the limited sampling, the results cannot be implemented into the economic practice of other countries. In addition, the dual long-term character of the shocks' impact on the economic stability has not been investigated. It will be the purpose of the further scientific research.

## CONCLUSION

The results of the empirical study provided the conclusions and recommendations that can be useful to reduce dependence on global markets fluctuations and for the development of preventive measures for the Russian economy. The dynamics of exogenous external and global shocks predetermines a significant proportion of fluctuations in key indicators of the Russian economy. The change in the real GDP index influenced by the internal shocks is in the range from 0.04% to 0.07%, influenced by external shocks is in the range from 0.11% to 0.14%, and influenced by global shocks comprises 0.21%. The most significant dependence of the Russian economy is observed in relation to the shocks of the global raw materials and financial markets. In addition, the Russian economy is influenced by trading partners such as the United States and China. It is necessary to provide distinct economic policy and structural reforms that would reduce the dependence of the Russian economy on foreign markets. Structural reforms will contribute to the diversification of the Russian economy. This will protect the exchange rate and the balance of payments from fluctuations in the global oil market.

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# Examining the Relationship Between Foreign Direct Investment and Economic Growth: Evidence from Croatia

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ABSTRACT

The paper examines the relationship between foreign direct investment (FDI) and economic growth in Croatia over the period 2000-2019, based on quarterly data. The research data were retrieved from the Croatian National Bank and Eurostat databases. Two options of time series were considered: (1) logarithm of GDP growth rate and logarithm of FDI and (2) logarithm of GDP growth rate and logarithm of FDI/GDP. The conducted research employed three cointegrations tests: Engle-Granger cointegration test, Johansen cointegration test, bounds cointegration tests (ARDL model). Results of three cointegration tests indicated that there is no long-run equilibrium relationship between quarterly GDP growth rate and any of the FDI series. Lack of long-run equilibrium relationship between GDP growth rate and FDI means also that there is no Granger causality relationship between these series. In other words, FDI have no statistically significant impact on the growth rate of the GDP in Croatia for the period being investigated. This research study has important theoretical and practical implications. One of the possible explanations would be in the type of FDI inflow, mostly brownfield FDI. However, greenfield FDI is the one generating more positive effects on the recipient country and countries should focus their efforts to attract this type of FDI.

## INTRODUCTION

There is a vast literature examining the impact of FDI on economic growth (de Mello, 1997; Balasubramanyam et al.,1999, etc.) which found positive impact of FDI on economic growth of the recipient countries and determined factors which facilitate this positive impact – absorption capacity of the recipient country, size of the domestic market, the level of the development of human capital, etc. On the other hand, the relationship between FDI and economic growth in recipient countries is not found in cases of some countries, due to different factors.

According to Carbonell and Werner (2018), single-country studies are necessary if we consider heterogeneous relationships between FDI and economic growth among different countries. The aim of the research conducted in the paper is to examine the relationship between FDI and economic growth in Croatia over the period 2000-2019, based on quarterly data. In order to conduct

the research, different cointegration tests were employed: Engle-Granger cointegration test, Johansen cointegration test and bounds cointegration tests (ARDL model).

This research paper is organized in five sections. After this introductory section, Section 2 summarizes theoretical background and gives an overview of previous researches. Section 3 introduces research data and methodology, while Section 4 illustrates empirical analysis. The final section summarizes the main findings of the research and concludes the research study by outlining the theoretical and practical implications, including possible directions for future research.

## 1. THEORETICAL BACKGROUND

The hypothesis that FDI serves as a source of economic growth has sound theoretical foundation. For example, Borensztein et al. (1995) proved that FDI contributes to the economic growth more than domestic investment. Markusen and Venables (1997) found that FDI can serve as a catalyst, leading to the development of local industry. Iamsiraroj and Ulubaşoğlu (2015) on a sample of 140 countries in the period 1970-2009 proved that FDI positively affects economic growth.

Following text represents results of the single-country studies on relationship between FDI and economic growth related to the European countries. Dritsaki et al. (2004) examined the relationship between trade, FDI and economic growth in the period 1960-2002 using annual data for Greece. They found long-run equilibrium relationship, as well as, unidirectional relationship between FDI and economic growth (real GDP), from FDI to economic growth, among others. Kosztowniak (2016) confirmed the bidirectional relationships between FDI and GDP in Poland in the period 1992-2012. Interestingly, the impact of GDP growth on attracting FDI inflows is stronger than that of FDI inflows on GDP growth. However, Carbonell and Werner (2018) found no evidence that FDI stimulated economic growth in the period 1984-2010 in Spain.

Tvaronaviciene and Grybaite (2007) examined impact of FDI on economic growth in Lithuania over the period 2000-2006 using quarterly data. They found strong positive relationship between FDI stock and GDP growth. Kurecic, Luburic, and Simovic (2015) concluded although exists, it would be difficult to prove causal relationship between FDI and GDP per capita in transitional economies of Central and Eastern European in their study for the period 1994-2013. Dritsaki and Stiakakis (2014) found no evidence that FDI lead to growth in Croatia in their study for the period 1994-2012 in Croatia. On the other hand, Ivanovic (2015) found that FDI have negative influence on domestic investment in Croatia with time lag.

There are vast single-country studies on the sample of developing countries, mostly Asian and African countries. Mehrara et al. (2014) examined the causality among economic growth, exports and FDI inflows for 57 selected developing countries based on the availability of data in the period 1980-2008. They found bidirectional causality between economic growth and FDI inflows. Chowdhury and Mavrotas (2006) examined the relationship between FDI and economic growth for three developing countries (Chile, Malaysia and Thailand) in the period 1969-2000. They found bidirectional causality between the two variables in Malaysia and Thailand, as well as unidirectional causality in the case of Chile, i.e. that GDP causes FDI in Chile.

Iqbal et al. (2010) examined the relationship between trade, FDI and economic growth in the period 1998-2009 using quarterly time series data for Pakistan. They found long-run relationship and bidirectional causality between FDI, export and economic growth, as well as unidirectional of import to export and FDI. Similarly, Rehman (2016) examined the relationship between FDI and economic growth (GDP per capita) in the period 1970-2012 using annual data for Pakistan. The results showed that FDI depends on economic growth, as well as that FDI, among other analysed, is important factor of economic growth. Siddique et al. (2017) also examined relationship between FDI and GDP in Pakistan, but for the period 1980-2016 using ARDL and causality test. They found unidirectional causality from economic growth to FDI.

Suliman et al. (2018) tested endogenous association between FDI and economic growth in the period 1980-2011 using annual data for Economic and Social Commission for Western Asia countries. They found bidirectional relationship between FDI and economic growth, in other words FDI positively and significantly impact economic growth and growth rate stimulates positively FDI inwards. Agrawal and Khan (2011) analysed the effect of FDI on economic growth in China and India for the period 1993-2009. They found 1% increase in FDI would result in 0.07% increase in GDP of China and 0.02% increase in GDP of India. Additionally, Liu et al. (2002) examined causal links between trade, economic growth and inward FDI in China over the period 1981-1997 (quarterly data). They found bidirectional causality between economic growth, FDI and exports. Sengupta and Puri (2018) explored the causality between FDI and GDP in India and its neighboring countries (Pakistan, Nepal, Bangladesh and Sri Lanka) in the period 1995-2015 and found that FDI is instrumental in enhancing the economic growth of the sample countries.

Yu-Chi and Lin (2018) examined the relationship between international tourist arrivals, foreign exchange income, FDI and economic growth in Taiwan for the period 1976-2016. They found unidirectional causality running from one to another in each pair of these variables, while there is no causality between international tourist arrivals and FDI. Faruk (2013) found positive correlation between FDI and GDP in case of Bangladesh for the period 1980-2011. Rafat (2018) examined the relationship between FDI and economic growth in Iran over the period 1991–2014 and found reciprocal relationship between FDI and economic growth.

Duarte et al. (2017) examined the relationship between FDI, economic growth and financial development in Cabo Verde for the period 1987-2014. Their results indicated that FDI has positive effect on the economic growth, as well as bidirectional causality between FDI and economic growth. Interestingly, FDI increase economic growth in the short run, but also in the long run. Tee et al. (2017) examined the relationship between trade, FDI and economic growth in the period 1980-2012 using annual data for Ghana. They found that increasing FDI inflows has also significantly increased the GDP. Onuoha et al. (2018) examined the relationship between FDI and GDP growth in ten West African countries (Benin, Burkina Faso, Cote D'Ivoire, Ghana, Mali, Niger Republic, Nigeria, Senegal, Sierra Leone and Togo) for the period 1990-2016. They found positive long-run effect of FDI on GDP, and no causality in the short-run. Among others, their results indicate that increase in FDI would significantly reduce unemployment in these countries in the long-run.

Kelly (2016) examined the relationship between FDI and GDP growth in six East African countries (Burundi for the period 1985-2008, Ethiopia for the period 1992-2008, Kenya for the period 1980-2008, Rwanda for the period 1981-2005, Tanzania for the period 1988-2008 and Uganda for the period 1993-2008). The results don't indicate short-run and long-run relationship between FDI and GDP growth, but including financial sector development, it is concluded there is an indirect relationship between FDI and GDP growth through financial sector, i.e. FDI has positive impact on the GDP growth in countries where financial sector is more developed.

Ramadhan et al. (2016) examined the effects of FDI on GDP in Mozambique and South Africa for the period 1996-2014. In case of Mozambique results revealed that FDI is not significant but have positive relationship with economic growth, but in the case of South Africa, FDI has negative relationship respectively with economic growth. On the other hand, Akoto (2016) examined the relationship between FDI, exports and GDP for South Africa over the period 1960-2009 (quarterly data). The results indicate that in the long-run, FDI has a significant impact on facilitating exports, as well as unidirectional causality from FDI to exports and FDI to GDP in the short run.

Özkan and Dube (2018) examined the long-run dynamic relationship between FDI, export and economic growth in Ethiopia for the period 1970-2016. They found unidirectional causality from FDI and export to GDP. Olatunji and Shahid (2014) examined the relationship between FDI and GDP in Nigeria for the period 1970-2010. They found short-run dynamic relationship between FDI and economic growth, but no long-run.

## 2. RESEARCH OBJECTIVE, METHODOLOGY AND DATA

The research objective is to examine the relationship between FDI and economic growth in Croatia using different cointegration tests. Quarterly data for the FDI and GDP are available since 2000Q1 until 2019Q2. This means there are 78 observations for analysis. To identify the relationship, different indicators have been used and two options are considered within the research:

- Option 1: Gross domestic product (GDP) at market prices, seasonally and calendar adjusted (current prices, million euro) and foreign direct investment (FDI) (million euros; liabilities: equity investments, retained earnings and debt relationships between owner-occupied residents and non-residents) time series from the Eurostat and Croatian National Bank database respectively were used. After transformation, the following two series were used: logarithm of GDP growth rate (Log(rGDP)) and logarithm of FDI (Log(FDI)).
- Option 2: Gross domestic product (GDP) at market prices, seasonally and calendar adjusted (current prices, million euro) and foreign direct investment (FDI) (million euros; liabilities: equity investments, retained earnings and debt relationships between owner-occupied residents and non-residents) time series from the Eurostat and Croatian National Bank database respectively were used. After transformation, the following two series were used: logarithm of GDP growth rate (Log(rGDP)) and logarithm of FDI/GDP (Log(FDI/GDP)).

The following graphs are generated to illustrate original series and the actual, transformed series used in analysis. The last two graphs are showing logarithm transformed time series used in further analysis.

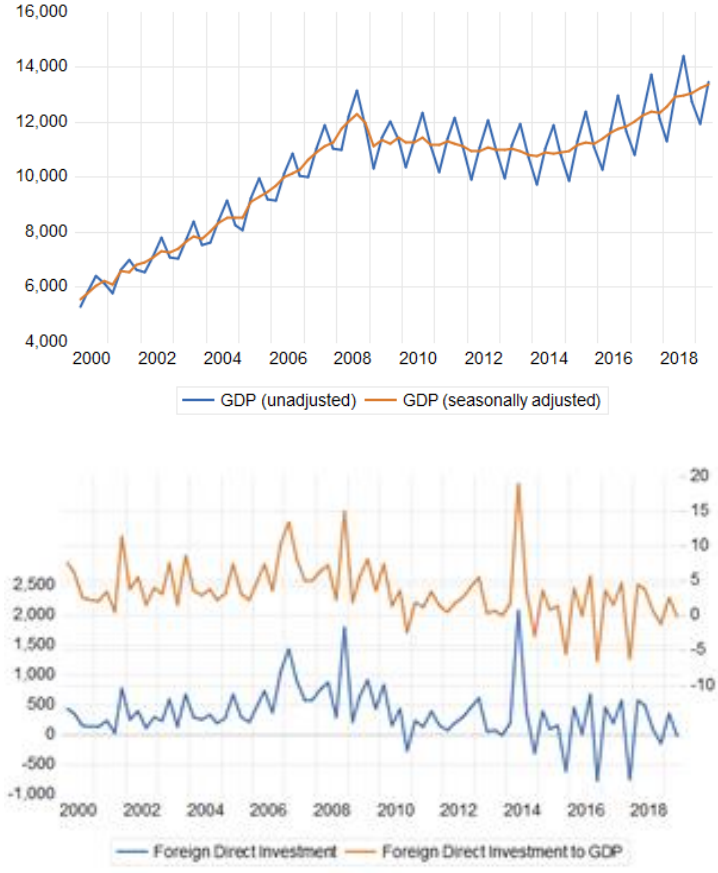


**Figure 1.** GDP and FDI series used in the analysis

Source: Eurostat, Croatian National Bank, 2019.

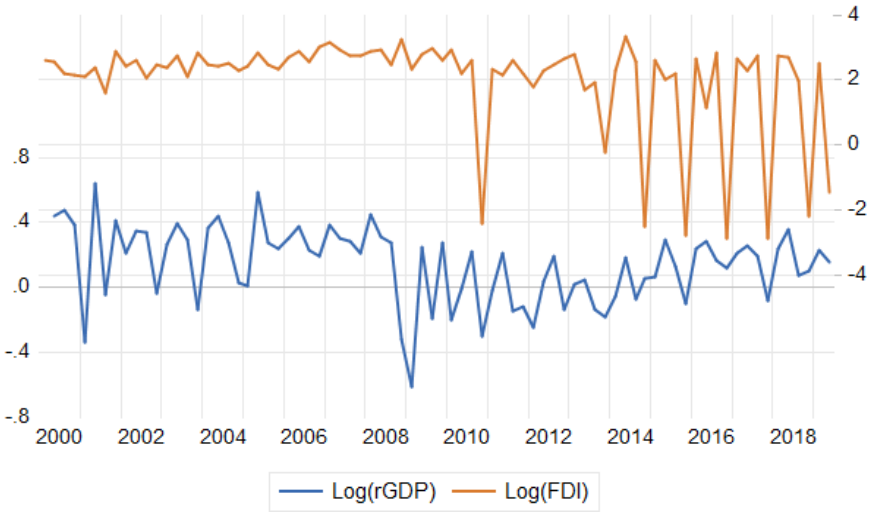


**Figure 2.** Log(rGDP) and Log(FDI/GDP) time series – option 1

Source: Author's calculation

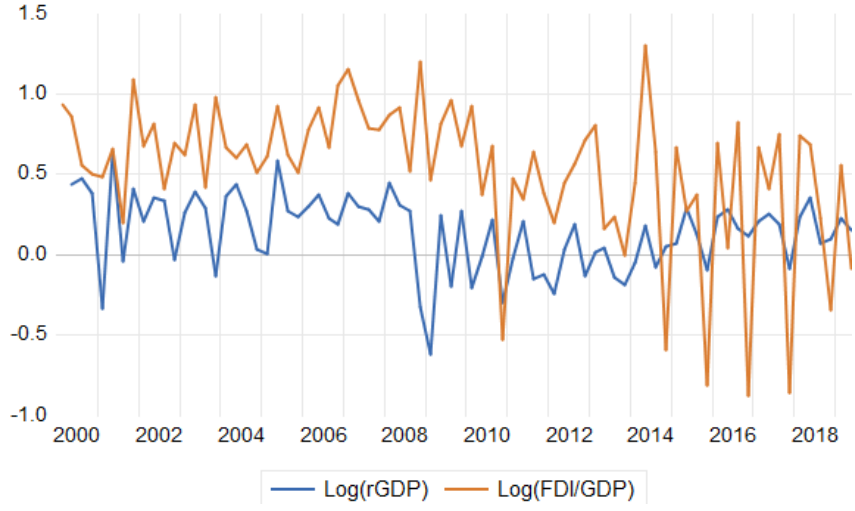


**Figure 3.** Log(rGDP) and Log(FDI) time series – option 2

Source: Author's calculation

# 3. RESULTS AND DISCUSSION

## 3.1 Unit root tests

In order to improve the validity of the research results, paper employed several different unit root tests. Numerous unit root tests have been proposed in the literature. Usually they are divided into two groups: (1) traditional unit root test and (2) unit root tests with structural break. In following text, results of employed both groups of tests are presented. As traditional unit root tests are considered: Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), Elliot, Rothenberg and Stock Point Optimal (ERS), and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. For the first three tests the null hypothesis is that the series contains unit root. The KPSS test differs from the other unit root tests described here in that the series is assumed to be trend-stationary under the null. The standard

recommendation is to choose a specification that is a plausible description of the data under both the null and alternative hypotheses. Results of ADF, PP, ERS and KPSS unit root tests are presented in Table 1.

**Table 1.** Traditional unit root tests

| Series | ADF | | | | PP | | | | KPSS | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C | D | C + T | D | C | D | C + T | D | C | D | C + T | D |
| | Level | | | | | | | | | | | |
| Log(rGDP) | -7.54 (<.01) | I(0) | -7.93 (<.01) | I(0) | -7.72 (<.01) | I(0) | -8.07 (<.01) | I(0) | 0.32 (<.05) | I(1) | 0.19 (<.01) | I(1) |
| Log(FDI) | -0.93 (.77) | I(1) | -2.42 (.37) | I(1) | -9.28 (<.01) | I(0) | -10.9 (<.01) | I(0) | 1.35 (>.10) | I(0) | 0.24 (<.01) | I(1) |
| Log(FDI/GDP) | -1.59 (.48) | I(1) | -2.81 (.20) | I(1) | -8.64 (<.01) | I(0) | -10.4 (<.01) | I(0) | 1.27 (<.01) | I(1) | 0.14 (<.10) | I(1) |
| | First difference | | | | | | | | | | | |
| Log(rGDP) | -8.40 (<.01) | I(0) | -8.39 (<.01) | I(0) | -34.3 (<.01) | I(0) | -38.8 (<.01) | I(0) | 0.19 (>.10) | I(0) | 0.14 (>.05) | I(0) |
| Log(FDI) | -17.9 (<.01) | I(0) | -18.0 (<.01) | I(0) | -44.6 (<.01) | I(0) | -40.7 (<.01) | I(0) | 0.16 (>.10) | I(0) | 0.09 (>.10) | I(0) |
| Log(FDI/GDP) | -13.5 (<.01) | I(0) | -13.4 (<.01) | I(0) | -47.3 (<.01) | I(0) | -47.0 (<.01) | I(0) | 0.09 (>.10) | I(0) | 0.08 (>.10) | I(0) |

Note: Models with intercept (C), intercept and trend (C + T). D stands for Decision made based on the 5% significance level. *P*-value is given in brackets below the test statistic. The Schwarz information criterion was used to select degree of augmentation for ADF and PP tests. For the KPSS tests the bandwidth was selected using the Newey-West method, with the Bartlett kernel. Null hypothesis for ADF and PP tests is that the series has unit root. Null hypothesis for KPSS test is that the series is trend stationary. Asymptotic critical values for KPSS test for model with the intercept: 1%: 0.739, 5%: 0.463, 10%: 0.347 and for model with intercept and trend: 1%: 0.216, 5%: 0.146, 10%: 0.119

Source: Author's calculation

**Table 2.** Perron-Vogelsang unit root tests with one endogenous break

| Series | AO: C | | | AO: C + T | | | IO: C | | | IO: C + T | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *t*-stat | TB | D | *t*-stat | TB | D | *t*-stat | TB | D | *t*-stat | TB | D |
| | | | | | | Level | | | | | | |
| Log(rGDP) | -10.6 (<.01) | 2009q1 | I(0) | -11.9 (<.01) | 2009q1 | I(0) | -9.71 (<.01) | 2008q3 | I(0) | -10.2 (<.01) | 2008q3 | I(0) |
| Log(FDI) | -10.1 (<.01) | 2018q4 | I(0) | -11.7 (<.01) | 2002q4 | I(0) | -9.23 (<.01) | 2003q1 | I(0) | -11.4 (<.01) | 2003q2 | I(0) |
| Log(FDI/GDP) | -11.8 (<.01) | 2010q4 | I(0) | -12.4 (<.01) | 2010q4 | I(0) | -8.54 (<.01) | 2002q2 | I(0) | -10.9 (<.01) | 2003q1 | I(0) |
| | | | | | | First difference | | | | | | |
| Log(rGDP) | -16.3 (<.01) | 2001q1 | I(0) | -16.2 (<.01) | 2001q1 | I(0) | -15.2 (<.01) | 2002q4 | I(0) | -15.3 (<.01) | 2003q4 | I(0) |
| Log(FDI) | -20.4 (<.01) | 2010q2 | I(0) | -20.9 (<.05) | 2010q2 | I(0) | -21.0 (<.01) | 2010q4 | I(0) | -21.2 (<.01) | 2010q4 | I(0) |
| Log(FDI/GDP) | -18.0 (<.01) | 2001q1 | I(0) | -18.0 (<.01) | 2001q3 | I(0) | -17.7 (<.01) | 2001q3 | I(0) | -17.5 (<.01) | 2001q3 | I(0) |

Note: Models with intercept (C), intercept and trend (C + T). TB is the break point. D stands for Decision made based on the 5% significance level. *P*-value is given in bracket below the test statistic. Null hypothesis for these tests is that the series has unit root with a single break. The Schwarz information criterion was used to select degree of augmentation for Perron & Vogelsang test. Minimize Dickey-Fuller *t*-statistic was used for break selection in these tests.
Source: Author's calculation

A well-known weakness of the ADF and PP unit root tests is their potential confusion of structural breaks in the series as evidence of non-stationarity. Unit root tests with structural break take

into account possible structural break(s) in time series. As Perron (1989) points out, researchers should bear in mind that traditional unit root tests are biased toward a false unit root null when the data are trend stationary with a structural break. To test the hypothesis of unit root with one structural break Perron-Vogelsang (P, 1992a, 1992b) tests with additive (AO) and innovative outlier (IO) were used. Deterministic component was either constant or constant and trend. Results are presented in Table 2. To tests the hypothesis of unit root with one structural break Zivot-Andrews (ZA, 1992) tests with possible break in constant, trend and constant and trend were used. This test allows one structural break in the level and trend of the series. Results are presented in Table 3.

**Table 3.** Zivot-Andrews unit root tests with one endogenous break

| | Break in intercept | | | Break in trend | | | Break in intercept & trend | | |
|---|---|---|---|---|---|---|---|---|---|
| Series | *t*-stat | TB | Decision | *t*-stat | TB | Decision | *t*-stat | TB | Decision |
| | | | | | Level | | | | |
| Log(rGDP) | -6.60 (<.01) | 2008q4 | I(0) | -2.54 (<.01) | 2012q1 | I(0) | -6.65 (<.01) | 2008q4 | I(0) |
| Log(FDI) | -3.39 (.06) | 2014q4 | I(1) | -3.84 (>.05) | 2007q4 | I(1) | -4.10 (.04) | 2010q4 | I(0) |
| Log(FDI/GDP) | -4.00 (.02) | 2010q4 | I(0) | -4.01 (.07) | 2007q2 | I(1) | -4.88 (<.01) | 2010q2 | I(0) |
| | | | | | First difference | | | | |
| Log(rGDP) | -5.08 (.01) | 2008q4 | I(0) | -4.43 (.07) | 2009q2 | I(1) | -5.15 (>.05) | 2008q4 | I(1) |
| Log(FDI) | -18.4 (.04) | 2011q2 | I(0) | -17.9 (.04) | 2016q2 | I(0) | -18.3 (.04) | 2011q2 | I(0) |
| Log(FDI/GDP) | -13.6 (.09) | 2011q2 | I(1) | -13.3 (.09) | 2011q1 | I(1) | -13.5 (.09) | 2011q2 | I(1) |

Note: TB is the break point. Decision was made based on the 5% significance level. *P*-value is given in bracket below the test statistic. Null hypothesis for these tests is that the series has unit root with a single break

Source: Author's calculation

Clemente et al. (CMR, 1998) defined the test which could be used if the series has one or two breaks. Consequently, to tests the hypothesis of unit root with one structural break Clemente-Montañés-Reyes tests with additive (AO) and innovative outlier (IO) were used. Results are presented in Table 4.

**Table 4.** Clemente-Montañés-Reyes unit root tests with one endogenous break

| | AO | | | IO | | |
|---|---|---|---|---|---|---|
| Series | *t*-statistic | TB | Decision | *t*-statistic | TB | Decision |
| | | | Level | | | |
| Log(rGDP) | -1.14 | 2008q3 | I(1) | -1.52 | 2008q4 | I(1) |
| Log(FDI) | -0.55 | 2014q1 | I(1) | -2.01 | 2014q2 | I(1) |
| Log(FDI/GDP) | -3.20 | 2010q1 | I(1) | -4.00 | 2010q2 | I(1) |
| | | | First difference | | | |
| Log(rGDP) | -2.89 | 2008q3 | I(1) | -3.74 | 2008q2 | I(1) |
| Log(FDI) | -3.79 | 2010q2 | I(0) | -5.02 | 2015q3 | I(0) |
| Log(FDI/GDP) | -12.58 | 2015q2 | I(0) | -4.49 | 2015q3 | I(0) |

Note: TB is the break point. Decision was made based on the 5% significance level. *P*-value is given in bracket below the test statistic. Null hypothesis for these tests is that the series has unit root with a single break. Critical values for Clemente-Montañés-Reyes unit root test with one structural break for AO and IO are -3.56 and -4.27 respectively at the 5% significance level

Source: Author's calculation

To tests the hypothesis of unit root with two structural breaks Clemente-Montañés-Reyes tests with additive (AO) and innovative outlier (IO) were used. Results are presented in Table 5.

**Table 5.** Clemente-Montañés-Reyes unit root tests with two endogenous breaks

| | AO | | | | IO | | | |
|---|---|---|---|---|---|---|---|---|
| Series | *t*-stat | $TB_1$ | $TB_2$ | Decision | *t*-stat | $TB_1$ | $TB_2$ | Decision |
| | | | | Level | | | | |
| Log(rGDP) | -1.58 | 2008q3 | 2014q3 | I(1) | -7.90 | 2008q2 | 2014q4 | I(0) |
| Log(FDI) | -0.78 | 2010q2 | 2014q1 | I(1) | -3.66 | 2010q3 | 2014q2 | I(1) |
| Log(FDI/GDP) | -2.19 | 2010q2 | 2015q2 | I(1) | -4.50 | 2010q3 | 2014q2 | I(1) |
| | | | | First difference | | | | |
| Log(rGDP) | -5.53 | 2008q3 | 2009q2 | I(0) | -4.46 | 2008q2 | 2008q4 | I(1) |
| Log(FDI) | -13.96 | 2016q2 | 2017q2 | I(0) | -5.01 | 2015q3 | 2016q3 | I(1) |
| Log(FDI/GDP) | -10.83 | 2016q2 | 2017q2 | I(0) | -4.49 | 2015q3 | 2016q3 | I(0) |

Note: $TB_1$ and $TB_2$ are the break points. Decision was made based on the 5% significance level. Null hypothesis for these tests is that the series has unit root with two breaks. Critical value for Clemente-Montañés-Reyes unit root test with two structural breaks for AO and IO is -5.49 at the 5% significance level

Source: Author's calculation

If the estimates of the Perron-Vogelsang, Zivot-Andrews and Clemente-Montañés-Reyes unit root tests provide evidence of significant additive or innovation outliers in the time series, the results derived from Augmented Dickey-Fuller, Phillips-Perron and Kwiatkowski-Phillips-Schmidt-Shin tests are doubtful, as this is evidence that the model excluding structural breaks is misspecified. Therefore, in applying unit root tests in time series that exhibit structural breaks, only the results from the Clemente-Montañés-Reyes unit root tests should be considered if the two structural breaks indicated by the respective tests are statistically significant.

On the other hand, if the results of the Clemente-Montañés-Reyes unit root tests show no evidence of two significant breaks in the series, the results from the Perron-Vogelsang, Zivot-Andrews and Perron-Vogelsang unit root tests with one structural break are considered. If these tests show no evidence of a structural break, the Augmented Dickey-Fuller, Phillips-Perron and Kwiatkowski-Phillips-Schmidt-Shin tests can be considered. By following this procedure, we first examine the results of Clemente-Montañés-Reyes tests presented in Table 5. All three series are with unit root and with two structural breaks (additive outliers), which consider sudden change, indicated non-stationarity at level with two breaks, but stationary by taking the first difference. Therefore there is no need to further analyse unit root tests results in Tables 2-4. In summary, we may say that the Log(rGDP), Log(FDI) and Log(FDI/GDP) series are I(1) with two structural breaks. Further analysis will be conducted with information about these time series features.

## 3.2 Cointegration tests

In the following analysis, three methodological approaches were used to assess the long-term relationship between time series of GDP growth rates and FDI: Engle-Granger single equation cointegration test, Johansen cointegration test, and bounds cointegration test based on ARDL model. The null hypothesis in the Engle-Granger single equation causality test is that the series are not cointegrated. Results of the tests are presented in Table 6.

**Table 6.** Engle-Granger causality tests

| Dependent | *tau*-statistic | *P*-value* | *z*-statistic | *P*-value* |
|---|---|---|---|---|
| | Series: Log(rGDP) & Log(FDI) | | | |
| Log(rGDP) | -1.21 | 0.86 | -4.69 | 0.75 |
| Log(FDI) | -0.97 | 0.91 | -4.18 | 0.79 |
| | Series: Log(rGDP) & Log(FDI/GDP) | | | |
| Log(rGDP) | -1.22 | 0.86 | -4.83 | 0.74 |
| Log(FDI/GDP) | -1.63 | 0.71 | -7.90 | 0.48 |

Note: *MacKinnon (1996) p-values

Source: Author's calculation

Test statistics for both set of series suggest that we can't reject the null hypothesis of no cointegration relationship between two series, i.e. GDP growth rate (Log(rGDP) and the foreign direct investment (Log(FDI) or Log(FDI/GDP)). In other words, this indicates lack of the existence of a long-run equilibrium relationship between quarterly GDP growth rate and the FDI in Croatia for the period being investigated.

Since the unit root tests results suggested that GDP growth rate (Log(rGDP)) and Log(FDI) and Log(FDI/GDP) series are of the same order of integration, I(1), with two structural breaks we can apply the Johansen procedure to test cointegration, since the assumption of this approach is that all series are of the same order of integration.

Before applying Johansen test the lag order of the VAR model containing two series, Log(rGDP) and Log(FDI), should be selected. Most of the criteria suggest lag order of 12, i.e. VAR(12) model for two series: Log(rGDP) and Log(FDI).

We assumed that there is no deterministic trend in data with intercept in cointegrating equation and not intercept in VAR model. We have also included two exogenous dummy variables for two structural breaks (D2008q3 and D2014q3) identified when using Clemente-Montañés-Reyes unit root tests. However, the cointegration tests outcome is the same even without including those two dummy variables. Results of the Johansen test, i.e. trace and maximum eigenvalues test statistics are presented in Table 7.

**Table 7.** Johansen tests of cointegration

| Null hypothesis | Alternative hypothesis | Test statistic | 5% critical value | *P*-value |
|---|---|---|---|---|
| | | Trace statistic | | |
| $r = 0$ | $r \geq 1$ | 12.53 | 20.26 | .402 |
| $r \leq 1$ | $r \geq 2$ | 3.77 | 9.16 | .448 |
| | | Maximum eigenvalue statistic | | |
| $r = 0$ | $r \geq 1$ | 8.76 | 15.89 | .460 |
| $r \leq 1$ | $r \geq 2$ | 3.77 | 9.16 | .448 |

Note: *P*-value: MacKinnon, Haug & Michelis (1999)

Source: Author's calculation

Both tests suggest that we can't reject the null hypothesis of no cointegration relationship between two series, i.e. GDP growth rate and the FDI. In other words, this indicates lack of the existence of a long-run equilibrium relationship between quarterly GDP growth rate and the FDI in Croatia for the period being investigated.

Before applying Johansen test the lag order of the VAR model containing two series, Log(rGDP) and Log(FDI/GDP), should be selected. Most of the criteria suggest lag order of 12, i.e. VAR(12) model for two series: Log(rGDP) and Log(FDI/GDP).

We assumed that there is no deterministic trend in data with intercept in cointegrating equation and not intercept in VAR model. We have also included two exogenous dummy variables for two structural breaks (D2008q3 and D2014q3) identified when using Clemente-Montañés-Reyes unit root tests. However, the cointegration tests outcome is the same even without including those two dummy variables. Results of the Johansen test, i.e. trace and maximum eigenvalues test statistics are presented in Table 8.

Both test statistics suggest that we can't reject the null hypothesis of no cointegration relationship between two series, i.e. GDP growth rate (Log(rGDP) and the FDI to GDP (Log(FDI/GDP). In other words, this indicates lack of the existence of a long-run equilibrium relationship between quarterly GDP growth rate and the FDI in Croatia for the period being investigated.

**Table 8.** Johansen tests of cointegration

| Null hypothesis | Alternative hypothesis | Test statistic | 5% critical value | *P*-value |
|---|---|---|---|---|
| Trace statistic | | | | |
| $r = 0$ | $r \geq 1$ | 9.23 | 20.26 | .714 |
| $r \leq 1$ | $r \geq 2$ | 1.91 | 9.16 | .796 |
| Maximum eigenvalue statistic | | | | |
| $r = 0$ | $r \geq 1$ | 7.33 | 15.89 | .630 |
| $r \leq 1$ | $r \geq 2$ | 1.91 | 9.16 | .796 |

Note: *P*-value: MacKinnon, Haug & Michelis (1999)

Source: Author's calculation

This approach is based on the use of the ARDL model proposed by Pesaran and Shin (1999) and Pesaran et al. (2001). Before estimating the ARDL model for GDP growth rate, an F-bounds and t-bounds tests was used to test the existence of long-term relationship between two series. The results of the F-bounds test are given in Table 9.

**Table 9.** F-bounds tests

| Estimated model: Log(rGDP) = f(Log(FDI)) Optimal lag length (AIC): ARDL(11, 0) | | | | Estimated model: Log(rGDP) = f(Log(FDI/GDP)) Optimal lag length (AIC): ARDL(11, 0) | | | |
|---|---|---|---|---|---|---|---|
| *F*-bounds test | | | | *F*-bounds test | | | |
| Value | Significance | I(0) | I(1) | Value | Significance | I(0) | I(1) |
| 0.93 | 10% | 4.18 | 4.93 | 0.89 | 10% | 4.18 | 4.93 |
| | 5% | 5.13 | 5.98 | | 5% | 5.13 | 5.98 |
| | 1% | 7.32 | 8.44 | | 1% | 7.32 | 8.44 |

Note: Null hypothesis: no cointegration relationship. Case 3: Model with unrestricted constant and no trend was used. Akaike (AIC) criterion was used as a model selection method to determine the optimal lag length, i.e. order of ARDL model. Critical values are for finite sample *n*=65

Source: Author's calculation

The F-statistic values in the F-bounds test are 0.93 and 0.89 for the first and second models, respectively, and are well below lower limit, 4.18, at the 10% significance level. Therefore, we have enough evidence not to reject the null hypothesis that there is no long-term relationship between series in these ARDL models. In other words, this test confirmed that there is no long-term relationship between GDP growth rate and both FDI series.

The results of the t-bounds test are given in Table 10.

**Table 10.** t-bounds tests

| Estimated model: Log(rGDP) = f(Log(FDI)) Optimal lag length (AIC): ARDL(11, 0) | | | | Estimated model: Log(rGDP) = f(Log(FDI/GDP)) Optimal lag length (AIC): ARDL(11, 0) | | | |
|---|---|---|---|---|---|---|---|
| *t*-bounds test | | | | *t*-bounds test | | | |
| Value | Significance | I(0) | I(1) | Value | Significance | I(0) | I(1) |
| -1.36 | 10% | -2.57 | -2.91 | -1.30 | 10% | -2.57 | -2.91 |
| | 5% | -2.86 | -3.22 | | 5% | -2.86 | -3.22 |
| | 1% | -3.43 | -3.82 | | 1% | -3.43 | -3.82 |

Note: Null hypothesis: no cointegration relationship. Case 3: Model with unrestricted constant and no trend was used. Akaike (AIC) criterion was used as a model selection method to determine the optimal lag length, i.e. order of ARDL model

Source: Author's calculation

The t-statistic values in the t-bounds test are -1.36 and -1.30 for the first and second models, respectively, and are well below lower limit, -2.57, at the 10% significance level. Therefore, we have enough evidence not to reject the null hypothesis that there is no long-term relationship between series in these ARDL models. In other words, this test also confirmed that there is no long-term relationship between GDP growth rate and both FDI series.

Because there is no cointegration between these series there is no reason to further estimate and analyse ARDL model.

Summarising results of all three cointegration tests applied we can conclude with high degree of certainty that there is no existence of a long-run equilibrium relationship between the quarterly GDP growth rate and the FDI in Croatia for the period being investigated.

## CONCLUSION

Based on the conducted analysis using quarterly time series in period from 2000q1 to 2019q2 we can conclude the following. Results of three cointegration tests indicated that there is no long-run equilibrium relationship between quarterly GDP growth rate and any of the FDI series. Lack of long-run equilibrium relationship between GDP growth rate and FDI means also that there is no Granger causality relationship between these series. In other words, FDI have no statistically significant impact on the growth rate of the GDP in Croatia for the period being investigated. The results of this paper are specifically related to Croatia and cannot be generalized to other countries. One of the possible explanations would be in the type of FDI inflow, mostly brownfield FDI, to less extent greenfield. Greenfield FDI is the one generating more positive effects on the recipient country and countries should focus their efforts to attract this type of FDI. Therefore, this research should be supplemented with the structure characteristic of the FDI inflows over the analysed period. Important topic for further studies, and at the same time the limitation of the conducted research, would be also identifying and examining other factors that might affect or determine these two variables (FDI and economic growth).

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# Private Equity Determinants In European Union

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determinants.

## ABSTRACT

Purpose: This paper examines the determinants of private equity investments in the European Union. Theoretical part of this paper analyses the development and current situation of private equity activity within the European Union, as well as possible determinants of private equity capital. Methodology: To analyse impact of selected indicators based on literature review panel data analysis and Granger causality test was performed. Based on this literature review, we have chosen 28 indicators from five different groups to measure the impact on private equity investments. This analysis was based on aggregated data from organisation Invest Europe during 2007-2017 as well as macroeconomic data of analysed countries. Approach: Hausman test was performed to choose the best consistent model in panel data analysis, suggesting the fixed effects model is consistent. This paper supports the of various indicators affecting private equity activity in the country. Subsequently, the impact of various potential macroeconomic factors was measured, selected on the basis of literature as well as the mutual relationship between private equity and GDP itself. Findings: The results suggest there are different significant determinants of private equity investments in the European Union. Economic performance, low tax burden and low labour market rigidity have a positive effect on private equity investments. The low availability of other forms of funding increases the activity of private equity capital. Unexpectedly, we have also identified a negative effect of the trade freedom probably because of steeper competition. Negative effect of property rights index can be the consequence of limited opportunities in creating similar projects to those already introduced by competitors.

## INTRODUCTION

Europe is currently facing a lack of capital that restrains its growth potential. One of the possible solutions to overcome this state is according to T. Stofa and M. Soltes (2017) to support alternative sources of business financing, for example individual forms of private equity. They can help to overcome this need throughout the business life cycle. The aim of private equity capital is primarily to finance start-up business activities in high-growth industries but also to increase competitiveness of mature companies. We work with the term private equity capital in the European way,

where this word represents all forms of long-term investments to companies of different size with the aim to help them grow faster and be more profitable. This includes venture capital, growth capital, buyouts, rescue and replacement capital. Private equity capital focuses on riskier transactions. Companies seeking capital in this market have limited access to traditional forms of financing, which narrows their further development.

This form of ownership reduces public pressure to make short-term profits at the expense of long-term profitability. This works through a direct relationship between the owner and the manager, where the goal is not the current profitability of the company but its future growth. In addition to providing financial support, private equity investors can also provide own know-how. These investors usually operate in the industry they know, therefore their experience can be directly and more effectively used to enhance and improve the company processes. Moreover, they bring to the company a wide range of contacts and practices which could create an advantage against competition. The effects of the private equity investment on the company itself have been under investigation for a long time, but there are different opinions about how it works inside the company. Most researchers as G. Chesini and E. Giaretta (2013) expose the opinion on increasing company revenues and decreasing short-term profits. This situation can be explained by the company's focus on long-term growth using different business opportunities. O. Blanchard et al. (1997) suggests negative impact of private equity on the short-term employment, due to creation of efficiency in business processes.

According to A. Boquist a J. Dawson (2004) Europe relies more on bank financing than other alternative forms of company financing. Although the importance of private equity investments has increased, the financial crisis of 2007–2008 caused a significant fall in supply and demand of this form of funding seen on Figure 1. On the other side, this period has reduced the disparities between Eastern and Western Europe, however, differences are still noticeable. The financial crisis was a very important element in the development of private equity but the market has already revived. In 2017 the total private equity investment amount reached €71.7bn in Europe, just 4% below the pre-crisis state, and thus increasing the total value of active European private equity investments to €640bn. On the Figure 1, it is shown development of private equity capital covering 21 analysed countries of this paper, representing the majority of the Europe private equity investments. (Invest Europe, 2018).

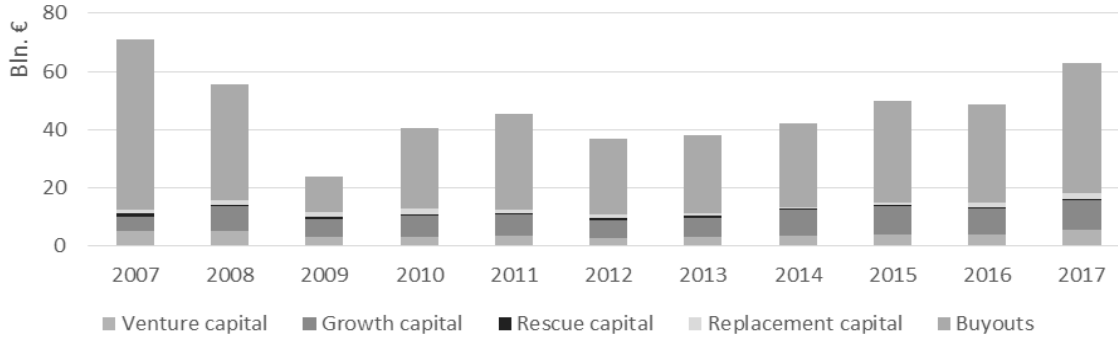


**Figure 1** Private equity capital development in the 21 analysed countries of European Union

Source: Own elaboration based on (Invest Europe, 2018)

The presence of private equity may be important for sustaining long-term economic growth, and thus their influx can maintain a strong economy. One way to attract private equity investments is to focus on the main determinants of the inflow of private equity and improve their status within the country. K. Amess et al. (2016) emphasize needs to shape the business environment, therefore the legislative and executive power in the country itself must be used to improve conditions in the country.

# 1. LITERATURE REVIEW

Private equity investments have important role in the financing of companies on the global market in recent years. Their presence encourages innovative activities of start-ups, but also supports activities of large corporations, in order to increase their competitiveness to gain higher market share. This positive influence is confirmed by Amess et al. (2016) while investigating effects of buyouts as well as venture capital. Their presence is also important for sustaining long-term economic growth, high employment, innovative activities and the use of new technological processes.

The factors examined in this paper contain both cyclical and structural components. While structural changes represent long-term to permanent changes in the environment, cyclical components tend to return to their original state. B. Van Pottelsberghe de la Potterie and A. Romain (2004) has found clear evidence of the cyclical nature of private equity investments themselves, which is the result of the business cycle itself.

B. Clarysse et al. (2009) has found several common determinants of the private equity development in the study of relatively different countries like the United States, the United Kingdom and Israel. The differences in these countries are at the cultural and social level, but also in the intensity of using private equity capital. While US private equity market has a rich history, in Israel it is a quite new form. The United Kingdom represents the Europe most advanced market in private equity activity, thanks to London's position as a global financial centre. All these countries utilize intensely private equity investments and despite their differences, the common factors determining the inflow of investments could be identified. Therefore, we can expect it will be possible to identify common driving forces of private equity activity within the European Union.

Economic growth was identified by P. Gompers and J. Lerner (1998) as a most important factor for venture capital activity. Capital activity is also positively influenced by the presence of the developed stock market, which can be measured by market capitalization. These findings were confirmed by van Pottelsberghe de la Potterie and Romain (2004), but in contrast with that L. Jeng and P. Wells (2000) found no evidence of GDP and market capitalisation effects on venture capital activity. I. Oino (2014) states that growing low-inflation economies tend to attract all forms of investment into the country, hence private equity capital.

S. Bonini and S. Alkan (2009) found a significant negative impact of the interest rate on the venture capital offer. With rising interest rates, risky investments become less attractive and investors look for less risky assets that offer lower but risk-free returns. Growth of risk-free investments reduces the supply of capital that flows into private equity funds, and eventually leads to a decline in the fund's investment activity. On the other side higher interest rate could lead to higher demand for this capital, because of higher costs of loans.

According to P. Gompers and J. Lerner (1998), we expect the tax burden reduction has a positive impact on private equity activity. This effect can be explained by the growth of entrepreneurial activity, which is according to D. Bruce et al. (2005) positively influenced by the lower tax burden in the country. A. Groh and H. von Liechtenstein (2009) have analysed Central and Eastern European countries with a result, that low corporation tax is the most important factor for investing in emerging markets. The decline in corporate tax burden has a significant impact on all forms of private equity. On the other hand, T. Gurley-Calvez et al. (2009) have shown there is no significant tax impact on business growth under New Markets Tax Credit in the US.

A. Bozkaya and W. Kerr (2014) also found that labour market expenditures as the mechanism for providing worker insurance is linked with stronger venture capital market. The results of the study of I. Oino (2014) indicate the strong impact of the country's legal environment on attracting investment. The legal system itself can create barriers to the inflow of investment into the country or support entrepreneurial activity. Therefore, creating a better business environment can lead into the inflow of capital. Enforceability and property rights protection represent important conditions

for the promotion of entrepreneurial activity. A. Groh and H. von Liechtenstein, 2009) found significant influence of property rights protection on the inflow of such investments.

The main objective of this paper is to identify the determinants of private equity investments in a European union. These determinants may support domestic private equity capital activity, as well as stimulating the inflow of private equity capital from abroad. According to this review 5 main groups of indicators have been identified: economic growth, taxation, funding availability, labour market and business environment. We assume that economic growth, low taxation, developed capital market, favourable conditions of the business environment and low rigidity of labour market positively affect the level of private equity activity.

## 2. METHODOLOGY

We have harvested data from different sites including Invest Europe (2018), Eurostat (2018), WorldBank (2018), The Heritage Foundation (2018) and from the Ludwig-Maximilians University in Munich (LMU) - D. Shanz et al. (2017). The variables were selected according to literature review on the subject. Few missing records were replaced by linear interpolation to create balanced panel. In order to reduce differences between countries due to disproportions of investment volume and due to different units in our dataset, the ratio indicators expressed in relation to GDP have been used.

As a depended variable volume of private equity investments in a country was used. We have tried to identify driving forces of total private equity investments, but also of its individual types, namely venture capital, growth capital, buyouts, rescue and replacement capital. In contrast to the study of R. Kelly (2010), which used private equity volume based on the location of the investor, we have selected an investment activity of the country of the supported enterprise regardless of the origin of the private equity firm. This activity was reported in the form of investments volume made in the country, with data denominated in Euro. The reason of this choice was to find out what determinants influence the investment activity of private equity investment in the country and therefore affect the economy.

The cross-sectional dimension of the data is represented by individual countries of the European Union. This paper deals with 21 countries of the European Union due to unavailability of data for smaller and less developed countries. Following countries were included in this analysis: Austria, Belgium, Bulgaria, Czech Republic, Denmark, Finland, France, Netherlands, Ireland, Italy, Luxembourg, Hungary, Germany, Poland, Portugal, Romania, Slovakia, Spain, Sweden and United Kingdom.

Due to the nature of the data, the panel data analysis was carried out. F-test has also confirmed, it makes sense to perform panel data analysis over the linear regression model. Models with random and fixed effects were subsequently performed. According to performed Hausman test, random effects models are inconsistent, and therefore fixed effect models were preferred. In fixed effects model individual and time effect can be quantified. Although F-test has recommended in one case using two-way fixed effects model, Lagrange Multiplier Test has preferred in every combination only one-way model with individual effects. Based on these results, we assumed that time effects were not present. All test results were monitored at a significance level at least 5%.

Panel data analysis requires fulfilment of multiple assumptions, that have been successively verified for each created model. Within the model, the multicollinearity hypothesis (variance inflation factor) and cross-sectional dependence (Pesaran's cross-sectional dependence test) were rejected, and the stationarity (Maddala-Wu test) of the data was confirmed. On the other side there were problems with heteroscedasticity (Breusch-Pagan test) and autocorrelation (Breusch–Godfrey test), which was solved by using a robust covariance matrix. In this procedure, the Arellano method of calculation of covariance matrix was used, which counts with the existence of heteroscedasticity and autocorrelation (Arellano, 1987; Croissant and Millo, 2008).

The general form of studied equation had the form:

$$y_{it} = \alpha + X'_{it}\beta + u_{it}, \quad (1)$$

where

$i = 1,2,\dots,N$ is entity index,
$t = 1,2,\dots,T$ is time index,
$y_{it}$ is dependent variable for entity $i$ in time $t$, depended on $K$ exogenous variables,
$X_{it}$ represent vector of K exogenous variables for entity $i$ in time $t$,
$\alpha$ is intercept,
$\beta$ is vector of slopes,
$u_{it}$ is random error with normal distribution. (Baltagi, 2005)

We have studied effect of 28 variables representing basic indicators of economic activity, taxation in the country, possibilities of financing companies, labour market and business environment. These variables were selected on the basis of literature review and these predictor variables were statistically eliminated. They can be found in

Table 3 in the Annexes section. According to (Balboa and Marti, 2007) most of the information about economy development are available with a lag. At the same time, it takes some time for information to be absorbed by the market, which in turn will cause a change in our observed variable. Therefore, the delayed effect was also investigated in this article. All variables were delayed by one year, and so the impact of past values on the current state of private equity investments was examined. A longer delay could lead to false results due to a short data timeframe, where every new variable could significantly reduce the degrees of freedom. Due to the large differences between the analysed countries, absolute values were not used. Such values were transformed into a ratio indicator compared to GDP. Other variables expressed as percentage change, index value or ratio were not homogenized because of their nature. This step was intended to reduce the differences that arose mainly from the different sizes of the countries. The differences between absolute and relative values of private equity investments in 2017 can be seen in the Figure 2. The countries of eastern and southern Europe indicated low private equity activity even after conversion to ratio to GDP, but the differences were reduced.

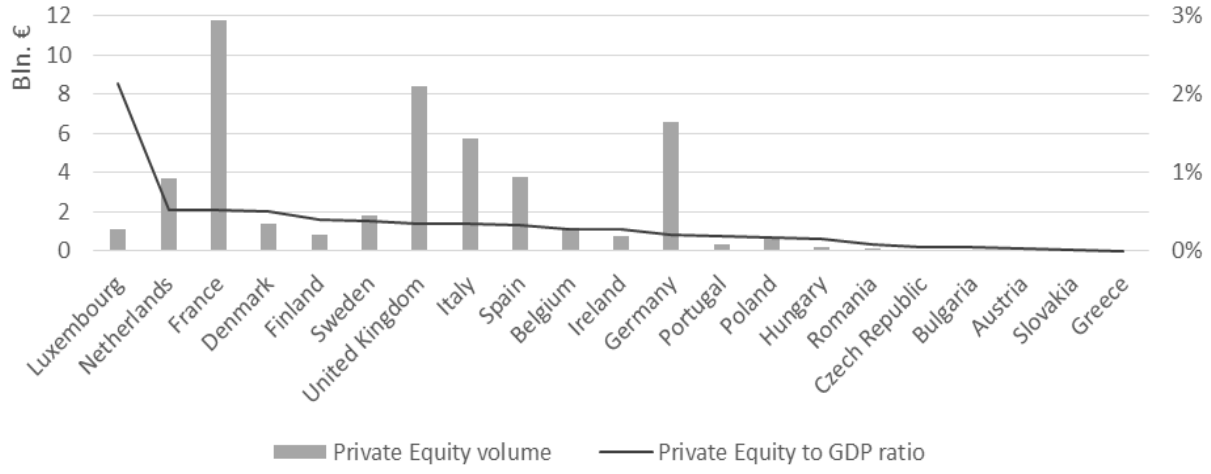


Figure 2.Absolute and relative volume of Private equity investments in year 2017

Source: Own elaboration based on (Invest Europe, 2018)

This recalculation made it impossible to include GDP in the panel analysis. Its effect was measured using GDP growth variable, however, its effect was not significant. Therefore, Granger causality test was performed to determine if GDP is predicting our analysed dependent variables. Since the original Granger test was not created for panel data, a variation of (Hurlin a Dumitrescu 2012) was used. This test creates linear model, where the variability of $y_t$ is analysed using $y_{t-k}$ and $x_{t-k}$ with regression parameters as follows $\gamma_i^{(k)}$ and $\beta_i^{(k)}$. In this model, the individual regression coefficients $\gamma_i^{(k)}$ and $\beta_i^{(k)}$ may vary between countries. The null hypothesis is expressed as follows:

$$H0: \beta_i = 0 \quad \forall i = 1, \dots, N, \tag{2}$$

where $\beta_i = \left(\beta_1^{(k)}, \dots, \beta_i^{(k)}\right)'$..

In the case of independence, the regression coefficients $\beta_i^{(k)}$ at $x_{t-k}$ would be zero. Alternative hypothesis represents existence of Granger causality. The more delayed values we use, the better we can capture the influence of the explanatory variable and the explained one, but at the same time the strength of the test decreases. Due to the short timeframe it was possible to use at most one delayed value $x_{t-1}$, and therefore the use of this test may not reveal relationships between variables with a delay of more than one year.

## 3. RESULTS AND DISCUSSION

Dependent variables are shown in individual columns and exogenous variables in individual rows. The labels *, ** and *** are used to represent significance levels 1%, 5% and 10%. The average value of the adjusted coefficient of determination was 30%, however, models with Rescue and Replacement capital have shown much lower values around 10%.

**Table 1.** Beta coefficients of panel data analysis models with significance levels

| | *Private Equity* | *Venture Capital* | *Growth capital* | *Buyouts* | *Rescue capital* | *Replacement capital* |
|---|---|---|---|---|---|---|
| Fundraising | 1,84E-01 * | | | 8,47E-02 * | -6,42E-03 * | 4,64E-02 *** |
| Tax Burden$_{t-1}$ | | | | | | -2,18E-03 ** |
| Trade Freedom$_{t-1}$ | | | -9,67E-03 *** | | 1,07E-03 * | |
| Labour Market Rigidity$_{t-1}$ | | | -2,23E-03 *** | | 6,71E-04 * | |
| Employment | -9,72E-02 * | | | -7,89E-02 ** | | |
| Unemployment | | | | -5,55E-02 * | | |
| Property rights index | | -4,32E-03 ** | 3,61E-02 *** | | | |
| Market Capitalisation | | -2,59E-04 ** | | | | 1,14E-04 * |
| Market Capitalisation$_{t-1}$ | 2,28E-03 *** | 1,31E-04 ** | 1,12E-03 ** | 1,38E-03 *** | | 1,58E-04 ** |
| Interest rate$_{t-1}$ | 6,52E-03 * | 9,38E-04 * | | 7,67E-03 * | | |
| Government expenditure$_{t-1}$ | | 3,20E-04 ** | | | | |

Source: Own calculation in R software

In consideration of the nexus between fundraising and investment, effect of fundraising is not only a confirmation of dependence, but also the reminder of importance of resources collected in the country. Every country should primarily focus on own accumulation of capital by encouraging citizens to invest, e.g. by smaller taxes. This result is an unfavourable report for the smaller and less developed countries of the European Union because they rely only on the inflow of private equity capital into the country.

The impact of the tax burden was significant only in the replacement capital, which tries to balance the ratio of own and foreign capital in an enterprise to an optimal value. The higher tax burden has negative effects on private equity investments, but according to our results only to very small extent.

The labour market flexibility index is a significant determinant in the case of growth and rescue capital, thus suppressing the impact of variable employment and unemployment. In the case of a rescue business, higher labour market flexibility leads to a rise in rescue capital. Rescue capital, involves terminating the employment relationship with unnecessary workers and so higher rigidity is unwelcome. These operations are performed to higher productivity and remove non-profit parts of the company. The negative impact on growth capital may be explained by the need for low staff turnover, because keeping a trained and skilled staff is essential to achieve rapid growth in the company. High employment rate in the country may indicate that it will be more difficult to find experienced workers, which is crucial for an expected further development of a company. On the other side, high levels of unemployment can indicate the existence of an unskilled labour force that may be an obstacle to the investor's entry into the country.

In context with trade freedom, we have experienced a mixed effect. It positively influences business funding for struggling companies, but on the contrary, there is a slight negative impact on the growth capital. This situation can be interpreted by easy access to foreign markets. On the one hand, this access expands the market where the company can place its products, but on the other hand, increases competitiveness due to the presence of foreign substitutes on domestic market.

There are various controversial views on the optimum level of property rights protection. R. Horii and T. Iwaisako (2007) point out that in the case of strong ownership protection there is a negative impact of property rights on the level of the country's development. Imitation and adaptation have an important role in the technological development of developing countries, therefore strong protection can create barriers to investment inflows and so to reach the level of advanced countries is much harder task. This situation may not only concern the differences within the European Union but also in the international context. A high level of property rights protection can also be associated with higher costs, which ultimately can influence the investor himself when choosing an investment (Haydaroglu, 2015).

Market capitalization has a positive impact on the inflow of private equity investments with an exception of venture capital. The impact of market capitalization in a lagged form has acted as expected, and therefore developed and liquid capital market lead to a rise in private equity. Given the characteristics of this capital, the completion of the equity market investment is expected, and this effect has not been proven to be due to the use of a short period of time. The impact of the interest rate on the volume of private equity is positive, and hence high long-term interest rates of loans lead the company to find alternative forms of company financing as private equity capital.

It was possible to observe the extractive effect of government consumption. This effect was observed this time by including the Government Expenditure Freedom Index variable. Higher levels of this index refer to lower government spending, leading to a rise in private equity.

Although the impact of GDP growth was not significant for any dependent variable, Granger causality test of GDP revealed partial influence of economic activity on private equity capital. According to

Table 2, GDP Granger causes variables Venture capital and Buyouts. Considering the development of the economic cycle and private equity activity, we can assume that this relationship is positive.

**Table 2.** Granger causality results of GDP on dependent variables

| | Private Equity | Venture Capital | Growth capital | Buyouts | Rescue capital | Replacement capital |
|---|---|---|---|---|---|---|
| GDP–> y | 0,3227 | 0,0002577 (***) | 0,559 | 0,02939 (**) | NA | NA |

Source: Own calculation in R software

The impact of GDP on venture capital and buyout supports the idea that private equity is cyclical. If data were available for a longer period of time, (Robinson and Sensoy, 2016) thesis that negative shocks in economic development are first reflected in fundraising and then in the volume of private equity investments could be verified. In this context, it can be assumed that the use of a larger number of delayed values of an independent variable in explaining the volume of investment as well as GDP would also reveal the relationship between private equity itself and GDP.

## CONCLUSION

The main aim of this paper was to identify the determinants of private equity capital influencing the demand and supply of these assets. This analysis was carried out on data obtained from Invest Europe, enriched with possible determinants of private equity capital based on the literature review. However, the availability of data represents a major obstacle in the field of private equity, which complicates the conduct of scientific research in any form.

Each type of private equity contains more or less different determinants based on the results of panel regression, so we can assume that the differences between these forms play a larger role than is commonly understood. By examining economic activity, it has been confirmed that in economic growth conditions companies are trying to take advantage of business opportunities, and thus increasing venture capital and buyouts. Unexpectedly, the positive effect of low inflation was not confirmed.

Higher trade freedom and property rights can have a positive effect on some forms of private equity, but we have also found negative impact on innovative investments of venture and growth capital. Higher trade freedom causes higher competition, which can negatively affect competitiveness of domestic products and so influence investment volume in the country. Similar effects were recorded in the condition of higher protection of property rights, which can lead to limitation of start-up projects supported by venture capital and prevent creation of substitutes to existing products by other companies. On the other hand, already established businesses show the importance of protecting property rights, which can reduce theft of the original ideas.

Government resources are one of the main sources of capital in less developed countries, and therefore public consumption reduces the amount of available funds that the government is willing to invest into private equity capital. According to (Invest Europe, 2018), venture capital is one of the main sources of start-up financing in less developed European Union countries, where the government remains as one of the main funders of this capital. This creates exclusion effect of public consumption with a significant impact on venture capital.

Although the capital market might appear as a competitive form of company funding, the presence of an advanced capital market increases private equity capital activity. Growth of interest rate had a nearly uniform positive effect, and so in the case of expensive loans other ways to finance the company projects were sought.

Tax burden also represents a driving force of private equity capital, but its effect is according to our results limited only on replacement capital. Furthermore, the labour market appears to be more significant predictor, however, mixed effects of its individual variables were found.

These conclusions are in most cases a confirmation of the results of the literature studied. Unlike other publications, we have focused on investments made in the country to identify immediate and delayed determinants of private equity capital for the European Union as a whole. Using panel regression and Granger causality test, we have confirmed that it is possible to stimulate the influx of private equity investment into the country, but these changes require significant interventions in the country's economy and business environment.

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## ANNEXES

**Table 3.** List of all used variables

| *Variable* | *Variable description* | *Source* |
|---|---|---|
| | *Economic activity* | |
| GDP | GDP growth in%, change from last year | Eurostat |
| HC | Final household consumption expressed as % of GDP | Eurostat |
| PC | Final public sector consumption expressed as % of GDP | Eurostat |
| Inf | Inflation rate | Eurostat |
| CPI | Consumer price index compared to 2010 | Eurostat |
| MFI | The monetary freedom index calculated as the weighted average of inflation over the last three years and the use of price controls | Heritage |
| EFI | Economic Freedom Index calculated as an average of all partial indicators | Heritage |
| GI | Government Integrity Index calculated from Corruption Perceptions Index | Heritage |
| GSI | Index of independence from government spending in that with rising government spending due to their lower efficiency decreases | Heritage |
| R&D | Total R&D expenditure in the country expressed as% of GDP | Eurostat |
| R&DG | Government R&D expenditures in the country expressed as% of GDP | Eurostat |
| | *Taxation* | |
| TT | Total tax paid by enterprises, expressed as % of commercial profits | WB |
| TA | Country tax attractiveness index for companies | LMU |
| TB | Tax burden index | Heritage |

| | | |
|---|---|---|
| *Funding* | | |
| FR | Funds collected in the country for private equity investment as % of GDP | Invest Europe |
| MC | Market capitalization of listed companies in% of GDP | WB |
| IR | Harmonized long-term interest rate created for convergence purposes at 10 - year maturity in % | ECB |
| *Labour market* | | |
| UN | Percentage of unemployed people expressed as % of labour force | Eurostat |
| EM | Percentage of the employed in the country in % | Eurostat |
| LMF | Labour market flexibility index taking into account various aspects of the country's labour market legal and regulatory framework | Heritage |
| *Business environment* | | |
| TR | Time required to complete the procedures required to obtain legal authorization to conduct business | WB |
| NP | Number of procedures required to obtain legal authorization to conduct business | WB |
| PAT | Number of patents filed by residents in a given country per 100,000 inhabitants | Eurostat |
| PRI | Property Rights Index | Heritage |
| TFI | Trade freedom index representing the absence of barriers to the import and export of goods | Heritage |
| BFI | Business Freedom Index reflecting government business regulations for starting and ending business | Heritage |
| IFI | Investment freedom index expressing the possibility of free flow of investment | Heritage |
| FFI | Financial Freedom Index to measure banking efficiency and independence from government control | Heritage |

Source: Own elaboration based on given sources

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# Ukrainian Cereals in Global Food Security: Production and Export Components

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ABSTRACT

The research *purpose* was devoted to providing the global food security by cereals and the most demanded crop like wheat. This topic belongs to the dominant issues in the world economic agenda and engages Ukrainian agriculture in supplying such staple crops as much as possible. The explored *hypothesis* dealt with simultaneous improvements in production and export components of a grain segment considering the period 2006-2018 when Ukraine restored its "breadbasket" status. The investigation *methodology* involved the ABC-XYZ analysis and econometric approach. The obtained calculation *results* specified regional ABC-XYZ distributions of 24 national producers into 4 groups by their harvest contributions to growing grain crops as well as discovered upward progress in volumes, values, and shares of Ukrainian cereals exports via linear regressions of high confidence levels. The study *findings* concerning a production component allowed us to propose enhancing cereals yields in Ukraine through implementing a complex of technological, product, management, and marketing innovations witnessed in the effective EU agriculture. The research *conclusions* with regard to an export component were as follows. To stay on the right track of current positive dynamics and face requirements of European consumers, the national farmers were recommended to focus on grain quality. Ukrainian agriculture should develop logistics and product promotions among the overpopulated major cereals importers from Asia. At last, Ukrainian exporters ought to foster increasing quantities and expanding geography of grain supply to African continent to mitigate the sharpest food insecurity around the world.

## INTRODUCTION

Food security was elevated to the top of the international agenda for a long time. Food and Agriculture Organization (FAO) of the United Nations identifies availability and stability of food supply, among others, via cereals indicators such as the share of dietary energy input derived from cereals

and the cereal import dependency ratio. Since 1961 FAO statistics has been collecting data on the harvested area, yield, and total production of cereals for over 245 countries (FAO, 2019). The most cultivated food grain crops in the world are wheat and rice which covered around 220 and over 162 million hectares of agricultural lands in 2019. The feed and biofuel components of cereals are presented by the coarse grain crops including barley, maize (corn), millet, oats, rye, and sorghum. The most common one among them is maize that occupied approximately 190 out of 325 million hectares of the harvested areas under the coarse grain crops in 2019 (USDA, 2019).

The prevalent cereals in Ukraine are wheat, maize, and barley which encompass on average 46%, 32%, and 18% of the agricultural lands under grain crops (State Statistics Service of Ukraine, 2019). In 2018 Ukraine provided

- 7.3% of the world wheat export after Russia, Canada, the USA, France, and Australia;
- 10.3% of the world maize export following the USA, Argentina, and Brazil;
- 8.9% of the world barley export surpassed by Australia, France, and Russia.

Cereals segment is the most profitable part of Ukrainian agriculture. It maintains state financial stability, welfare of rural population, makes the largest contribution to the national and global food security (Vasylieva, 2019). This reasoning encouraged to focus the fulfilled research on the paramount development of Ukrainian grain production and export in the context of reinforcing food security system.

## 1. LITERATURE REVIEW

Scientific community delivers numerous miscellaneous studies on providing food security. To define the issue in question in general, C. Barrett (2010), L. Jarosz (2014), N. Wald and D. Hill (2016) presented multifaceted views about food insecurity phenomenon ranging between restrictions over food trade, agricultural policy, and state food sovereignty down to systematic state disability to eliminate hunger and chronic malnourishment of the country's population. M. Gibson (2012), D. Headey and O. Ecker (2013) revealed the complicated nature of food security starting from the basic international demographic, economic, environmental, political, and cultural conditions up to regional food access, household well-being, individual health dietary and high nutritional status.

Above all, implementation of food security supposes balancing food consumption and production. Therefore, A. Kavallari et al. (2014), R. Grafton et al. (2015) focused on the increasing food demand driven by a rapid population growth towards 9 billion people beyond 2050. Meanwhile, T. Lang and D. Barling (2012), H. Godfray and T. Garnett (2014), F. McKenzie and J. Williams (2015), B. Campbell et al. (2016), E. Fouilleux et al. (2017) and M. Morkūnas et al. (2018) compared food control, capacity, resilience, risks, and sustainability as well as explored the ways of agricultural intensification and rise in food supply which have to facilitate slowed productivity development, limitations of natural resources and environmental impact.

Evidently, cereals are the key crops in agricultural economics. In this context, studies of B. Carver (2009), A. Danforth (2009), S. Elfson (2011) are worth mentioning among recent investigations on enhancing effectiveness of growing grain crops. These scientific works accumulated contemporary results concerning production management and logistics, economical soil cultivation, advanced machinery, applying improved seeds and fertilizers, safe technologies of plant protection, minimal waste of harvest, optimal storage, quality control, and profitable grain sales.

In spite of high priority and cohesive scientific assistance, Ukrainian current achievement is far from the existing potential in cereals segment (Samarets and Nuzhna, 2019; Zavorotniy and Bilyk, 2017). Thus, problems and prospects of increasing Ukrainian grain endowment to the global food security needs further elaboration and updated findings.

## 2. RESEARCH METHODOLOGY

The goal of this research was to assess conditions and find reserves to develop Ukrainian grain component of food security at the national and global scales. To reach this aim, the conducted study was divided into two tasks, namely:

- to evaluate cereals production and ground options on increasing their harvests applying best foreign innovative experiences;
- to specify trends in Ukrainian grain export as well as clarify its promising competitive advantages by continents and countries.

Following the announced topic and practical evidence of Ukrainian agriculture, the research was expanded over cereals in general and wheat in particular like a core grain crop around the world. To accomplish the first research task, it was relevant to choose a mathematical base of the ABC-XYZ analysis (Waters, 2003; Muller, 2011). The considered units were 24 regions in Ukraine all of which, to some extent, participate in production of grain crops. In our case, A, B, and C grades associated with Large, Average, and Small regional harvests sorted in the descending order. Like in the classic ABC approach, the grade A accumulated 80% of grain producers, while the grades B and C contained their parts of the next 15% and last 5%. X, Y, and Z grades corresponded to High, Medium, and Low yields compared to the average yields around the whole country. Adjusting the classic XYZ approach to the research purposes, first, regions with higher yields by 10% and more were embedded in the grade X. Second, the grade Y aggregated regions where yields deviated by ±10% around the average one in Ukraine. Third, the grade Z enveloped the rest of the regions with lower yields by -10% and less.

The offered distribution arranged 4 groups of regional producers with specific common values interpreted as follows:

- the cells AX, AY, BX, BY are the main contributors to the global food security;
- the cells AZ, BZ determine Ukrainian potential in increasing grain production and export;
- the cells CX, CY are responsible for a local food security;
- the cell CZ depicts regions with a relatively wrong agricultural specialization in the cereals segment.

Phillips et al. (2013), and Norton et al. (2014) are quite convincing that a contemporary agricultural development requires comprehensive innovative improvements. In our case, Ukraine grain producers in

- the cells AX, AY, BX, BY need Marketing innovations to promote their commodity and perfect purchase practices;
- the cells AZ, BZ would benefit from Technological innovations rising their yields;
- the cells CX, CY should focus on Management innovations to enhance their output volumes;
- the cell CZ would gain from Product innovations identifying alternative crop varieties.

European gravitation of Ukrainian economy convinces that the effective EU patterns and practices are reliable sources of the necessary agricultural innovations (Hebinck and Oostindie, 2018).

The mathematical base of the second research task was econometrics (Greene, 2007; Studenmund, 2016). First, describing Ukrainian dynamics of grain export resulted in creating Time-Series linear regressions to volumes, values, and shares of cereals and wheat exports. In this way, the regressions' slopes and R-squared enabled to measure annual trends and their input to explaining export dynamics. Second, to examine export tendencies by continents, it was feasible to create Time-Series linear regressions to cumulative volumes and values of cereals and wheat exports over the considered period. Third, the performed examination of Top-importers of Ukrainian

cereals gave recommendations on export progress and expanding Ukrainian involvement in the global food security system in the foreseeable future (Schroeder and Meyers, 2015).

# 3. RESULTS AND DISCUSSION

## 3.1 Findings on improving cereals production

The performed calculation to the first research task was arranged over the official average data from State Statistics Service of Ukraine over the last three years (see Table in Appendix). Such approach allowed to align climatic risks of production volatility but retain similar economic conditions in Ukrainian farming. Tables 1 and 2 stored the found regional distributions in Ukrainian cereals and wheat segments.

In more detail, data in Table 1 persuaded that 12 or 50% of Ukrainian regions with the total harvest of 61.7% establish a stable backbone of Ukrainian contribution to the cereals segment of the global food security. 3 or 13% of the national regions with the total grain harvest of 2.6% are engaged in a local food security. 2 or 8% among Ukrainian regions with the total harvest of 3.7% should update their cereals varieties. At last, 7 or 29% of the national regions with total grain production of 32.1% have unsatisfactory yields and can increase their common share at least by 8.1 percentage point, i.e. 5.4 million tons of cereals worth $932 million in 2018 export prices.

**Table 1.** Regional Distribution of Ukrainian Cereals Producers

| *Harvest* | *Yield* | | |
|---|---|---|---|
| | *X – High* | *Y – Medium* | *Z – Low* |
| A – Large | Cherkasy<br>Chernihiv<br>Khmelnytskiy<br>Kyiv<br>Poltava<br>Sumy<br>Vinnytsya | Kirovohrad | Dnipropetrovsk<br>Kharkiv<br>Mykolayiv<br>Odesa<br>Zaporizhya |
| B – Average | Ternopil<br>Zhytomyr | Lviv<br>Rivne | Donetsk<br>Kherson |
| C – Small | Ivano-Frankivsk | Chernivtsi<br>Zakarpattya | Luhansk<br>Volyn |

Source: compiled by the author based on data from State Statistics Service of Ukraine (2019).

Likewise, data in Table 2 substantiated that 13 or 54.2% of Ukrainian regions with the total harvest of 61.6% constitute a stable core of Ukrainian input to the wheat segment of the global food security. 4 or 16.7% of the national regions with the total wheat harvest of 6% are valuable for a local food security. 1 or 4.1% among Ukrainian regions with the total harvest of 0.4% should revise its agricultural specialization. At last, 6 or 25% of the national regions with total wheat production of 32% confront poor yields and can raise their common share at least by 5.5 percentage point, i.e. 1.4 million tons of wheat worth $258.4 million in 2018 export prices. In both cases the fulfilled ABC-XYZ analysis confirmed additional production capacities in 5 regions including Dnipropetrovsk, Donetsk, Kherson, Mykolayiv, and Zaporizhya areas. As a matter of fact, it can be tackled via implementing Marketing, Management, Technological, and Product innovations (Velychko and Velychko, 2017; Khalatur et al., 2019). The successful EU farmers offer the nearest pool of reliable novelties applicable to Ukrainian agriculture (Tomich et al., 2019).

**Table 2.** Regional Distribution of Ukrainian Wheat Producers

| *Harvest* | *Yield* | | |
|---|---|---|---|
| | *X – High* | *Y – Medium* | *Z – Low* |
| A – Large | Cherkasy<br>Khmelnytskiy<br>Sumy<br>Ternopil<br>Vinnytsya | Kharkiv<br>Kirovohrad<br>Odesa<br>Poltava | Dnipropetrovsk<br>Donetsk<br>Kherson<br>Mykolayiv<br>Zaporizhya |
| B – Average | Kyiv<br>Lviv | Chernihiv<br>Volyn | Luhansk |
| C – Small | Chernivtsi<br>Ivano-Frankivsk<br>Rivne | Zhytomyr | Zakarpattya |

Source: compiled by the author based on data from State Statistics Service of Ukraine (2019).

To pick exemplary Marketing and Management innovations to Ukrainian regions by the grades A, B, C, it makes sense to analyze indicators of the total harvest and production per capita. On average in Ukraine they amounted to 61.8 million tons and 1.47 tons for cereals as well as 25.6 million tons and 0.63 tons for wheat. Hence, first, the most appropriate agricultural innovations can be delivered by France with the total grain harvest of 64 million tons as well as by Denmark, Hungary, and Lithuania where cereals production per capita ranged between 1.55 and 1.89 tons. Second, the best agricultural innovative objectives represent France with a wheat harvest of 36.4 million tons as well as Bulgaria, Denmark, Latvia, and Lithuania where wheat production per capita varied from 0.8 to 1.41 tons (FAO, 2019).

For selecting Technological and Product innovations best fitted to the grades X, Y, Z, we compared indicators of yields. In more detail, regions of the grade X (Table 1) had productivity between 51 and 63.5 centners per hectare that matched to the ranks from 17 to 9 among the EU cereals producers. The relevant innovations for these regions can be found in Austria, Belgium, Denmark, Germany, France, Ireland, the Netherlands, and the United Kingdom which had cereals yields between 65.7 and 86.7 centners per hectare. Ukrainian regions of the grade Y obtained yields between 42.2 and 48 centners per hectare that associated with the ranks from 20 to 18 among the EU cereals growers. The affordable innovations for these areas can be conveyed from Austria, Bulgaria, the Czech Republic, Croatia, Hungary, Italy, Luxembourg, Slovakia, Slovenia, and Sweden, where cereals yields varied from 49.9 to 61 centners per hectare. Regions of the grade Z had productivity between 27.9 and 40.2 centners per hectare being ranked from 27th up to 23rd among the EU cereals producers. Such Ukrainian regions are invited to start with implementing innovations from Latvia, Lithuania, Malta, Portugal, and Romania which had cereals yields between 42 and 47.6 centners per hectare (FAO, 2019).

In this fashion, regions of the grade X (Table 2) had productivity between 44.3 and 56.3 centners per hectare that corresponded to the ranks from 20 to 11 among the EU wheat producers. The relevant innovations for these regions can be found in Belgium, the Czech Republic, Croatia, Denmark, Germany, France, Ireland, the Netherlands, Sweden, and the United Kingdom which had wheat yields between 56.7 and 101.3 centners per hectare. Ukrainian regions of the grade Y obtained yields between 37.1 and 43.5 centners per hectare that associated with the ranks from 24 to 21 among the EU wheat growers. The proper innovations for these areas can be conveyed from Austria, Bulgaria, Hungary, Latvia, Lithuania, Luxembourg, Malta, Poland, Slovakia, and Slovenia, where wheat yields varied from 47 to 56.3 centners per hectare. Regions of the grade Z had productivity between 30.2 and 34.9 centners per hectare being ranked 25th among the EU wheat producers. These Ukrainian regions are invited to follow the innovative patterns from Estonia, Fin-

land, Italy, and Romania which had wheat yields between 39.3 and 42 centners per hectare (FAO, 2019).

## 3.2 Findings on improving grain export

And now, let us delve in the export component of Ukrainian agricultural engagement in the global food security system. The research results to the second task were calculated on the basis of the available data for 2006-2018 (State Statistics Service of Ukraine, 2019). So far, Ukraine exports 41.4 million tons of cereals for approximately $7.2 billion, including 16.4 million tons of wheat for over $3 billion. Overall grain export amounts to approximately 15% in total Ukraine's foreign trade in goods. To a great extent, contemporary development of Ukrainian cereals production and export is incentivized by relatively fair prices. They reached on average $158.6 per ton of grain at the domestic market which was consistent with the common export price of $173.7 per ton of cereals or $163.2, $178.9, and $177.6 per ton of grain to Europe, Asia, and Africa in 2018. By comparison, similar gaps between domestic and export prices were $65-83 in 2011-2013. It is obvious that now economic transparency has become much better.

Table 3 contained the computed figures concerning quiet encouraging upward tendencies in Ukrainian grain export. With a high level of confidence they say that average annual increments of cereals export amounted to 3024.6 thousand tons or $502.3 million. These trends explained 86% and 76% of deviations in the national grain export. Its share in Ukrainian cereals production raised by 3.4 percentage point per annum. Similarly, the data in Table 3 revealed that Ukrainian average annual increments of wheat export reached 1153.3 thousand tons or $201.8 million. These trends verified 67% and 79% of changes which occurred in the national wheat sales abroad. Their share in Ukrainian wheat production increased by 3.7 percentage point per annum. It should be noted that in the short-run the expected export acceleration will not encounter with the enhanced domestic demand for feed since the national animal husbandry has been weakened by the reduced industrial financing and low purchasing power of Ukrainian population (Vasylieva, 2017; Vasylieva and Velychko, 2017).

**Table 3.** Export Dynamics of Ukrainian Cereals and Wheat

| *Regression Name* | *Regression Slope* | *P-Value* | *R-Squared* | *F-Significance* |
|---|---|---|---|---|
| Cereals export: | | | | |
| volume | 3024.6 | 0.000 | 0.86 | 0.000 |
| value | 502.3 | 0.000 | 0.74 | 0.000 |
| share | 3.4 | 0.001 | 0.62 | 0.001 |
| Wheat export: | | | | |
| volume | 1153.3 | 0.001 | 0.67 | 0.001 |
| value | 201.8 | 0.000 | 0.79 | 0.000 |
| share | 3.7 | 0.006 | 0.52 | 0.006 |

Source: calculated by the author based on data from State Statistics Service of Ukraine (2019).

Currently, the quantities of Ukrainian cereals export are distributed between Europe, Asia, and Africa in proportion of 32.4%, 43.4%, and 23.8% in total Ukrainian grain sales abroad. Turning to wheat, the corresponding ration is 8.9%, 53.6%, and 36.3% (State Statistics Service of Ukraine, 2019). The latter ones define that the European importers are more inclined to Ukrainian coarse crops while the buyers from Asia and Africa prefer wheat. It seems logical because on average poorer and overpopulated countries in Asia and Africa have to respond to an insufficient food supply. Meanwhile, wealthier European countries need more crops for processing them in animal feed and biofuel (Yatsenko et al., 2017).

Trends to cumulative grain export made it possible to highlight strategic prospects of Ukrainian involvement in the global food security by continents (see Table 4). Actually, now the cumulative values of Ukrainian cereals exports are distributed between Europe, Asia, and Africa in proportion of 24.5%, 47%, and 26.9% over the considered period of 2006-2018. With regard to wheat, the corresponding ration looks like 12.9%, 47.8%, and 37.9%. Table 4 with high level of confidence informed about the annual increases in shares of cereals export volumes to Europe and Africa by 0.83 and 0.77 percentage points. These trends determined 78% and 76% of the respective trade dynamics. Simultaneously, European and African shares in cereals export values enhanced by 0.89 and 0.91 percentage points per annum. Such indicators explained 77% and 75% of the observed changes in the revenues of Ukrainian cereals exporters. Unfortunately, Asian shares in cereals export volume and value dropped annually by 1.1 and 1.28 percentage points. Besides, these tendencies were pretty strong since they determined 83% and 81% of the discussed relative trade decline.

**Table 4.** Ukrainian Export of Cereals and Wheat by Continents

| *Regression Name* | *Regression Slope* | *P-Value* | *R-Squared* | *F-Significance* |
|---|---|---|---|---|
| *Share of cereals export:* | | | | |
| volume to Europe | 0.83 | 0.000 | 0.78 | 0.000 |
| value to Europe | 0.89 | 0.000 | 0.77 | 0.000 |
| volume to Asia | -1.10 | 0.000 | 0.83 | 0.000 |
| value to Asia | -1.28 | 0.000 | 0.81 | 0.000 |
| volume to Africa | 0.77 | 0.000 | 0.76 | 0.000 |
| value to Africa | 0.91 | 0.000 | 0.75 | 0.000 |
| *Share of wheat export:* | | | | |
| volume to Europe | -1.29 | 0.000 | 0.84 | 0.000 |
| value to Europe | -1.26 | 0.000 | 0.84 | 0.000 |
| volume to Asia | 0.64 | 0.024 | 0.39 | 0.024 |
| value to Asia | 0.39 | 0.107 | 0.30 | 0.107 |
| volume to Africa | 0.90 | 0.002 | 0.60 | 0.002 |
| value to Africa | 1.15 | 0.001 | 0.65 | 0.001 |

Source: calculated by the author based on data from State Statistics Service of Ukraine (2019).

Additionally, Table 4 with high level of confidence detected the annual fall in European wheat export volume and value by 1.29 and 1.26 percentage points per annum. On the contrary, wheat export to Africa demonstrated essential growths in volume and value by 0.9 and 1.15 percentage points per annum which explained 60% and 65% of the identified trade progress. The volume and value of Ukrainian wheat export to Asia also had annual upward trends by 0.64 and 0.39 percentage points. However, they were less convincing and accompanied significant fluctuations in Asian wheat demand during 2006-2018.

For reflecting Ukrainian participation in the global food security, we analyzed the mainstream countries in the national export. More specifically, the Top-importers of Ukrainian wheat in Europe were Italy and Spain. The latter one absorbed on average 61.6% of the continent purchases. It is quiet logical since Italy and Spain were ranked 4th and 9th among the World Top wheat importers or were the two largest ones in Europe. Among the coarse grain crops European consumers prefer maize. Therefore, Ukrainian barley needs an active promotion within the Top European importers such as the Netherlands, Belgium, and Spain ranked 4th, 5th, and 7th among the World Top barley buyers. The major importers of Ukrainian maize were the Netherlands and Spain with the shares of purchases of 21% and 41.9%. It is no wonder because these countries were ranked 8th and 4th in the list of the World Top maize buyers. Overall, Spain remains the major European importer of

Ukrainian cereals which encompass over 45% of Ukrainian goods' export to Spain (State Statistics Service of Ukraine, 2019).

The long-term core consumer of Ukrainian wheat in Asia was Bangladesh acquiring on average 16.8% of Ukrainian export. For the last three years Top-importer of Ukrainian wheat to Asia was Indonesia embracing 22.8% of Ukrainian wheat sales to the continent. Overall, wheat sales covered 76.7% and 79% of the total goods' export to these countries from Ukraine in 2018. Wheat export to Asia is a clear and sound evidence of Ukrainian commitment to the global food security. Actually, being the 4th most populous country in the world Indonesia has to be the major importer of wheat across the globe. Similarly, Bangladesh is the 8th most populous state with the highest density of population among the countries with over 8 million people. The sole robust major buyer of Ukrainian barley during 2006-2018 was Saudi Arabia with the average import share of 69%. It is worth mentioning that Saudi Arabia have the second greatest demand for barley in the world. And it was barley sales that absorbed 60% of international trade between Ukraine and Saudi Arabia in 2018. Unfortunately, Ukraine does not gain from exporting barley to its mainstream world importer China. Undoubtedly, improvements in this area would offset the sharpest misbalance of $5.4 billion displayed by Ukrainian foreign trade in goods with China. The lasting consumer of Ukrainian maize was Iran with the average share of 24.7% in Ukrainian export to Asia. The Top-importer of maize for the past five years was China acquiring on average 39.7% of Ukrainian export to the continent.

The key buyers of Ukrainian wheat in Africa were Morocco, Tunisia, and Egypt. The latter one was the long-term prevalent importer which acquired on average 41.8% in Ukrainian wheat export to Africa. Egypt was also a leading African consumer of Ukrainian maize with the share of 65.7%. As before, these export links confirm strong Ukrainian involvement in the global food security. It is true because Egypt is the first African importer of wheat and maize necessary to meet challenges of feeding the 14th most populous country in the world. Ukrainian barley was the most sellable in Libya which encompassed on average 56% in Ukrainian export to Africa. As before, this Ukrainian input to the global food security provided the demanded coarse grain crop to the largest importer in the continent.

## CONCLUSION

Overall, the study findings revealed that now the cereals segment of Ukrainian agriculture has returned and successfully justifies its name of 'breadbasket' at the global scale (Babenko et al., 2017). It is important since further development of grain production is a primary issue in the world agenda. Really, the present global indicator of cereals production per capita amounted to 0.34 tons. In particular, wheat production of 0.1 tons per capita agrees with the recommended level of the healthy dietary (USDA, 2019). But the annual growth of the world population at a rate of around 1.1% implies the same imperative increment in grain harvest. The outlined results of this research substantiated the options to desired steady progress.

Concerning Ukrainian cereals production, it supposes implementing innovations to raise regional yields applying the checked practices from the EU countries. Consequently, an additional grain production will boost export quantities. To expand its market shares, Ukrainian cereals growers should focus on:

- grain quality to satisfy strong requirements of European consumers, including those ones in Belgium, Germany, Italy, the Netherlands, and Spain;
- logistics and product promotion in Asia with regard to the overpopulated countries which are the largest world cereals producers, like China, India, and Pakistan or the major world grain importers, involving Bangladesh, Indonesia, Japan, Malaysia, the Philippines, South Korea, and Vietnam;
- increasing volumes and expanding geography of grain export to African continent which have

the most rapid growth in population at an average rate of 2.6% per annum, meaning Nigeria as well as richer countries, such as Algeria, Egypt, Libya, Morocco, and Turkey.

Eventually, the offered improvements targeted at the production and export components of the cereals segment in Ukrainian agriculture would facilitate existing positive dynamics of Ukrainian contribution to the global food security.

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# APPENDIX

**Table.** Initial Data to ABC-XYZ Analysis

| *Region* | *Share of Harvest, %* | | *Deviation of Yield, %* | |
|---|---|---|---|---|
| | *Cereals* | *Wheat* | *Cereals* | *Wheat* |
| Cherkasy | 5.9 | 3.8 | 31.9 | 14.8 |
| Chernihiv | 6.4 | 3.3 | 35.9 | 8.2 |
| Chernivtsi | 0.9 | 0.7 | 1.9 | 10.8 |
| Dnipropetrovsk | 5.3 | 6.3 | -30.2 | -16.6 |
| Donetsk | 2.5 | 4.4 | -32.9 | -13.0 |
| Ivano-Frankivsk | 1.2 | 1.2 | 12.4 | 19.7 |
| Kharkiv | 6.1 | 7.9 | -11.3 | 3.7 |
| Kherson | 3.6 | 5.7 | -26.1 | -15.5 |
| Khmelnytskiy | 5.2 | 5.1 | 37.6 | 40.2 |
| Kirovohrad | 5.2 | 4.1 | -6.9 | -7.7 |
| Kyiv | 5.1 | 3.5 | 27.1 | 10.4 |
| Luhansk | 1.9 | 3.3 | -30.1 | -13.8 |
| Lviv | 2.2 | 3.1 | 5.8 | 17.0 |
| Mykolayiv | 4.1 | 5.2 | -30.8 | -15.3 |
| Odesa | 6.6 | 8.8 | -19.9 | -4.9 |
| Poltava | 8.3 | 4.1 | 26.9 | 6.3 |
| Rivne | 1.9 | 1.8 | 4.4 | 12.2 |
| Sumy | 6.0 | 3.7 | 38.9 | 19.2 |
| Ternopil | 3.9 | 4.2 | 22.8 | 29.1 |
| Vinnytsya | 8.3 | 7.4 | 40.1 | 32.3 |
| Volyn | 1.8 | 2.7 | -11.8 | 7.9 |
| Zakarpattya | 0.6 | 0.4 | -2.8 | -18.6 |
| Zaporizhya | 3.9 | 7.1 | -38.5 | -24.7 |
| Zhytomyr | 3.3 | 2.3 | 14.1 | 7.1 |

Source: compiled by the author based on data from State Statistics Service of Ukraine (2019).

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# The Effectiveness of Creating a Common Energy Market in the Eurasian Economic Union

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## ABSTRACT

The integration of energy markets (gas and oil) is accompanied with growing imbalance in the economic interests pursued by member states of the Eurasian Economic Union (EAEU). The evaluation was based on price and synergy factors (economies of scale), and the production function was solved by building a linear regression model. The model construction involved calculating the indicators of GDP elasticity that reflect changes in consumption and foreign trade for the period 2007 to 2018 and assessing the effects of the price factor (indices of growth in oil and gas transit prices and oil and gas export prices) on GDP changes when a common gas or oil market is created. Finally, the priority conditions for the integration of EAEU gas and oil markets were ascertained to allow the design of optimal scenarios for the establishment of a shared electricity market. The findings confirmed a synergistic effect, which manifests as an increase in GDP growth rate for each of the EAEU member states. The proposed approach enables a comprehensive evaluation of integration effectiveness on the basis of available relevant data.

# INTRODUCTION

Stability in the energy sector is crucial for economic prosperity in the member states of the Eurasian Economic Union (EAEU) as these countries are rich in resources and collectively produce 14.6% and 17.3% of the world's oil and natural gas, respectively (The Common Energy Market of the Eurasian Economic Union, 2018). Such stability has been pursued through a traditional industry approach, which has instead caused imbalance given the difficulty of identifying the development potential of the energy industry outside conventional areas of action (Burke a Stephens, 2018; Semin et al., 2019a). Under the conditions of dynamic economic development, therefore, the concept of synergistic effect has become the central aspect of an integrated approach to the expansion of the energy industry (Tang et al., 2018; Santamouris, 2019; Thellufsen and Lund, 2015). Under this scientific approach, energy is regarded not as a static product that needs to be evaluated and delivered but as a dynamic contribution that can bring about economic and social benefits to a state (Santamouris, 2019; Thellufsen and Lund, 2015; Arto et al., 2016). It is an approach that focuses on the relationship between improved energy supply and elevated development potential (Bergasse, 2013). The problem is that many countries do not have enough natural hydrocarbon reserves or capacities to promote competition (breaking up a monopoly) in the energy market and meet the needs of the national economy. Nevertheless, such issue can be solved by individual countries or regions through the creation of a common regional energy market (Nangia, 2019)—a strategy that has been verified effective, in practice, in reducing the market share of monopolistic companies and increasing the number of entrants into the market (Nangia, 2019; Madyo, 2008). Regional integration also improves the operation of an entire system, thereby eliminating border issues and facilitating integrated production, network operation, and trade (Madyo, 2008; Dugstad, 2019). A success story in this regard is represented by the regional electricity markets created in Nordic countries 10 years ago (Deryabin and Antyushina, 2008). Over time, the focus has shifted to the consolidation of energy markets in neighbouring countries, which is a trend observed in Europe, the USA, and some other regions (Dugstad, 2019).

In Europe, various regional initiatives are aimed at developing regional markets for electricity and gas. Similarly, the United States uses a standard market model based on the concept of regional wholesale markets regulated by independent system operators (ISOs) and/or regional transmission organizations (RTOs) (Hartman, 2016). The same tendency manifests itself in Eastern Europe. Given that many energy markets in EAEU member states seek to establish a competitive integrated space, the draft Concept for the Formation of the EAEU Common Electricity Market was approved on March 10, 2015. This document outlines the main stages, goals, and objectives of the formation and development of the energy market and the methods by which its participants interact (On the Concept for the Formation of a Common Electricity Market of the Eurasian Economic Union, 2015). It implies that the establishment of common energy markets is to ensure the stable supply of energy resources to the national markets of participating states, enhance their energy security (both in terms of supply and demand), and foster their positions in global energy markets. In terms of geographical scope, a consolidated market would represent one of the world's largest commercial energy arenas, strategically located between Europe and Asia and encompassing a population of about 182 million (The Common Energy Market of the Eurasian Economic Union, 2018). The EAEU common energy market is a system of relationships among participants in the domestic gas, oil and electricity markets of member states that buy and sell hydrocarbons, electric energy (power capacity), and related services and that act on the basis of general rules and relevant agreements (Eurasian Economic Treaty Union, 2014). Integrating EAEU energy markets can engender major effectiveness gains in welfare terms to consumers and industries. Energy markets can be further consolidated through a process of market coupling, which also produces effectiveness benefits owing to its more efficacious use of generation capacity and the consequent reduction in the need for large but idle productive capability (Böckers, 2013). The potential for savings is indicated by the sharing of diverging high-peak periods among member states. The larger the share of divergence, the greater the generation capacity gained in utilization. While market coupling theoretically increases market effectiveness, issues such as market design or other regu-

latory interventions significantly affect the performance of market coupling. Therefore, aligning the different existing national regulatory frameworks across the EAEU or setting up a new common framework altogether is important. According to the Concept, the common energy market is formed on the basis of parallel electric power systems and capacities. It will have uniform technical norms and rules, as well as coordinated energy balances (On the Concept for the Formation of a Common Electricity Market of the Eurasian Economic Union, 2015). However, objectively, creating a common oil and gas market is first necessary. The countries that participate in the integration have various models and conditions of their energy markets' operation. This condition results in the imbalance of interests. For example, Kazakhstan and Belarus seek to differentiate tariffs between exports and domestic deliveries, while Russia wants all tariffs to be the same for all types of shipments (Gnutzmann-Mkrtchyan, 2013). Kazakhstan and Belarus would like to unify quality standards, while Russia believes such an approach is unrealistic since oil and oil products are streamed from different fields, and this situation would inevitably lead to significant expenses (The Common Energy Market of the Eurasian Economic Union, 2018). The integration process in the electric energy industry, as in any other field, brings about different effects for the countries of the integration association. The goal of this study is to develop an approach to estimate the economic efficiency of energy market integration for each EAEU member state (Fedorenko et al., 2016). The study describes the main conflict of interests of net exporters and net importers of hydrocarbons during the integration of the EAEU's energy markets. Results show that the factors of price and economies of scale are the key to economic efficiency during the integration of energy markets. By solving the production function and performing regression analysis (Chikunov et al., 2019), the authors showed that in modern conditions the creation of a common oil and gas market has a positive synergistic effect in all EAEU countries that manifests itself through GDP growth (Osipov et al., 2019).

## 2. LITERATURE REVIEW

Under modern conditions, the creation of common EAEU markets is not only timely, but also a fairly innovative measure. As a matter of fact, except for a very specific and narrowly applicable integration model implemented in the European Union, no one has yet proposed other efficient integration projects. However, such work has begun (a recent example is the GEIDCO Chinese project in the electric power industry (Cornell, 2019)). The EAEU can present its own model of broad Eurasian integration to neighbouring countries, including China, Japan, the Republic of Korea, Iran, the European Union, and others. The attractiveness of this project depends on the characteristics of the model itself and its viability. The decision to form a common electricity market for the EAEU member states drew researchers' attention to the issues related to evaluating the economic efficiency of cross-border integration of electric power complexes, which is reflected in numerous scientific publications.

Research papers provide a range of approaches to evaluating the effectiveness of regional energy systems and markets integration (Batten et al., 2019; Li, Zhang and Andrews-Speed, 2019; Aalto, 2014; Leal, Rego and Ribeiro, 2019). The integration of energy markets has been studied mainly as part of the creation of a common energy market of the European Union (EU). In 2005, Copenhagen Economics attempted a preliminary evaluation of the possible consequences of launching a common European electricity market based on the data for the period from 1990 to 2003. The goal of that research was to evaluate its impact on electricity prices caused by the synergistic effect for consumers in the integrated electricity market (Copenhagen Economics, 2005). The study consisted of several stages: measuring the market opening at the national level, an econometric evaluation of the impact of the market opening on electric power indicators of individual countries, and finally, the evaluation of the overall economic impact using the general equilibrium model of the European economy. It was established that the market opening had a significant impact on national productivity, and the researchers estimated that a long-term impact on electricity could manifest itself as a 7–8% price reduction (Sheng, Shi and Zhang, 2013).

Dealing with these issues, scientists also widely applied the scenario modelling approach: using the world gas market model and the least cost method, they determined the differences between various scenarios of energy market integration (Volkart, Mutel and Panos, 2018; Shi, Variamand and Shen, 2019).

Research papers from the EAEU countries mainly consider different aspects of creating an integrated electricity market in the Eurasian Union. The authors explored the issues of organizing cross-border trade in electric power (Salimonenko, 2017), the specifics of electric power as a marketable product (Valeeva, 2017), and presented proposals for building an effective model of cross-border trade in electric power in the EAEU (Filippova, 2018; Arifulova and Storozhenko, 2018). Scientists have developed methods for optimizing the costs of generating electricity, having considered different generation patterns in the EAEU countries (Matveev, 2017). However, it should be noted that creating common gas and oil markets is the first step for the integration of the electricity market of the EAEU countries. After this, the electricity market can be integrated in 2025 (Sargsyan, 2017). The creation of common markets will allow bringing together wholesale prices for gas, oil, oil products and electricity in the domestic markets of five EAEU countries. Definitely, there will still be regional differences, but these will be mainly due to transportation distances. That is, from the perspective of manufacturers, this will ensure the equal profitability of energy supplies over the largest part of the EAEU (with the exception of some isolated and inaccessible areas) (the EAEU Common Energy Market will create the infrastructure basis for the Union, 2017). It is difficult to predict whether prices will be stable and acceptable for consumers. At the same time, one should remember that common markets mainly influence wholesale trade, while a significant share of the final price is formed in retail. In the future, as cross-subsidies decrease, the role of retail will grow (The EAEU Common Energy Market will create the infrastructure basis for the Union, 2017). The creation of the common EAEU energy market should contribute to the economic development of the member states through greater energy security and effectiveness (The EAEU Agreement on the Common Electricity Market was signed, 2019). Higher effectiveness is not an obvious result for all the countries as they have formed different levels of energy prices. The formation of an equilibrium price in a single market at a level lower than the export price of an individual country will increase the economic benefits of importing countries and reduce the economic benefits of energy exporting countries. Reaching an equilibrium price in the common market at a level higher than the export price of an individual country will have the opposite effect for importing and exporting countries. The imbalance of economic benefits associated with the integration of energy markets is also due to the cost of hydrocarbons transit. Cancelation of transit fees, as provided for by the conditions for creating a common market (Mgdesyan, 2017; Osipov et al., 2018), will be beneficial for importing countries and not good for countries involved in the transit of energy resources (primarily Russia and Kazakhstan).

Modern scientific approaches mostly address the issues of electricity market integration. They do not consider the matter consistently and require expensive or inaccessible detailed data, especially in the developing EAEU member countries. Therefore, we aimed to develop a method for evaluating energy transition strategies adapted to the conditions of the countries in which they are to be implemented and to consider them with a holistic approach that would ensure the evaluation of the economic effect (change in GDP) for each EAEU country.

## 3. METHODS AND MATERIALS

As we have already said, the effectiveness of energy markets integration primarily depends on the factors of price and economies of scale obtained by combining economies and individual industries (Wang and Feng, 2019). Therefore, the proposed methodology for evaluating the effectiveness of creating a common energy market involves evaluating the influence of the price factor (change in the price of export and transit) and the synergy factor (synergistic effect from this combination).

When evaluating the effectiveness, one should consider changes in GDP—an indicator that reflects the efficiency of the whole economy and the oil and gas sector in particular. To determine the impact of the synergy factor on changes in GDP, we used the production function:

$$Y_1 = \alpha_0 \times X_1^{\alpha_1} \times X_2^{\alpha_2}, \quad (1)$$

where $Y_1$ is the GDP indicator, billion USD;
$X_1$ is oil/gas consumption in the country, million tons;
$X_2$ is net export of oil/gas in the country, million tons;
$\alpha_0$ is the intercept term;
$\alpha_1 - \alpha_2$ are indicators of the elasticity of GDP changes from factors $X_1 - X_2$, respectively.

The type of the model (formula 1) was chosen by the analogy with the Cobb-Douglas production function which is used to evaluate the influence of production factors on production volumes (Vîlcu, 2011). At the macro level, GDP is an indicator of production volumes. Since we are examining the oil and gas industry, the indicator of this sector that influences GDP was selected as the production factor. This is the volume of consumption—the greater the consumption of energy, the larger are the volume of production and the indicators of export and import of energy resources.

Since the production function does not include negative values, the indicator X2 for importing countries was calculated as the difference between import and export. This indicator has the following economic interpretation: importing countries receive almost no profit from energy exports, and imported energy resources are a factor of production, which, when used effectively, increases the profit of enterprises and GDP. The economic development of a country exporting energy resources is ensured by revenues from the export of hydrocarbons, whereas import is associated with expenditures (Vasiljeva et al., 2019).

The chosen model (formula 1) allowed evaluating the effectiveness of the integrative energy association within the Eurasian Union. Since the integration of energy markets produces a synergistic effect (manifesting itself in economies of scale when creating a common market), it does not seem accurate to calculate the total effect from the creation of a common energy market as a sum of individual GDPs of the EAEU member states.

We analysed the model of creating a common market with the production function (1) to determine the presence of super-additive synergy that means long-term advantages of integration associations arising from access to new markets, development of corporate and competitive potential, and diversification of production (Filippova, 2018).

We used a multifactor linear regression model to solve the production function (1). For this, the logarithm was taken of both parts of the equality, and the function was reduced to a multifactor regression model:

$$lnY_1 = lna_0 + a_1 lnX_1 + a_2 lnX_2 \rightarrow \overline{\overline{Y}} = \overline{\overline{a}}_0 + a_1 \times \overline{\overline{X}}_1 + a_2 \times \overline{\overline{X}}_2, \quad (2)$$

where $\overline{\overline{Y}} = lnY_1$; $\overline{\overline{a}}_0 = lna_0$; $\overline{\overline{X}}_1 = lnX_1$; $\overline{\overline{X}}_2 = lnX_2$ (from function 1);
$\overline{\overline{a}}_0$ is the intercept term;
$a_1 - a_2$ are coefficients for independent variables—model elasticity coefficients (1).

The influence of the price factor on economic efficiency was evaluated with a linear regression model, in which the dependent variable is the index of change in GDP (growth rate of each EAEU member state) ($Y_2$), while independent variables are export price indices ($X_3$) and transit price indices ($X_4$):

$$Y_2 = a_0 + a_3 \times X_3 + a_4 \times X_4, \quad (3)$$

This model type was chosen since the relationship between the dependent and independent variables is linear. Relative values—growth rates—were taken as dependent and independent variables in order to ensure the commensurability of the indicators. Modeling is more accurate if one uses the same units of measure and the same dimension. The GDP growth rate is the dependent variable in the model (3). In both functions (formulas 1 and 3), absolute or relative values of GDP were used for final evaluation of the total change in GDP under the influence of the synergetic and price factors. Independent variables are the price indicators that will change after creating a common energy market: the growth rate of the export price and the growth rate of the transit cost (Semin, 2019b). The model was built to evaluate the change in GDP of each EAEU member state regarding its oil and gas market. Unknown model parameters (2)-(3) ($\mathbf{a_0} - \mathbf{a_4}$) were determined in Statistica 12.0 software with the multifactor linear regression method.

## 4. DATA

In this study, we imposed a system of certain limitations. First, we evaluated the effectiveness of creating common oil and gas market since the creation of such markets is the priority for the EAEU member states during the integration of energy markets. After this, it is possible to build an integrated electricity market (The common EAEU electricity market: it won't work without gas, 2019). The creation of a common electricity market is a long-term project (the stipulated implementation period is up to 2025) (Sargsyan, 2017). During this period, the political and economic conditions of the agreement may change. Therefore, one cannot model the long term effectiveness of creating a common market with a high degree of reliability, so it is not viable. Oil and gas are key components in the structure of the total consumption of primary fuel and energy resources of the EAEU for 2018 (72.2%) (EAEU Statistics, 2019). Second, the efficiency is understood as the GDP growth of a country participating in the integration of energy markets. Since there are no statistical data for the EAEU countries regarding the energy efficiency indicator (EROEI) that most accurately characterizes efficiency, we used GDP as the resulting indicator—an indicator of the overall performance of business entities and the state, whose level significantly depends on the efficiency of the oil and gas market. Third, the export price is measured as the price of Russia's oil and gas exports, which is the main producer and exporter of energy resources to the EAEU countries. Fourth, we evaluated the effectiveness of creating a common market separately for each EAEU country. Such a decision can be explained by the heterogeneity of the data sample on the volumes of oil and gas exports and imports in the studied countries, as well as the differentiated effect of the price level and transit volumes for the exporting and importing countries.

The most significant factors that change first when a common market is created are price and transit fees (Mgdesyan, 2017). Investments in the technological process are secondary tasks in the integration of energy markets integration; therefore, in this study, the costs of energy production and processing are constant values and were not taken into account in the efficiency evaluation model. At the same time, the synergistic effect occurring due to increased production (the capacities of several countries are combined), greater consumption, export, and import may lead to a change in total costs, which will influence changes in GDP. We put forward the hypothesis that the creation of a common market of the EAEU countries is characterized by a synergistic effect. This hypothesis was verified with the production function (formula 1). For this purpose, and to evaluate the effectiveness of the formation of common oil and gas markets, we used the following indicator values for the period from 2007 to 2018:

- GDP of the EAEU countries (Armenia, Belarus, Kazakhstan, Kyrgyzstan, Russia), billion USD;
- Oil and gas consumption in the EAEU countries in physical units, million tons and million $m^3$, respectively;
- Oil and gas imports to the EAEU countries in physical units, million tons and million $m^3$, respectively;
- Oil and gas exports by the EAEU countries in physical units, million tons and million $m^3$, respec-

tively;

- Transit cost of oil (USD per ton) and gas (USD per 1000 m³/100 km);
- Price of oil and gas exported by Russia.

A model for evaluating the effectiveness of a common market included Russia, Kazakhstan, Belarus, the Kyrgyz Republic, and Armenia (EAEU Statistics, 2019; World Data Atlas, 2019; National Statistics Committee of the Kyrgyz Republic, 2019; Federal State Statistics Service, 2019; Ministry of National Economy of the Republic of Kazakhstan, Statistics Committee, 2019; National Statistical Committee of the Republic of Belarus, 2019; Statistical Committee of the Republic of Armenia, 2019).

## 5. RESULTS

Having solved functions (1)–(3), we obtained multifactor regression estimates of the effectiveness (change in GDP) of creating a common oil and gas market in the EAEU (Table 1).

**Table 1.** Models for evaluating the economic efficiency of integrating oil/gas markets of the EAEU member states

| Country | Model for efficiency evaluation (by the price factor) | Model for efficiency evaluation (by the synergy factor) |
|---|---|---|
| **Integrated oil market** | | |
| Armenia | $Y_2 = 1.03 - 0.002 \times X_3 - 0.02 \times X_4$ | $Y_1 = 19.65 \times X_1^{0.68} \times X_2^{0.83}$ |
| Belarus | $Y_2 = 0.88 + 0.11 \times X_3 + 0.072 \times X_4$ | $Y_1 = 0.37 \times X_1^{1.02} \times X_2^{1.01}$ |
| Kazakhstan | $Y_2 = 0.85 + 0.14 \times X_3 + 0.028 \times X_4$ | $Y_1 = 0.11 \times X_1^{1.05} \times X_2^{1.02}$ |
| Kyrgyzstan | $Y_2 = 0.999 + 0.009 \times X_3 + 0.07 \times X_4$ | $Y_1 = 17.79 \times X_1^{1.001} \times X_2^{1.01}$ |
| Russia | $Y_2 = 0.88 + 0.11 \times X_3 + 0.093 \times X_4$ | $Y_1 = 0.04 \times X_1^{1.05} \times X_2^{1.03}$ |
| *Annotation*<br>**$Y_1$** is GDP, billion USD; **$Y_2$** is GDP growth rate; **$X_1$** is oil consumption, million tons; **$X_2$** is net oil exports, million tons (for Belarus, Kazakhstan, Kyrgyzstan, Russia) and the difference between imports and exports, million tons (for Armenia); **$X_3$** is the growth rate of export oil price set by Russia; **$X_4$** is the growth rate of oil transit cost (average for the EAEU). | | |
| **Integrated gas market** | | |
| Armenia | $Y_2 = 1.87 - 0.30 \times X_3 - 0.41 \times X_4$ | $Y_1 = 39.94 \times X_1^{0.81} \times X_2^{1.02}$ |
| Belarus | $Y_2 = 0.63 + 0.28 \times X_3 + 0.11 \times X_4$ | $Y_1 = 0.34 \times X_1^{1.03} \times X_2^{1.01}$ |
| Kazakhstan | $Y_2 = -0.07 + 0.64 \times X_3 + 0.31 \times X_4$ | $Y_1 = 0.31 \times X_1^{1.09} \times X_2^{1.04}$ |
| Kyrgyzstan | $Y_2 = 1.51 - 0.21 \times X_3 - 0.21 \times X_4$ | $Y_1 = 37.16 \times X_1^{0.78} \times X_2^{1.02}$ |
| Russia | $Y_2 = -0.15 + 0.83 \times X_3 + 0.42 \times X_4$ | $Y_1 = 0.02 \times X_1^{1.03} \times X_2^{0.98}$ |
| *Annotation*<br>**$Y_1$** is GDP, billion USD; **$Y_2$** is GDP growth rate; **$X_1$** is gas consumption, million m³; **$X_2$** is net gas exports, million m³ (for Belarus, Kazakhstan, Russia) and the difference between imports and exports, million m³ (for Armenia and Kyrgyzstan); **$X_3$** is the growth rate of export gas price set by Russia; $X_4$ is the growth rate of gas transit cost (average for the EAEU). | | |

The adequacy of the constructed models for evaluating the efficiency of creating a common oil and gas market is proven by the values of determination coefficients (**R2**) exceeding 0.8, and higher values of the F-test than in Table 1 (4.26 at **p** = 0.05).

The constructed functions revealed the following patterns in the formation of common energy markets of the EAEU member states:

- Energy exporting countries (Russia, Kazakhstan, Belarus, Kyrgyzstan—oil; Russia, Kazakhstan, Belarus—gas) benefit from creating a common market due to the super-additive effect of an increase in total consumption and export (**α1> 1, α2> 1**). That is, an increase in total oil consumption by 1% will lead to an increase in Russia's GDP by 1.05%, Kazakhstan—by 1.05%, Belarus—by 1.02%, and Kyrgyzstan—by 1.001%. A 1% increase in gas consumption will lead to

an increase in Russia's GDP by 1.03%, Kazakhstan—by 1.09%, and Belarus—by 1.03%. An increase in net oil exports by 1% will lead to an increase in Russia's GDP by 1.03%, Kazakhstan—by 1.02%, Belarus—by 1.01%, and Kyrgyzstan—by 1.01%. An increase in net gas exports by 1% will result in an increase in Russia's GDP by 0.98%, Kazakhstan—by 1.04%, and Kyrgyzstan—by 1.02%. A positive effect from market integration is due to the access to labour and capital resources of the EAEU countries, rational territorial redistribution of production, processing, and energy consumption, which will reduce logistics costs and expenses associated with the processing of energy resources. This confirms the hypothesis that there is a synergistic effect when a common market is created.

- Energy importing countries (Armenia imports oil and gas, and Kyrgyzstan imports gas) experience a positive impact on their GDP from an increase in hydrocarbon consumption and, consequently, an increase in their import ($\alpha1 > 0$, $\alpha2 > 0$); it is achieved by lifting import restrictions and reducing fixed costs.
- The creation of a common market implies the cancellation of transit fees for the Union countries, which will positively influence the economies of the importing countries ($\alpha4 < 0$). For exporting countries, a decrease in transit fees will have a negative impact on the economy ($\alpha4 < 0$).

To quantify the synergistic effect on the creation of a common oil and gas market for each country, we estimated indicator **Y1** in the model from Table 1. Indicator **X1** was replaced with the volume of total oil and gas consumption (separately for each market) that was calculated as the sum of the corresponding indicator for the EAEU countries for 2018, and **X2** was replaced with the total volumes of net oil and gas exports for the EAEU for 2018. The effect was calculated as a relative deviation of the calculated values of **Y1** from the real GDP of the EAEU countries for 2018.

To determine the effect of the price factor, the value of **X4** = 0 (the result of cancelling the transit fee) was introduced into the model (Table 1). The changes in GDP due to the cancellation of transit fees correspond to the calculated value of indicator **Y2**. The calculated results of the creation of common oil and gas markets are given in Table 2.

**Table 2.** Indicators of the effectiveness of creating a common oil/gas market of the EAEU member states

| *Country* | *Changes in GDP, %* | | |
|---|---|---|---|
| | *The impact of the synergy factor* | *The impact of the price factor* | *Total change* |
| *Integrated oil market* | | | |
| Armenia | 0.02 | 2.79 | 2.81 |
| Belarus | 0.80 | -0.60 | 0.19 |
| Kazakhstan | 0.90 | -0.50 | 0.40 |
| Kyrgyzstan | 0.01 | 0.83 | 0.84 |
| Russia | 1.00 | -0.60 | 0.39 |
| *Integrated gas market* | | | |
| Armenia | 0.10 | 0.32 | 0.42 |
| Belarus | 0.30 | -0.18 | 0.12 |
| Kazakhstan | 0.90 | -0.82 | 0.07 |
| Kyrgyzstan | 0.08 | 1.77 | 1.85 |
| Russia | 0.40 | -0.14 | 0.26 |

The creation of common oil and gas markets will have a positive synergetic effect in all EAEU countries that will manifest itself as an increase in GDP. Such changes will be the most significant in less developed countries importing energy resources. Positive changes are primarily due to the cancellation of energy transit fees. For more developed countries, mainly export-oriented, the negative impact of cancelling transit fees is eliminated by a positive synergistic effect leading to an increase in their GDP.

# 6. DISCUSSION

Creating a common market, it is necessary to keep in mind not only its general purpose, but also the specific task to be solved for each particular country. This can be achieved only by determining the synergistic effect of integrating the energy market into the economy as a whole. These factors and their influence have been studied by modern researchers, as we have mentioned above. However, the focus has been made on reducing the price of electricity for the population (Nangia, 2019; Knaut and Paschmann, 2019). However, researchers have not examined such an objective condition for the integration of the EAEU countries as the synergistic effect for the economies of the participating countries due to the common gas/oil market.

In contrast to scenario modeling (Volkart, Mutel and Panos, 2018; Shi, Variam & Shen, 2019), the production function allowed us to study not only the combination of the price factor and the synergy factor, but also to take into account the interests of both categories of the countries—hydrocarbon exporters and importers. The previous experience of the CIS and the EurAsEC demonstrates that the creation of common markets and mutual integration have always been associated with different goals of the participants (Vartanova, 2018). The key aspect here is developing an attractive model of energy integration. The countries participating in the integration have different models and operating conditions of the electricity markets. Russia and Kazakhstan are active exporters of hydrocarbons, whereas the rest of the EAEU member countries are importers. That is, the former are interested in selling the product with profit, while the latter want to buy it at a lower price. Trade and economic conflicts in the common market are virtually inevitable. The transfer of oil and gas from Russia to other EAEU members is a crucial redistribution mechanism and a prerequisite for obtaining potential positive economic effects within the integrated EAEU energy market. In other words, Member States do not pay export tariffs for energy imports. In fact, this means that Russia provides indirect subsidies by selling gas and oil in the EAEU cheaper than the world market prices. For example, the Belarusian economy is highly dependent on Russian hydrocarbons. Belarus imports Russian crude oil (of which 45-50% is used for the production of petroleum products for export) and natural gas (that is not re-exported directly) at lower than market prices. For instance, purchasing Russian gas at USD 173 per 1000 cubic meters (for comparison, its price for Armenia is USD 250 and for Ukraine—USD 430), Belarus is exempted from paying the export tariff (30% of the price of a barrel of oil). As a result, the Russian budget loses about USD 73 per 1000 cubic meters or USD 9.5 million in total (USD 8.5 million for oil and USD 1 million for gas) (The Common Energy Market of the Eurasian Economic Union, 2018). The situation with Armenia is somewhat similar: after it joined the EAEU, the gas import price was reduced from USD 271 in 2014 to USD 189 in 2015. This means the Russian budget does not receive USD 82 from each 1000 cubic meters of gas exported, and which in total corresponds to 2% of Armenia's GDP (The Common Energy Market of the Eurasian Economic Union, 2018). The proposed model for evaluating the effectiveness considers the fundamental factors in the imbalance of the EAEU economic interests. Compromise on these differences has been reached in the Concept for the Formation of a Common Electricity Market of the Eurasian Economic Union. The developed model is based on available and relevant statistics. The variables of the regression models for evaluating the economic efficiency of the EAEU energy markets are reduced to the same dimension (growth rates), which allowed us to develop adequate evaluation models. By applying the proposed approach, we could evaluate the impact on the economy of each participant (country) at the stage of energy markets integration and determine optimal conditions of the integration, even if at first glance they do not seem so attractive. The study proved that integrating the energy markets of EAEU members increases GDP growth; this is because price smoothing increases the economic stability of both net exporters and net porters of oil and gas.

The economic situation is constantly changing, and these changes affect the energy sector. Any change in the energy balance has a socioeconomic effect; therefore, the results of this study are relevant in the short term. We believe this issue should be studied further because it is essential to understand all Eurasian Economic Union processes when creating a common energy market.

## CONCLUSION

In this study, we proposed an approach to evaluating the economic efficiency of EAEU gas and oil market integration. We used the production function and the linear regression model and reflected the price factor influence. This approach allowed us to determine the cumulative effect of such economic characteristics of energy market integration as the prices of gas/oil export and transit and consider the effect of the economies of scale on each EAEU member's GDP during integration. We empirically proved that integrating EAEU energy markets produces a positive synergistic effect that increases GDP. These changes will be most significant for less-developed countries importing energy resources, such as Armenia and Kyrgyzstan. Creating a common oil market will increase Armenia's GDP by 2.81% and Kyrgyzstan's by 0.84%; creating a common gas market will increase Armenia's GDP by 0.42% and Kyrgyzstan's by 1.85%. The cancellation of energy transit fees is the primary reason for these positive changes. For exporting countries, a positive synergistic effect eliminates the negative impact of cancelling transit fees, which ensures a higher GDP growth rate. Therefore, the formation of common markets will mean a more efficient use of the EAEU's great energy potential, solving the national economies' energy supply problems, expanding export opportunities and transit potential, and increasing the energy sector's resilience and infrastructure. Oil and gas market prices will be more predictable and will not depend on speculative dynamics in international markets.

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# Measuring Conduct Parameters in Jordanian Loanable Fund Market

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## ABSTRACT

This study aims to examine the structures of loanable funds markets by estimating the conduct parameters of the demand for loans and the supply of deposits in Jordanian banking sector for the period (Q1: 1994-Q4: 2018). Several tests were used to justify the usage of three stages least squares to estimate the system of simultaneous equations model. Sargan and Hausman tests results approved the usage of estimation method. Conduct parameters were calculated from estimation and found statistically significant. The results showed that both loans and deposits markets are oligopolistic. But deposits market is more competitive than the loans market. Also, the study showed that the interest rate margin between interest rates on loans and deposits equal on average 6%. Based on obtained results the study recommended to facilitate the process and conditions of opening new banks by Central Bank of Jordan, increase assets of small banks, strengthen the ability of the banking sector as all for extending more loans to all economic sectors, raise awareness about the functions of savings, and mitigating restrictions on loans market by central Bank of Jordan

## INTRODUCTION

Many countries, including Jordan, are seeking a higher level of economic development by using its scarce resources efficiently. To achieve this target these countries use different policies such as financial liberalization, deregulation, and globalization to increase competition in the various markets, such as Commodity market, capital markets, services markets, and financial markets. The lack of competition means the firm (or bank) has market power in the market, which will affect the economy through misallocation and underutilization of the resources, or in other words, decrease economic efficiency and subsequently affect economic growth negatively.

Jordan has been at the forefront of the market liberalization in the developing countries since it initiated the process of liberalization in its financial markets in 1989. The government has undertaken many actions such as the release of restrictions on a variety of financial services: allowing

foreign bank loans, raising equity internationally and paving the way for increased foreign investments. All these actions should lead to increase the competition in Jordanian financial sectors and subsequently higher growth rate.

Banks constitutes the large part of the financial market in Jordan; according to the Association of Banks in Jordan the total assets of banks equal to 58.50 billion JD at the end of 2018, which presents 94.1% of the total assets in the financial market. Out of the twenty-four licensed banks at the end of 2018, sixteen of these are local banks, and the rest are foreign banks. The five largest banks have 53% of total assets of licensed banks, and the ten largest banks have a total of 75% of these assets, despite the fact that both percentages have decreased over the years, the banking sector is still highly concentrated. Different studies indicate that competition in the banking sector in Jordan is low, and still suffering from monopoly power.

This study investigates the banks' behavior to determine if banks in Jordan exercise any market power in the loanable funds market. The study methodology is built on the method developed by Bresnahan, (1982, 1989), Porter, (1983), and Lee and Porter, (1984). Banks modeled as cournot competitors produce homogenous products in the deposit and loan markets. In a first step, this study will empirically estimate a model of equations for the local currency deposit and loan markets. In a second step estimates conduct parameters that show the degree of market power in both markets. This study organizes as follows: section 2 shed lights on the Jordanian banking sector.

## 1. THE JORDANIAN BANKING SECTOR

The structure of the banking sector in Jordan divides into four main categories: local commercial banks, local Islamic banks, foreign commercial banks, and foreign Islamic banks. The number of banks is ranged from (18- 24) through the study period (1994-2018). The largest four banks (Housing Bank for Trade & Finance, Arab Bank, Jordan Islamic Bank, Cairo Amman Bank and Bank of Jordan) own almost a total of 41% from total branches in Jordan in 2018; this may indicate a high concentration on the market in those banks.

### 1.1 Development in Jordan Banking Sector

#### 1.1.1 Total Assets

Total assets of the Jordanian banking sector, which is all banks operating in Jordan, have been doubled approximately ten times during the years (1994-2018), and reached approximately 58.50 billion JD in 2018, compared to 5 billion in 1994. These assets consist of claims on the public sector, claims on resident private sector, reserves in the Central Bank of Jordan (CBJ), deposit with CBJ in foreign currencies, and other sources of assets. On average the claims on resident private sector forms 50% from total assets for banks.

The total local assets grow at an increasing rate. The distribution of these assets among Jordanian banks clearly showed an uneven distribution, where five banks (Arab Bank, The Housing Bank, Jordan Islamic Bank, Jordan Kuwait Bank, and Union Bank) have a total of 57% of total local assets in the Jordanian banking sector. Also, total assets are concentrated in the domestic banks, on average 90% of total assets during the study period owned by local banks, and the rest 10% owned by foreign banks. There are small fluctuations in foreign banks' share of total assets, indicating that domestic banks dominate the banking sector in Jordan during the whole study period.

## 1.1.2 Total Deposits

The total deposit in licenses banks in Jordan reached 33.754 billion JD in 2018 compared to 5.32 billion JD in 1994. It is growing on an average of 7.41% per year and it doubled approximately five times during the study period. Deposits encompass three types according to the characteristics of deposits: Demand deposits, saving deposits, and time deposits. The volume of time deposits has the largest contribution of 64% of total deposits. In addition, deposits divided into currencies that are held in deposits in JD, and deposits in foreign currencies. The former dominates the latter and accounting for 67% of total deposits.

The weighted average interest rates on the Demand deposits, saving deposits, and time deposits, as stated in statistical databases of the Central Bank of Jordan (CBJ), shown in figure (1). In general, all rates fluctuated and tends to decrease during the period of the study. The rate on time deposit was the highest and demand deposit was the lowest with averages for the three rates as follows: 0.76%, 5.23% and 2.12% for demand, time and saving deposits, respectively.

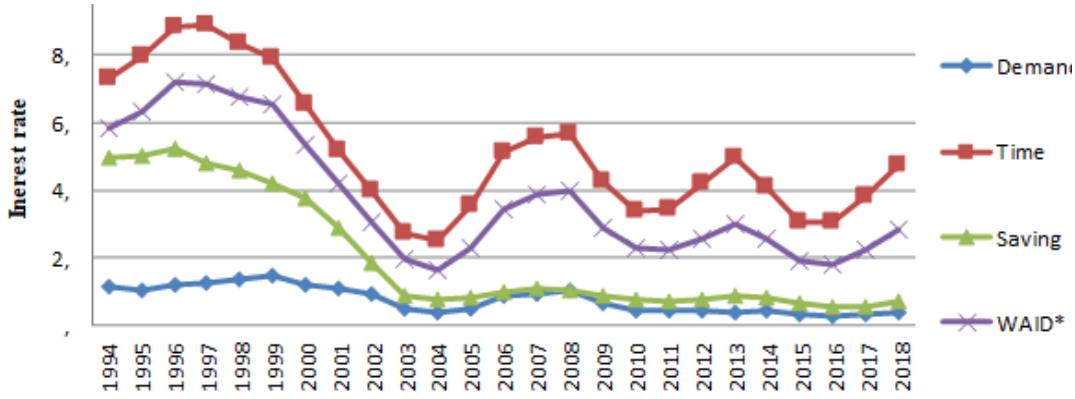


**Figure 1.** Weighted average interest rates on deposits during (1994-2018)

Source: prepared by researchers based on data from central bank of Jordan, statistical databases.
* weighted average interest rate on total deposits.

In addition, the study calculates the general weighted average interest rate of the three types of deposits (hereafter, WAID) to be considered as a proxy variable, which represents the nominal interest rate on the total supply of deposits, instead of taking one of these three rates. The WAID fluctuations show the dominance of time deposits over the other types of deposits.

The supplier of deposits to the banking sector including; deposits of the non-resident private sector, deposits of resident private sector, deposits of non-bank financial institutions, deposits of public institutions, and deposits of the central government. Resident private sector deposits dominate the others on average by 70% of total deposits during the study period. Also, six banks (Arab Bank, The Housing Bank, Jordan Islamic Bank, Jordan Kuwait Bank, Union Bank, and Jordan Ahli Bank) hold 70% of total deposits in the banking sector, this may indicate that those six banks controlled the setting of interest rate on deposits overall the banking industry in Jordan. The deposits for Jordanian banks and foreign banks. On average 90% of total deposits held with Jordanian banks.

## 1.1.3 Total Loans

In 2018 total loan, also called credit facilities, extended by licensed banks in Jordan reached 26.1 billion JD compared to 3.25 billion JD in 1994, it doubled seven times through the study peri-

od, and grew by 8.8% on average every year. Loans consist of three types according to loan characteristics: Loans and advances form 72% of the total loans extended by the banking sector.
The weighted average interest rates on the Overdraft loans, discounted bills and bonds, and loans and advances, as stated in statistical databases of the Central Bank of Jordan (CBJ), shown in figure (2). In

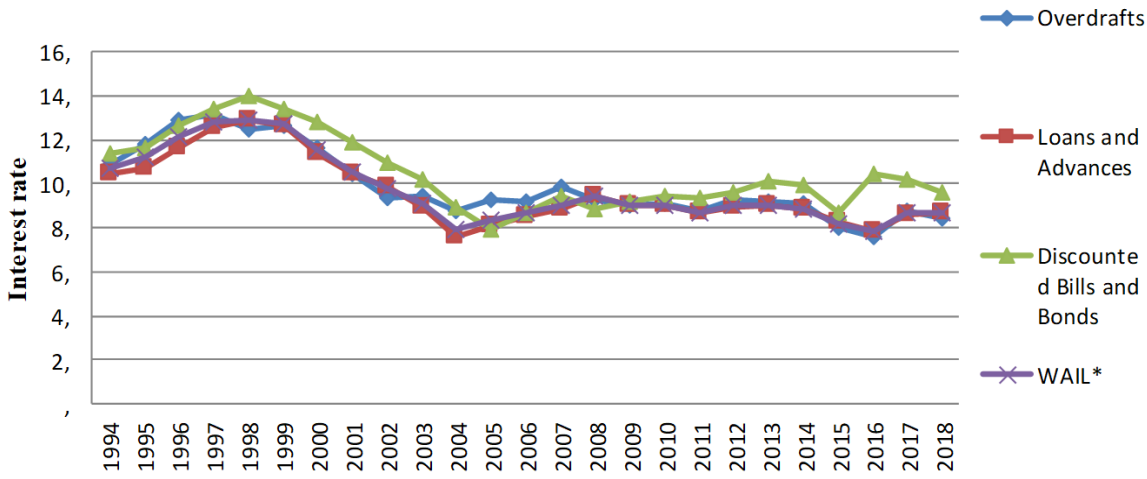


**Figure (2):** Weighted average interest rates on loans during (1994-2018)

Source: prepared by researcher based on data from central bank of Jordan, statistical databases.
* weighted average interest rate on total loans.

General, all rates fluctuated and tends to decrease during the period of the study. The rate on overdraft and loans and advances was close with averages 9.98% and 9.67%, respectively. Compared to the deposits, the fluctuations in loans rates were lower. In addition, the study calculates the general weighted average interest rate of the three types of loans (hereafter, WAIL) to be considered as a proxy variable, which represents the nominal interest rate on the total demand for loans, instead of taking one of these three rates. The WAIL fluctuations closes to the three types.

Banks preforms loans to five categories of loans demander: Resident private sector, non-resident private sector, non-banking financial institutions, public institutions, and the central government. Resident private sector is the major loans demander, where it demands on average 88% of total loans during the study period. Loans market is dominated by six banks (Jordan Islamic Bank, Arab Bank, The Housing bank, Union Bank, Jordan Kuwait Bank and Jordan Ahli Bank); they controlled around 55.44% of total loans in the market. This may indicate that the loans market has a high degree of market power and the listed banks determine the interest rate for the loans market (market leaders). Also, loans from Jordanian banks form approximately 90% of the total loans, and the other 10% extended by foreign banks located in Jordan.

## 1.1.4 Interest Rate Margin

Interest rate margin between weighted nominal interest rate on loans (WAIL) extended by licensed banks and weighted interest rate on deposits (WAID) is shown in figure (3) . The margin represents the difference between outputs prices, which are interest rates on loans, and inputs costs, which are interest rates on deposits. This difference is a sign of the profitability of the banking sector during study period. This margin is approximately stable around (6%), with small increase tendency during years (around 4.5% annually of the margin), and reached its maximum

value at (7.19%) in 2003 and its minimum value at (4.85%) in 1994. The ability of Jordan banking sector to maintain a relatively stable and high rate of return (interest rate margin) on the loanable funds in banking industry indicating to high degree of market power in Jordan banking sector, where the major object of this study to examine if banking sector exercise market power and its magnitude.

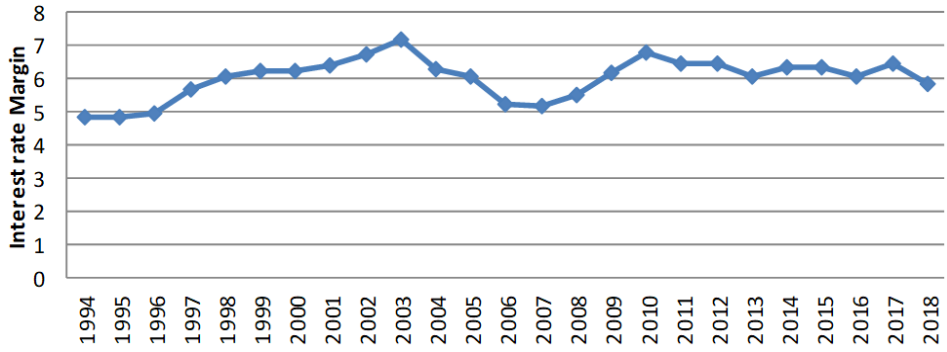


Figure (3): Interest Rate Margin During (1994-2018

Source: prepared by the researchers based on data from central bank of Jordan, statistical databases.

## 2. LITERATURES REVIEW

Competition is a complicated and not explicitly perceptible measure. Several economists address the concept of competition. Adam Smith was the first to address the concept of competition in his book "The Wealth of Nation". He stated that competition is not a situation, but it is a rivalry between competitors to gain larger market share, and in the long run the competition will lead to equilibrium between demand and supply. In 1883, Cournot, who was inspired by Smith, defined competition as the situation where the prices equal the production costs. There are several assumptions that must be satisfied to achieve more competition, such as a large number of firms in the market, full knowledge about opportunities in the market, and free exit and entry from the market. It is clear from the above that as competition increases, market power decreases, and vice versa.

Markets divide into four types according to their structure: perfect competion, monopolistic competition, oligopoly, and pure monopoly. Each type has special characteristics considering the number of firms, the easiness to entry or exit from the market, market power of the firm (the ability to set price above marginal cost), and many other characteristics. In the perfect competition markets there are large number of price taker firms, which indicates that firms under perfect competition have no market power, and firms have no barriers to enter or exit from the market. Monopoly is the opposite of the perfect competition. In the monopoly market there is only one price maker firm meeting the market demand, and has a market power to put price above marginal cost, leading monopolist to gain higher profits. The situation of pure monopoly and perfect competition do not exist in real markets, but a lot of markets are a blend of competition and monopoly. (Léon, 2014)

The conduct of banks in the financial sector, and the competition among them were the focus of a significant volume of research all over the world. Several literatures try to develop measurements of competition in the banking sector through two major streams of thought. The structural approaches established on traditional industrial organization and the Structure Conduct Performance paradigm. The other approach is the non-structural approaches which are associated with newly empirical industrial organization (NEIO) and relies on the oligopoly theory and on static model of competition.(Léon, 2014)

Several studies have tried to estimate the market power of the homogeneous products market in order to identify the pricing strategies in that market. The New Empirical Industrial Organization (NEIO) research has estimated firm's behavior by parameterizing the firm's static first-order condition; marginal revenue (MR) equals marginal cost (MC). This estimation process also named Conduct Parameters Method (CPM). Ribon, and Yosha (2001) estimate both monopoly and monopsony power conduct parameters for two markets (local currency loan, and deposit markets) in Israeli banks, where in the two markets the hypothesis of perfect competition is not valid. They find a large and statistically significant increase in competition in both markets. They compared the estimation for conduct parameters for market power in two markets pre and post financial liberalization, they find that banks lost market power post the financial liberalization. Delis, Staikouras and Varlagas, (2008) adapted the nonstructural approach which is (CPM), this model is based on the profit maximizing process, where a firm chooses its profits maximizing prices and quantities when the condition of the marginal cost equals its marginal revenue is achieved, and to estimate this model using simultaneous-equation, and also including conduct parameters that represents the degree of the market power of the firm in consideration. Those parameters are interpreted as the extent that the firm's marginal revenue deviate from its demand schedules.

## 2.1 Theoretical Framework [1]

The new empirical industrial organization (NEIO) measures the market power using stylized econometric model of oligopoly interaction. This study will follow the NEIO method. Léon (2014) stated that the structure of conduct estimation method consists of market demand schedule and its relative supply function for average firms, and the advantage of this method is "based on static industrial organization theory". The following model consists of four equations representing the demand for loans, supply of deposits, and solutions to maximization problem of each bank. The model will be described at the bank level then aggregates over for all banks. These equations are the following:

The demand for loans from all banks

$$L_t = f(i_t^l, r_t^l, z_t^l) = d_0 + d_1 \bullet i_t^l + d_2 \bullet r_t^l + d_3 \bullet z_t^l \ldots\ldots\ldots(1)$$

where $L_T$ is the volume of local currency loans for all banks, $i_t^l \; and \; r_t^l$ are nominal and real interest rates on loans, the first rate reflects the loan portfolio considerations between local and foreign currencies, and the latter reflects the real cost of capital on investment and production. $Z_t^l$ is a vector of demand shifting variables.

The supply for deposit in all banks

$$S_T = g(i_t^s, r_t^s, z_t^s) = s_0 + s_1 \bullet i_t^s + s_2 \bullet r_t^s + s_3 \bullet z_t^s \ldots..(2)$$

Where $S_T$ is the volume of interest-bearing deposits in local currency for all banks, $i_t^s \; and \; r_t^s$ are nominal and real interest rates on interest-bearing deposits, the first reflects the short term portfolio considerations between liquid deposit fund in local or in foreign currency, and the latter reflects the effects of real rates of return on saving. $Z_t^s$ is a vector of supply shifting variables.

Other sources of fund for each bank are Advances ($A_t$) given by the central bank with a unified interest rate ($i_t^a$), demand deposits ($DD_{jt}$), certificates of deposit ($CD_{jt}$), and other sources including net deposits by other bank ($OTHER_{jt}$).

[1] This research follows closely the model of Robin & Yosha [1999]; my model is a modification of their model to fit the Jordanian banking sector characteristics.

At each period t, bank "j" faces the following budget constraint:

$$L_{jt} = (1 - p_t^s)S_{JT} + DD_{jt} + A_{jt} - CD_{jt} + OTHER_{jt} \ldots (3)$$

Where $P_t^s$ is the required reserves ratio on interest-bearing deposits.

The variables $DD_{jt}, CD_{jt}$ and $OTHER_{jt}$ are the exogenous variables in the model. The variables $L_{jt}, S_{jt}$ and $A_{jt}$ are determined endogenously in the model as follows. By inverting the demand and supply functions, and using $r_t^l = \left(\frac{1+i_t^l}{1+\pi_t}\right) - 1$ and $r_t^s = \left(\frac{1+i_t^s}{1+\pi_t}\right) - 1$, where $\pi_t$ is the inflation rate on period t, we get:

$$i_t^l = \left(\frac{1}{d_1 + d_2\left[\frac{1}{1+\pi_t}\right]}\right)\left\{L_{jt} + \sum_{k \neq j} L_{kt} - d_0 - d_2\left[1 + \frac{1}{1+\pi_t}\right]\right\} - d_3 \bullet z_t^l \ldots\ldots (4)$$

And

$$i_t^s = \left(\frac{1}{s_1 + s_2\left[\frac{1}{1+\pi_t}\right]}\right)\left\{S_{jt} + \sum_{k \neq j} S_{kt} - s_0 - s_2\left[1 + \frac{1}{1+\pi_t}\right]\right\} - s_3 \bullet z_t^s \ldots . (5)$$

At period t, bank "j" chooses $L_{jt}, S_{jt}$ and $A_{jt}$, given the loans granted and deposits taken by other banks, to maximize its profits subject to its budget constraint. Here the assumption of "static quantity-setting model." is used.

The bank "j" profit, at period t, equals:

$$i_t^l L_{jt} - i_t^s S_{JT} - i_t^a A_{jt} + i_t^{**} CD_{jt} \ldots\ldots\ldots (6)$$

Where $i_t^{**}$ is the interest rate on the CD's.

The solution (first-order conditions) for the maximization problem of (6), using equations (4 & 5), and subject to the budget constraint in (3), sum over *j* (the index for banks), and divide through by *n* (the number of banks in the industry). We get the following equations:

$$\frac{\partial L}{\partial L_t} = i_t^l(\bullet) + \left(\frac{1}{d_1 + d_2\left[\frac{1}{1+\pi_t}\right]}\right) \bullet L_t \frac{1}{n} - \frac{\sum_j \lambda_{jt}}{n} = 0 \ldots\ldots (7)$$

$$\frac{\partial L}{\partial S_t} = -i_t^s - \left(\frac{1}{s_1 + s_2\left[\frac{1}{1+\pi_t}\right]}\right) \bullet S_T \frac{1}{n} + (1 - p_t^s) \bullet \frac{\sum_j \lambda_{jt}}{n} = 0 \ldots\ldots (8)$$

$$\frac{\partial L}{\partial A_t} = -i_t^a + \sum_j \lambda_{jt} / n = 0 \ldots\ldots\ldots (9)$$

$$\frac{\partial L}{\partial \lambda_t} = (1 - p_t^s) \bullet S_t + DD_t + A_t - CD_t + OTHER_t - L_t = 0 \ldots . (10)$$

$\lambda_{jt}$ is the Lagrange multiplier of the constrained profit maximization problem of bank j, and $(\sum_j \lambda_{jt}/n)$ denote the marginal cost of getting funds averaged over the banks in the industry. In the empirical application, we manipulate the equations to solve it. This model has been used in many

pieces of research but with some different variations or different variants like the research conducted by Delis, Staikouras and Varlagas, (2008) and others.

## 2.2 The estimated system of equations:

The following system of equations will be estimated:
The demand for loans from all banks

$$L_t = d_0 + d_1.i_t^l + d_2.r_t^l + d_3.z_t^l + v_t^l$$

The supply for deposit in all banks

$$S_T = s_0 + s_1.i_t^s + s_2.r_t^s + s_3.z_t^s + v_t^s$$

The F.O.C's of maximization:

$$i_t^l = i_t^a - \frac{1}{d_1 + d_2(\frac{1}{1+\pi_t})}\theta^l . L_T$$

$$i_t^s = (1 - p_t{}^s).i_t^a - \frac{1}{s_1 + s_2(\frac{1}{1+\pi_t})}\theta^s . S_t$$

Provided that the following budget constraint is satisfied each period

$$L_t = \left(1 - p_t^s\right) \bullet S_t + DD_t + A_t - CD_t + OTHER_t .$$

## 3. DATA AND VARIABLES

This study depends on data sourced from secondary sources from the statistical databases of the Central Bank of Jordan, main indices of Amman stock exchange, international financial statistics of the international monetary funds (IMF), and the World Bank databases. The main difficulty is to get some of the study variables on a quarterly basis, such as capital investment and household percent of GDP, and loans extended from the Central Bank of Jordan to licensed banks**. T**his study will use aggregate quarterly data for the banking sector in Jordan for the periods January 1994 to December 2018.

The endogenous variables are the total credits facilities (hereafter called total loans) in local currency JD, the supply of interest-bearing deposits in JD's (hereafter called total deposits), both of them are deflated by four quarter consumer price index to reflect the real values, the nominal interest rates on credits facilities and interest-bearing deposits.

Total loans consist of loans, bills discounted and overdrafts. A total deposit consists of demand, times, and saving deposits. Both variables are quarterly and measured in real million JD's. Nominal interest rates on total loans and total deposits are quarterly weighted average interest rates.

Exogenous Variables are Real interest rates are the nominal rates deflated by a four-quarter consumer price index. The certificates of deposits are the accumulated volume of certificates purchased by the licensed banks, and it measured in million JD's. The borrowing from central bank (hereafter called, advances) by the licensed banks is measured in million JD's. The variable "others" that shown in the budget constraint is residual that balanced the two sides of budget con-

straint.[2] Also, the study uses the required reserve ratio as reported from the central bank monthly statistical bulletin.

This study includes real quarterly GDP, the ratio of household consumption to GDP, and the ratio of capital investment to GDP, these variables will reflect the economic activities in the country. Also, the study includes the price index of the stock market to reflect the fact that stock market provides an alternative source for firms to raise funds, or in other words, it represents alternative for banks' loans.

This study uses instruments for the endogenous variables in the demand and supply equations and the other two FOC's equations, as shown in table 1. Lagged values of endogenous variables, also lagged values of some exogenous variables, the interpretation for using these variables is to eliminate.

**Table 1**. List of used instrumental variables

| *Loan equation* | *Deposit equation* | *First order condition for loan equation* | *First order condition for deposit equation* |
|---|---|---|---|
| $L_t(-1)$ | $S_t(-1)$ | $r_t^L(-1\ to-2)$ | $i_t^s(1\ to\ 4)$ |
| $i_t^L(-1)$ | $i_t^s(-1)$ | $i_t^L(1\ to\ 3)$ | $r_t^s(-3)$ |
| $CI_t(-1)$ | $r_t^s(-1)$ | | |
| $SMPI_t(-1)$ | $rGDP_t(1\ to-2)$ | | |
| $r_t^l(-1)$ | $HC_t(-2\ to-6)$ | | |

The effects of the nonstationary of these variables. The quarterly "Euro" interest rate on deposits or quarterly "Libor" as a proxy for the cost of foreign currency loans, which measures competition of foreign credit to local ones.

The Jarque-Bera test (normality test) shows that the p-value of the statistics under null hypothesis ranges from zero to the most of variables to 20.25% for household consumption as percent of GDP, according to the Jarque-Bera test results we can't reject the null hypothesis, the variables used are normally distributed with an unknown means and variances.
Table (2) below contains a brief statistical description of all used data and shows that for all of the variables, with two standard deviations, most of the observation will be included.

**Table 2.** Descriptive statistics of all variables

| *Variable* | *Mean* | *Maximum* | *Minimum* | *St. Deviation* |
|---|---|---|---|---|
| Total loans ($L_t$) | 10855.943 | 26084.058 | 2820.073 | 7139.991 |
| Total deposits $(S_t)$ | 16337.270 | 33812.139 | 4824.114 | 9814.762 |
| Nominal interest rate on loans $(i_t^l)$ | 9.780 | 12.869 | 7.664 | 1.535 |
| Nominal interest rate on deposits $(i_t^s)$ | 3.766 | 7.411 | 1.620 | 1.834 |
| Real interest rate on loans* $(r_t^l)$ | 6.528 | 12.889 | -7.643 | 3.571 |
| Real interest rate on loans* $(r_t^s)$ | 0.687 | 7.351 | -12.263 | 3.396 |
| Advances $(A_t)$ | 1143.499 | 1522.8 | 947.9 | 158.2817 |
| Others | -4638.838 | -1787.32 | -11345.87 | 2914.326 |

[2] This term has negative values for the whole period; the justification for this is that: the percentage of credits to deposits is within the range of 52-73% for all licensed banks. Also, the licensed banks keep more liquid assets to meet their liabilities.

| | | | | |
|---|---|---|---|---|
| Euro interest rate $(EUI_t)$ | 4.173 | 9.320 | 0.657 | 1.985 |
| The stock market price index $(SMPI_t)$ | 3137.431 | 9777.221 | 133.385 | 2687.272 |
| The ratio of capital investment to GDP $(CI)_t$ | 26.306 | 36.786 | 17.883 | 5.218 |
| The ratio of household consumption to GDP $(HC_t)$ | 78.001 | 87.190 | 64.355 | 6.206 |
| Certificates of deposits $(CD)$ | 1070.266 | 2651.5 | 80 | 805.8569 |
| Real GDP $(rGDP)$ | 1714.458 | 2632.400 | 876.500 | 554.347 |
| Required reserve ratio$(P_t^s)$ | 9.647 | 15 | 7 | 3.133 |
| Inflation rate | 3.15 | 18.25 | -3.09 | 3.22 |

* As mentioned before, I have used the formula ( $\frac{1+i_t^{sorl}}{1+\pi_t}-1$ ) to transform from nominal to real rates

## 4. ESTIMATION RESULTS

The above mentioned model is estimated simultaneously because the assumption of no correlation between the error term and the explanatory variables is broken according to Hausman test above, in order to reduce the biasness of estimated parameters if estimate each equation s individually. To benefit from the properties of the 3SLS method, this research uses it in estimating the conduct parameters of banking sector as illustrated in the model above.

The results are reported in table (3), and it shows: First, both loans and deposits are significantly affected by the nominal and real interest rates. The demand for loans is negatively affected by both nominal and real interest rates, therefore, it's determined by both loans portfolio considerations, and the real cost of capital, which may be interpreted as the real cost of capital, does affect the decision of borrowers. Where a percent increase in nominal interest will decrease the total loans extended by Jordanian banks by (8.7%), while real interest rate will decrease the total loans by (5.4%). In contrast, total supply of deposits is affected negatively by nominal interest rate, and positively by real interest rate, therefore the supply of deposits is determined by real rates of return on saving. Where there is an increase of nominal interest rate on deposits, the total deposits will decrease by (3.2%) and an increase of real interest rate in deposits will increase the total deposits by (1.56%).

Secondly, the sign of foreign interest rate (euro interest rate) is statistically significant but with a negative sign, or loans in JD and foreign currencies are not substitutes. Stock market price index and capital investment to GDP that enters the demand for loans are significantly affecting it, but the former has a very small coefficient which can be ignored, the latter has a positive effect on the demand for loans. For example, if the ratio of capital investment to GDP increased by one percent, the demand for loans will increase by (7.9%).

**Table 3.** Eestimation results

| *θ (loans)* | | *θ (deposits)* | |
|---|---|---|---|
| *0.26*** *(2.496)* | | *0.040*** *(12.6099)* | |
| *Loans equation* | | *Deposits equation* | |
| Variables | Estimated value | variables | Estimated value |
| Constant | 10.63** (20.99737) | Constant | 7.88** (42.53116) |
| Nominal interest rate | -0.087* (-1.771312) | Nominal interest rate | -0.032** (-3.674394) |

| | | | |
|---|---|---|---|
| Real interest rate | -0.054*<br>(-2.064104) | Real interest rate | 0.0156**<br>(4.265681) |
| Foreign interest rate (euro) | -0.51<br>)-9.759839) | Household consumption to GDP | -0.0022<br>)-0.944281) |
| Capital investment to GDP | 0.079**<br>(5.939744) | Real GDP | 0.001115**<br>(38.86919) |
| Stock market price index | -9.54E-05*<br>(-2.240365) | | |

t-statistics in parenthesis

(**, *) indicates statistically significant at 1% and 10%.

The ratio of household consumption to GDP effect the total deposits negatively, which disagree with Ribon and Yosha(1999) result's, and can be interpreted that if households consume more then they will not be able to put their money in form bank deposits, leading total deposits to decrease if the consumption to GDP increase. Real GDP effect total deposits positively, which agree with Ribon and Yosha(1999) results, and can be interpreted that if real income increase (economic growth) then households will increase their saving in form of bank deposits.

The estimated theta ($\theta_L$) for loans demand shows that the number of Cournot competitors (banks) in the loans market is at most four, which means that the loan market is oligopoly; i.e., the market for loans is not competitive. For the deposit market, the estimated theta shows that the number of Cournot competitors (banks) is around (25), and shows the deposit market is more competitive than loans market. The calculations and t-statistics for the two thetas proved to be statistically significant, so we can depend on the estimated results of the parameters for the two markets.

## CONCLUSIONS

Based on the analysis of the loans and deposits markets, and the results of the empirical model estimation, the main findings of this study are; In terms of banks' number of branches, at the end of 2018, the largest five banks are owning (51.2%) of total branches in the Jordanian banking sector. Total local assets in the Jordanian banking sector was increasing by an increasing rate, that sign for a large profit margin for banks and the ability to set their prices (interest rates) above their marginal cost (market power). The total loans extended by banks grew at an increasing rate and doubled by (7) times during the research period. The average growth rate was (8.8%) annually for the period. The total deposits held by banks grew at an increasing rate and doubled by five times during the research period. The average growth rate was (7.41%) annually for the period. Empirical analysis shows that the Jordanian market for loans is found to be oligopolistic market, and close to the hypothesis number of the study hypotheses. The estimated theta for loan market indicates that the numbers of banks that influence the key variables (interest rates on loans) in the loans market are between 3-4 banks.

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# Statistical Data Analysis of Socio-Economic and Demographic Losses of Labor Resources in Ukraine

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## ABSTRACT

Regarding the fact that life, in general, and public health, in particular, form the main values for the government and the individuals as well, the relevance of this study is indisputable. This article is aimed to statistical data analysis the losses in labor and life potentials of the Ukrainian population due to some negative socio-economic and demographic processes. The object of this study is represented by the demographic processes' impact on the national economy of Ukraine. Meanwhile, the subject of the paper is related to social, economic and demographic assessment of the losses in human resources in Ukraine associated with the catastrophic cancer mortality. The initial hypothesis of this study was that the interdependencies between the losses in labor potential, considering the premature mortality of Ukrainian working-aged population, and the Gross Domestic Product fluctuations were comparable with the corresponding relations in advanced economies. Regarding the losses in Gross Domestic Product, cancer-related issues are constantly urgent for both emerging and advanced economies. The problem is actualized due to the fact that cancer mortality primarily affects an economically active population, reduces the real Gross Domestic Product per capita growth rates and the quality of life. That fact is crucial for developing markets, namely Ukrainian. In this paper, the population's demographic and economic potentials were modeled in order to estimate the losses in life and labor potentials due to the certain reduction in life expectancy and increased cancer mortality. The observed cancer-related economic losses in Ukraine actualized the macroeconomic development programs aimed to counteract the main unfavorable consequences..

# INTRODUCTION

Generally, human life is invaluable and priceless according to a plenty of philosophical, ideological, and humanitarian concepts (Marks, 1844). Nevertheless, economically, human life has its own value, considering its productive capability. In Ukraine, taking the modern conditions into account, the value of life is critically reduced by the negative socio-economic, political and catastrophic demographic trends as well. A huge number of philosophers described human life as the greatest value. That position was generalized by N. Berdiaev (1933), V. Kuvakyn (1998). In Ukraine, the tendencies associated with the decrease in the value of life are explicit. The evidences are represented by the rapid increase in criminogenic situation and the level of violence, crucially declined personal and social protection and justice, expanded unemployment and labor migration, internal political conflicts, decreased fertility and increased mortality, primarily in the working-aged male stratum. M. Minakov (2016) argues that the struggle for justice, liberal entrepreneurship, vitality and social equality and simultaneous counteracting corruption, violence, and excessive paternalism have become decisive for Ukraine. The aforementioned led to constant stress conditions, depression, deterioration of the standards of living. In particular, that fact increased the cancer incidence and mortality. According to N. Amelchenko (2013), in order to achieve social justice, the economic values – similar to those that are implemented in the European Union – should be formed in Ukraine.

In economic sociology, the concept of the human life value has been highlighted. Simmel concluded that money affected the human personal values. V. Hesner and R. Kramme (2002) pointed out that both human life and death could be evaluated, using economic indicators. E. Pylypenko and Y. Batalov (2013) shared the theoretical position of economical philosophers K. Marx (1844) that utility induced a person's social value. There are lots of approaches to the value of life estimation in economic theory. But, regarding the list of values, none of the above approaches can be considered as universal and indisputable. Those approaches traditionally include calculation of the production costs, healthcare and rehabilitation expanses, insurance payments, etc. In this particular article we propose to calculate and include into the analytical bases a special element related to the losses in Gross Domestic Product (GDP) associated with the premature cancer mortality. That element is regarded as the cost of the aggregated unproduced (over the active individual lifespan) value caused by the premature cancer mortality. In our investigation we took the WHO methodology into account. Thus, the limits for working-aged population were set from 15 to 64 years (Kozlovskyi et al., 2019).

It should be specifically mentioned that the problem of cancer-related morbidity and mortality is simultaneously medical, demographic and socio-economic. Leading to an increase in the population's absenteeism level and the crucial premature working-aged population mortality, it is also associated with a decrease in labor potential and forms a threat to the national economic security. According to the group of the WHO analytics (2018), cancer was the second cause of death in the world (every sixth death in the world was due to cancer). In 2018, about 10 million people died from cancer; the economic losses from cancer-related issues in the world in 2010 were equal to 1.16 trillion US$. Ukraine is ranked second in Europe by the cancer-related deaths. The annually population losses caused by the cancer are estimated by 22 % of the total population. According to the WHO forecast, the situation is worsening: every second person after 2030 will be diagnosed with cancer. Regarding the alternative forecast, proposed by the political institutions, by 2050, the population of Ukraine will be reduced by 36 %. It also could be totally declined in 179 years due to the natural causes or in 90 years, taking the main migration trends into account. As on the 01.01.2019, the fact that there are about 1 million patients with cancer and its consequences, including about 6 thousand children, can be considered as a complicating factor. Moreover, about 150 thousand Ukrainians are annually diagnosed with cancer (420 people per day) and approximately 70 thousand people dies from it. Khmelnitsky region Health Center (2019) points out that about 10 % of cancer-causing factors are due to the genetic predisposition, while 90 % are related to carcinogenic environmental factors and the individual lifestyle. Therefore, cancer and the re-

spective economic reduction can be prevented. For example, adhering to the basic rules of the healthy lifestyle reduces the risk of cancer by 43 %. Hence, the main public governance task is to create the effective mechanisms to prevent cancer and to reduce the economic losses from premature death as well.

## 1. LITERATURE REVIEW

Vojtko et al. (2009) stated that the economic costs of medical care provision for the cancer patients were about 1 billion UAH or 16.7 % of the total health-care expenses. The vast majority of the aforementioned expenditures were associated with the financial assistance and support services for the people with disabilities, premature mortality of the patients, absenteeism, the payments to the family-members of the cancer patients, etc. R. Shevchenko (2019) proved that that in Russia the annually loses due to premature deaths from cancer and its consequences were about 8.1 billion US$, while the overall economic costs, including treatment, exceed 20.0 billion US$ (more than 1.0 % of GDP). In addition, according to the numerous estimates, the premature deaths from cancer losses in advanced countries were comparable and estimated by 0.1–0.5 % of GDP.

E. Libanova (2007) approximately assessed the socio-economic losses due to the high cancer-related morbidity and mortality in the working-aged population stratum in Ukraine. In 2006, the total economic losses due to premature mortality at the age of 25–64 years amounted to 72.3 billion UAH or 13.28 % of GDP. N. Rynhach (2016) calculated the GDP-gap due to premature death in Ukraine, which was amounted to 12 billion US$. If the population from 15 to 59 years was considered, the respective losses amounted to 10 billion US$ or 6.7 % of the Ukrainian nominal GDP (Government service of statistics of Ukraine, 2017). N. Rynhach (2016) showed that due to the cancer-related premature mortality in Ukraine the annual potential life losses were equal to 4 million years, while the GDP losses amounted to 90.0 billion UAH.

In the USA and the other advanced countries, the indicator of Years of Potential Life Lost (YPLL) is used. It is represented in the national (e. g., National Center for Health Statistics, NCHS) and international databases. That statics enables to calculate YPLL results for the population up to 65 years. N. Rynhach (2016) highlighted YPLL for the selected US states. The Figure 1 represents YPLL for Utah.

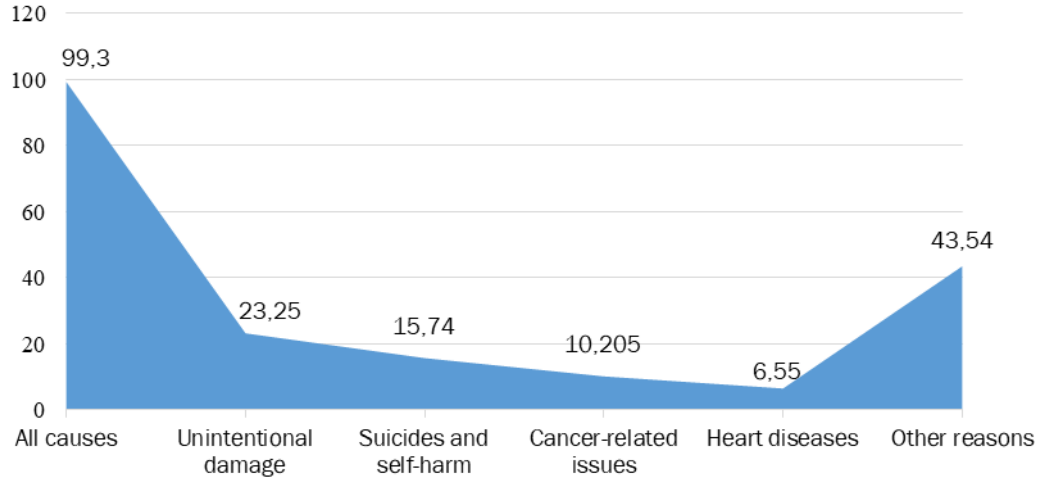


**Figure 1.** Years of Potential Life Lost in 2015 in Utah (USA), per 100,000 population (both genders)

Source: N. Rynhach and L. Luschyk (2018)

According to Figure 1, the largest YPLL in Utah (USA) were caused by: unintentional damage – 23.25 cases per 100 thousand population; suicide and self-harm – 15.74 cases per 100 thousand population; cancer-related issues – 10.205 cases per 100 thousand population. In fact, one in ten Utah working-aged residents annually dies. That situation leads to significant potential losses essential to the families, the state, the whole society, and the US economy as well. A huge number of domestic scholars (Libanova, 2007; Stetsenko, 2001; Pyrozhkov, 2008; Makarova, 2004; Rynhach, 2016) provided the methodologies for the estimation of Ukrainian losses in labor potential, applying some potential demographics' methods, building mortality tables, determining the duration of the working-aged population economically active life-span, the costs of their production and consumption, etc.

## 2. PROBLEM STATEMENT AND HYPOTHESES OF RESEARCH

### 2.1 Research objectives

The main objective of this research is to calculate and to model the demographic and economic potential of the population on the basis of life potential, taking the population's participation in public production into account. The losses caused by cancer-related premature mortality and the related issues both in the man-years and in terms of value. The main estimation criteria, regarding the age characteristics of the working-aged population stratum, for the losses caused by cancer-related premature mortality and the related issues include:

- years of potential life lost as a result of premature death (losses in life potential due to premature death);
- years of active life lost (losses in labor potential) – denoted by the number of man-years of lost public production as a result of premature death;
- the losses due to premature mortality in terms of value.

### 2.2 Purpose of the study

This paper is aimed to statistical data analysis and to evaluate the losses in labor and life potential of the Ukrainian population caused by the main negative social, economic and demographic processes.

### 2.3 The research hypothesis

Hypothetically, an average Ukrainian is considered to be working-aged until he reaches the age of 65 years, while in advanced countries the respective limit is denoted by 70 years or even more. The question under study is: "What are the losses in life and labor potentials (in man-years and the terms of value) caused by the premature cancer-related mortality of the working-aged population (aged 15–64)?" The data on the periods after 2017 is partly unavailable. Thus, 2017 was considered as the basis of our research. In the study we assumed that GDP should be adjusted for the shadow economy index. Consumption was accepted at the level of 75.0 %, while the shares of production and consumption in each age range were distributed similar to the survey data of O. Makarova (2004). In order to estimate the losses in labor potential we accepted the limiting age of 65 years. When GDP per capita was calculated, we regarded the working-aged population in the age range of 15–64 years.

# 3. METHODOLOGY

The calculation algorithm was based on the application of the potential demographics method, allowing to estimate the losses in labor and life potentials of the Ukrainian population caused by the cancer-related issues. The most important indicator in our calculations was the average life expectancy (mortality table). At the first stage of investigation, the annual economic value of an average person life expectancy in the age range from 0 to 100+ was determined (Kozlovskyi, 2010). We calculated a set of indicators, in particular: the production distribution between different age strata and its total value; the average economic value of each expected year of life per person; the total consumption, regarding the population structure; the average consumption of each expected year of life per person; the difference between production and consumption of each expected year of life.

Similar to S. Stetsenko (2005), *potential demographics method* was applied to estimate the demographic losses in:

– the total population's over 15 years old (when people usually start their working activity) life potential:

$$L_{life\_p} = d_i \cdot e_{life}, \quad (1)$$

where $L_{life\_p}$ – the losses in life potential of a particular age stratum;
$d_i$ – the quantity of the deceased at the age of *i* individuals;
$e_l$ – life expectancy at the age of *i*.

– the losses in labor potential due to the premature mortality (in man-years) were calculated as the difference between the actual age at the time of death and the maximum working age (that was equal to 65 years):

$$L_{labor\_p} = d_i \cdot e_{labor}, \quad (2)$$

where $L_{labor\_p}$ – the losses in labor potential of a particular age stratum;
$d_i$ – the quantity of the deceased at the age of *i* individuals;
$e_{labor}$ – labor life expectancy at the age of *i* (before reaching 65 years).

While calculating the losses in life and labor potentials, we applied the GDP per capita indicator, calculated as the ratio of the actual GDP (taking the shadow economy into account) to the size of the working-aged population stratum (aged 15-64).

**Data collection.** In the course of our study, in order to estimate both socio-economic and demographic losses in human resources due to the high level of cancer-related morbidity and mortality the official data of the State Statistics Service of Ukraine on 2017 were used. In particular, the forms "Distribution of deaths by sex and occupational groups" and "Distribution of deaths by sex, age and causes of death" (according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems – ICD–10) were involved as well as the statistical tables on life expectancy, GDP, population size and division by detailed occupation and age. The data provided by the Ministry of Economic Development, Trade and Agriculture (Kozlovskyi et al., 2017) of Ukraine (2019) on the size of the shadow economy was used in order to estimate GDP per capita.

# 4. STATISTICAL DATA ANALYSIS

## 4.1 Reliability and validity

Aiming to achieve high reliability and validity of the research, in the calculations we applied a probability statistical model. That model described the extinction process of some theoretical gen-

eration with fixed initial numbers and was based on the official statistics and calculations of the mortality table and the average life expectancy. The mortality process was characterized accurate and adequate.

## 4.2 Data analysis and results

According to the initial hypothesis, all the appropriate production and consumption calculations for the each year of the expected life were performed. Those calculations are presented in Table 1. While the indicators were calculated, nominal GDP was adjusted, taking the level of the shadow economy in 2017 into account. The respected shadow economy was amounted to 3908885.42 million UAH (while GDP in 2017 was equal to 2983882 million UAH) due to the data of the State Statistics Service of Ukraine (2019). According to the expert estimations of the Ministry of Economic Development, Trade and Agriculture of Ukraine (2019) in 2017, the level of the shadow economy equaled to 31 % of GDP. The main task of the above calculations was to determine the specific age when the population began to consume significantly more than produce; the economic value of the premature cancer-related mortality of the working-aged population was taken into account as well. Table 1 proved that the population of Ukraine began to consume more than produce at the age of 45–49 years. The authors made similar calculations for 2006. The empirical data proved that the analyzed age interval had shifted over the past 10 years from the range of 50–54 years (Koziuk and Dluhopolskyi, 2018). That fact poses enormous threats to the Ukrainian economy sustainability in the future. That was due to the negative demographic trends, represented by the decrease in the total population and its economically active stratum with the simultaneous increase in the share of elderly population, dangerous migration processes, and a number of phenomena in the Ukrainian economy.

**Table 1.** Economic value of the one year of the average person's life expectancy[1]

| *Age* | *Population, persons* | *Life expectancy, years* | *Share of production, corresponding with each age, %* | *Value of production corresponding with each age, mln. UAH* | *Total production, mln. UAH* | *Average value of production corresponding with the subsequent year of expected life, mln. UAH* | *Average value of production corresponding with the subsequent year of a person's expected life, UAH.* | *Share of age-specific consumption, %* | *Consumption corresponding with a certain age, mln. UAH* | *Total consumption, mln. UAH.* | *Average consumption corresponding with the subsequent year of expected life, mln. UAH.* | *Average consumption corresponding with the subsequent year of a person's expected life, UAH* | *Difference between the value of production and consumption corresponding with the subsequent year of expected life, mln. UAH.* |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 394 626 | 71.98 | 0.00 | 0.00 | 3908963.60 | 54306.25 | 137614.47 | 1.62 | 47493.91 | 2931664.07 | 40728.87 | 103208.79 | 34405.68 |
| 1–4 | 1 829 449 | 71.52 | 0.00 | 0.00 | 3908963.60 | 54655.53 | 29875.41 | 1.62 | 47493.91 | 2884170.16 | 40326.76 | 22043.12 | 7832.29 |
| 5–9 | 2 334 380 | 67.62 | 0.00 | 0.00 | 3908963.60 | 57807.80 | 24763.66 | 4.483 | 131429.13 | 2836676.25 | 41950.26 | 17970.62 | 6793.04 |
| 10–14 | 1 977 081 | 62.68 | 0.00 | 0.00 | 3908963.60 | 62363.81 | 31543.38 | 5.674 | 166345.95 | 2705247.12 | 43159.65 | 21829.99 | 9713.39 |
| 15–19 | 1 881 631 | 57.75 | 2.111 | 82516.57 | 3826447.03 | 66258.82 | 35213.51 | 6.853 | 200910.96 | 2538901.18 | 43963.66 | 23364.65 | 11848.85 |
| 20–24 | 2 451 572 | 52.89 | 10.329 | 403748.78 | 3422698.25 | 64713.52 | 26396.75 | 8.205 | 240547.85 | 2337990.22 | 44204.77 | 18031.19 | 8365.55 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25–29 | 3 212 459 | 48.10 | 12.497 | 488493.41 | 2934204.84 | 61002.18 | 18989.25 | 9.471 | 277663.46 | 2097442.37 | 43605.87 | 13573.99 | 5415.26 |
| 30–34 | 3 619 265 | 43.42 | 12.854 | 502448.13 | 2431756.71 | 56005.45 | 15474.26 | 9.5 | 278513.66 | 1819778.91 | 41911.08 | 11580.00 | 3894.26 |
| 35–39 | 3 186 012 | 38.87 | 12.682 | 495724.85 | 1936031.86 | 49807.87 | 15633.30 | 9.5 | 278513.66 | 1541265.26 | 39651.79 | 12445.59 | 3187.71 |
| 40–44 | 3 062 265 | 34.51 | 12.583 | 491855.05 | 1444176.81 | 41848.07 | 13665.72 | 9 | 263855.04 | 1262751.60 | 36590.89 | 11948.96 | 1716.76 |
| **45–49** | **2 840 642** | **30.28** | **12.283** | **480128.40** | **964048.41** | **31837.79** | **11207.96** | **8** | **234537.82** | **998896.56** | **32988.66** | **11613.10** | **-405.14** |
| 50–54 | 2 925 578 | 26.19 | 11.356 | 443893.03 | 520155.38 | 19860.84 | 6788.69 | 6.929 | 203139.07 | 764358.74 | 29185.14 | 9975.85 | -3187.16 |
| 55–59 | 3 154 026 | 22.28 | 9.43 | 368607.90 | 151547.49 | 6801.95 | 2156.59 | 5.437 | 159397.76 | 561219.68 | 25189.39 | 7986.43 | -5829.83 |
| 60–64 | 2 678 385 | 18.58 | 2.819 | 110191.48 | 41356.01 | 2225.83 | 831.04 | 4.301 | 126093.39 | 401821.91 | 21626.58 | 8074.49 | -7243.45 |
| 65–69 | 2 269 745 | 15.16 | 1.02 | 39870.63 | 1485.38 | 97.98 | 43.17 | 4 | 117268.91 | 275728.52 | 18187.90 | 8013.19 | -7970.02 |
| 70–74 | 1 299 459 | 12.03 | 0.037 | 1446.29 | 39.09 | 3.25 | 2.50 | 2.96 | 86778.99 | 158459.61 | 13172.04 | 10136.56 | -10134.05 |
| 70–74 | 1 299 459 | 12.03 | 0.037 | 1446.29 | 39.09 | 3.25 | 2.50 | 2.96 | 86778.99 | 158459.61 | 13172.04 | 10136.56 | -10134.05 |
| 75–79 | 1 751 144 | 9.21 | 0.001 | 39.09 | 0.00 | 0.00 | 0.00 | 1.534 | 44972.63 | 71680.62 | 7782.91 | 4444.47 | -4444.47 |
| 80+ | 1 547 186 | 6.80 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.92 | 26971.85 | 26707.99 | 3927.65 | 2538.57 | -2538.57 |

Note: [1] data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and temporarily occupied territories in the Donetsk and Luhansk regions.

Source: the authors' own calculations.

Using Table 1 and Table 2, considering the data on the cancer-related deaths distribution in 2017, we can determine the economic losses due to the premature death for each age stratum. Thus, Table 2 shows that the losses in production caused by all types of cancer in the age range of 15–19 years amounted to 142.35 million UAH. Considering the causes of death in the working-aged population stratum, mouth, pharynx & larynx cancers (C00–C14) was associated with the production losses amounted to 2.03 million UAH; the other types of cancer (C17, C23–24, …, D00–D48) were associated with the production losses amounted to 65.07 million UAH.

**Table 2.** Calculation of production and consumption losses due to premature mortality from different types of cancer and its consequences (population ages 15–64)[1]

| *Age* | *Causes of death, including:* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *006 Chapter II: Neoplasms C00–D48* | | | *In particular: 007 Malignant neoplasms of lip, oral cavity and pharynx C00–C14* | | | *Other types of cancer (C17, C23–24, …, D00–D48)* | | |
| | *number of death, persons* | *production losses due to premature death, mln. UAH* | *consumption losses due to premature death, mln. UAH* | *number of death, persons* | *production losses due to premature death, mln. UAH* | *consumption losses due to premature death, mln. UAH* | *number of death, persons* | *production losses due to premature death, mln. UAH* | *consumption losses due to premature death, mln. UAH* |
| 15–19 | 70 | 142.35 | 94.45 | 1 | 2.03 | 1.35 | 32 | 65.07 | 43.18 |
| 20–24 | 163 | 227.57 | 155.45 | 4 | 5.58 | 3.81 | 58 | 80.98 | 55.31 |
| 25–29 | 286 | 261.23 | 186.73 | 4 | 3.65 | 2.61 | 81 | 73.98 | 52.89 |
| 30–34 | 569 | 382.31 | 286.10 | 17 | 11.42 | 8.55 | 151 | 101.46 | 75.92 |
| 35–39 | 1 074 | 652.63 | 519.56 | 31 | 18.84 | 15.00 | 184 | 111.81 | 89.01 |
| 40–44 | 1 928 | 909.25 | 795.03 | 135 | 63.67 | 55.67 | 289 | 136.29 | 119.17 |
| 45–49 | 3 173 | 1076.84 | 1115.77 | 275 | 93.33 | 96.70 | 428 | 145.25 | 150.50 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 50–54 | 5 667 | 1007.57 | 1480.60 | 465 | 82.68 | 121.49 | 752 | 133.70 | 196.47 |
| 55–59 | 9 903 | 475.83 | 1762.12 | 657 | 31.57 | 116.90 | 1 352 | 64.96 | 240.57 |
| 60–64 | 12 110 | 186.99 | 1816.79 | 672 | 10.38 | 100.82 | 1 548 | 23.90 | 232.24 |

Note: [1] data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and temporarily occupied territories in the Donetsk and Luhansk regions.

Source: the authors' own calculations.

In Table 3 the estimations of the production losses and due to the premature mortality of the population aged 15-64 from cancer and its consequences were summarized. The production losses due to premature death of 34943 working-aged individuals (population ages 15–64) amounted to 5323 million UAH, while consumption losses amounted to 8213 million UAH (see Table 3). The observed fact led to an excess of consumption over production due to premature cancer-related mortality, which amounted to 2890 million UAH.

**Table 3.** Estimation of generalized production losses due to cancer mortality and its consequences (population ages 15–64)[1]

| *Causes of death* | *Number of death, persons* | *Production losses due to premature death, mln. UAH* | *Consumption losses due to premature death, mln. UAH* | *The difference between production and consumption losses due to premature death, mln. UAH* |
|---|---|---|---|---|
| Neoplasms (total), including: | 34943 | 5323 | 8213 | **-2890.00** |
| Malignant neoplasms of lip, oral cavity and pharynx | 2261 | 323.15 | 522.90 | **-199.75** |
| Malignant neoplasms of esophagus | 920 | 97.96 | 192.96 | **-95.00** |
| Malignant neoplasms of stomach | 2837 | 405.32 | 651.00 | **-245.68** |
| Malignant neoplasms of intestine | 3573 | 415.83 | 764.96 | **-349.13** |
| Malignant neoplasms of liver and intrahepatic bile ducts | 834 | 116.97 | 190.83 | **-73.86** |
| Malignant neoplasms of pancreas | 1871 | 222.31 | 404.25 | **-181.94** |
| Malignant neoplasms of larynx | 799 | 91.21 | 171.06 | **-79.85** |
| Malignant neoplasms of trachea, bronchus and lungs | 5599 | 567.34 | 1153.52 | **-586.18** |
| Melanoma and other malignant neoplasms of skin | 573 | 131.84 | 159.46 | **-27.62** |
| Malignant neoplasms of breast | 3126 | 499.43 | 749.33 | **-249.90** |
| Malignant neoplasms of cervix uteri | 2132 | 459.80 | 578.16 | **-118.36** |
| Malignant neoplasms of ovary | 1213 | 208.63 | 299.61 | **-90.98** |
| Malignant neoplasms of prostate | 709 | 41.23 | 127.20 | **-85.97** |
| Malignant neoplasms of bladder | 519 | 44.09 | 101.61 | **-57.52** |
| Malignant neoplasms of brain | 1286 | 335.10 | 380.80 | **-45.70** |
| Non-Hodgkin's lymphoma | 585 | 157.29 | 175.59 | **-18.30** |
| Multiple myeloma | 268 | 25.76 | 54.52 | **-28.76** |
| Leukemia | 963 | 241.88 | 279.57 | **-37.69** |
| Other causes | 4875 | 937.41 | 1255.27 | **-317.86** |

Note: [1] data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and temporarily occupied territories in the Donetsk and Luhansk regions.
Source: the authors' own calculations.

Figure 2 represents the difference between production and consumption losses due to premature death.

The losses in life potential of the working-aged population (ages 15–64) due to cancer and its consequences, considering the types of cancer (Khmelnytsk regional center of health, 2019), were calculated in man-years (see Table 4).

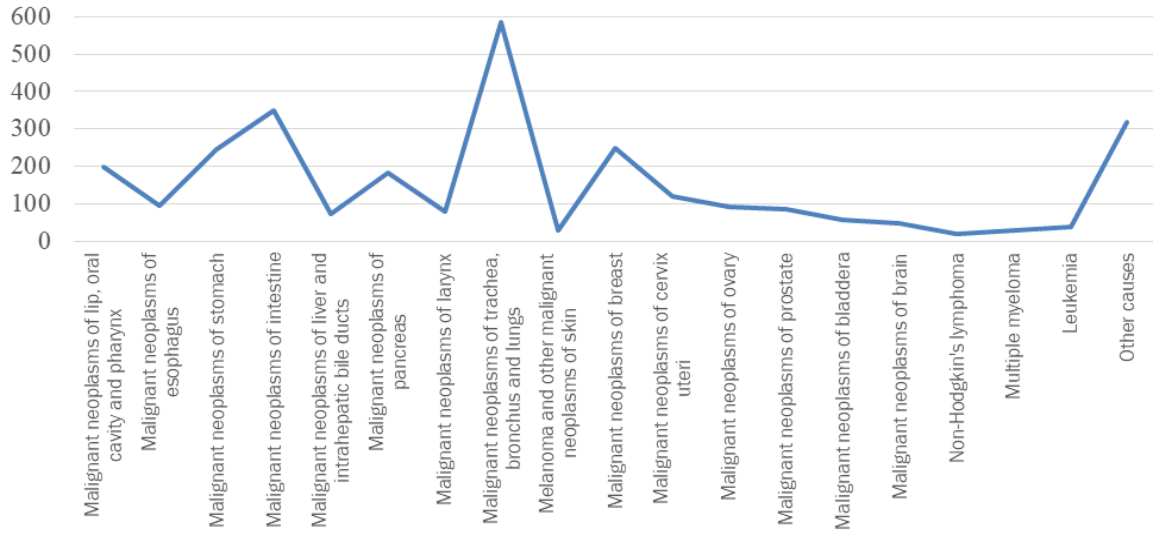


**Figure 2.** Difference between production and consumption losses due to premature death, mln. UAH

Source: the authors' own calculations.

**Table 4.** Losses in life potential of the working-aged population (ages 15–64) due to cancer and its consequences, considering the types of cancer[1]

| *Causes of death* | *Number of death, persons* | *Losses in life potential of the working-aged population, man-year* |
|---|---|---|
| **Neoplasms (total), including:** | **34943** | **849547.62** |
| Malignant neoplasms of lip, oral cavity and pharynx | 2261 | 54692.74 |
| Malignant neoplasms of esophagus | 920 | 21117.04 |
| Malignant neoplasms of stomach | 2837 | 68286.17 |
| Malignant neoplasms of intestine | 3573 | 82549.39 |
| Malignant neoplasms of liver and intrahepatic bile ducts | 834 | 19955.45 |
| Malignant neoplasms of pancreas | 1871 | 43641.62 |
| Malignant neoplasms of larynx | 799 | 18549.19 |
| Malignant neoplasms of trachea, bronchus and lungs | 5599 | 127126.72 |
| Melanoma and other malignant neoplasms of skin | 573 | 15393.83 |
| Malignant neoplasms of breast | 3126 | 77288.00 |
| Malignant neoplasms of cervix uteri | 2132 | 56561.29 |
| Malignant neoplasms of ovary | 1213 | 30341.31 |
| Malignant neoplasms of prostate | 709 | 14867.60 |
| Malignant neoplasms of bladder | 519 | 11479.20 |
| Malignant neoplasms of brain | 1286 | 35454.62 |
| Non-Hodgkin's lymphoma | 585 | 16215.26 |
| Multiple myeloma | 268 | 6023.25 |
| Leukemia | 963 | 25972.21 |
| Other causes | 4875 | 124032.73 |

Note: [1] data exclude the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol and temporarily occupied territories in the Donetsk and Luhansk regions.

Source: the authors' own calculations.

The losses in life potential of the working-aged population a represented below (see Figure 3).


**Figure 3.** Losses in life potential of the working-aged population, man-year

Source: the authors' own calculations

Regarding the actual causes of the premature cancer-related mortality of the working-aged population, the greatest losses in life potential were due to malignant neoplasms of: trachea, bronchus and lungs – 127126.72 man-years, intestine – 82549.39 man-years, breast – 77288.00 man-years. The economic losses in labor potential due the premature cancer-related mortality of the population aged 15–64 years are summarized in Table 5.

**Table 5.** Economic losses in labor potential due the premature cancer-related mortality of the population aged 15–64

| *Age* | *Losses in labor potential, man-year* | *Losses in labor potential, mln. UAH* |
|---|---|---|
| 15–19 | 3360.00 | 452.71 |
| 20–24 | 7009.00 | 944.35 |
| 25–29 | 10868.00 | 1464.29 |
| 30–34 | 18777.00 | 2529.90 |
| 35–39 | 30072.00 | 4051.73 |
| 40–44 | 44344.00 | 5974.65 |
| 45–49 | 57114.00 | 7695.21 |
| 50–54 | 73671.00 | 9926.00 |
| 55–59 | 79224.00 | 10674.18 |
| 60–64 | 36330.00 | 4894.89 |
| Total | **360769.00** | **48607.91** |

Source: the authors' own calculations.

Graphically the main results of the study in terms of time (Figure 4) and in the monetary expression (Figure 5) are illustrated below.

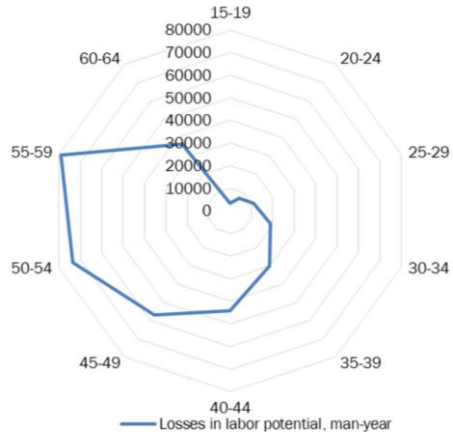


**Figure 4.** Losses in labor potential in terms of time, man-year

Source: the authors' own calculations.

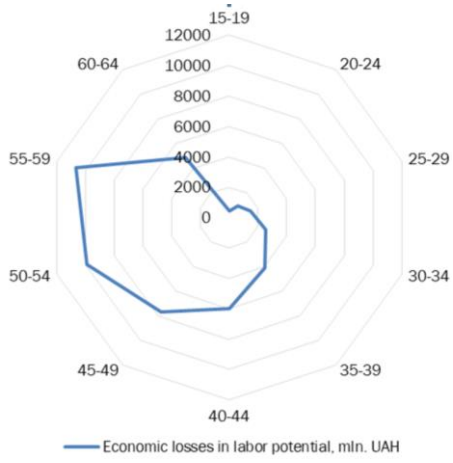


**Figure 5.** Economic losses in labor potential, mln. UAH

Source: the authors' own calculations.

# 5. DISCUSSION

## 5.1 Key findings and results

In this paper, the attempt to justify the enormous losses in life and labor potentials for an individual, the family, the state and entire society due to the catastrophic depreciation in the value of life, associated with the exogenous causes, in particular cancer-related issues, was made. The observed situation significantly reduced the individual value of life and eliminated effect of investment in human capital in Ukraine. In our opinion, that was primarily due to the negative economic trends in Ukraine, such as a rapid decline in the quality of life and deep crisis in socio-economic, demographic, political and other processes. A crucial disregard in social and economic justice in Ukraine is interconnected with the high cancer morbidity and mortality from cancer. It was proved that in 90 % of cases cancer was caused by the life-stile, society and the political environment.

It was found out that the losses in labor potential of Ukrainian population (aged 15–64) due to the cancer-related premature mortality equaled to 360.8 thousand man-years or 48607.91 million UAH (1.24% of Ukrainian GDP). In general, according to various estimates of a huge number of domestic and foreign scholars (Libanova, 2007; Stetsenko, 2001; Pyrozhkov, 2008; Makarova, 2004; Rynhach, 2016), the above economic losses amounted to 0.1–0.5 % of GDP. The observed fact was confirmed by our calculations and also gave the reason to conclude that the real losses were essentially higher.

In addition, the other results can be obtained if we change the initial hypothesis. If the limit of working-age was shifted from 65 to 70 years, the cancer-related losses in labor potential would be equal to 535.5 thousand man-years or 72147.99 million UAH (1.85% of GDP). Those conclusions were made ignoring the costs of treatment, surgery, rehabilitation, medical care, social welfare benefits, absenteeism, the relatives expenses associated with the care for the sick, the cost of burial, etc. Thus, in that case, the cancer-related economic losses in Ukraine amounted to 200 % of the respective indicator in a huge number of advanced and emerging countries.

## 5.2 Prospects for further research

The study results' relevance is justified by the fact that the person represents the highest social value and enormous wealth of the nation. The latter is rapidly decreasing; there is a risk of unmanaged processes in our country. Due to the enormous amount of demographic and socio-economic losses in labor resources, active, young, and promising people are condemned to death of the aforementioned fatal illness instead of full realization of their immanent working potential. The disclosed situation and a crucial lack of public resources for prevention and effective cancer treatment exacerbated the other problems in the country. It undermined the confidence in social justice and the constitutional right to get qualified medical care.

Considering the availability of complete statistical information, the further research should be associated with socio-economic and demographic estimations of the labor losses due to cancer mortality and related issues, e. g., the morbidity-related losses; losses for the family as a whole and regarding dependents; consumption losses; investment losses of society for the human, social, intellectual, innovative, cultural and other types of capital's formation.

# CONCLUSION

The study's results are summarized in the next statements:

- it is advisable to use the potential demographics method to statistical data analysis the socio-economic and demographic losses in labor resources in Ukraine;
- using the statistical analysis methods, it was revealed that there was an imbalance between the production and consumption losses in the age ranged of 45–49 years. The tendency of the above indicator to the deterioration over the past ten years proved that an average citizen started to consume more than produce ten years earlier (regarding the advanced economies);
- the developed probability statistical model allowed to establish that premature retirement limits of Ukrainian labor potential, occurred because of the high morbidity and mortality levels. It was proved that the greatest imbalance between production and consumption losses was recorded due to the above reason;
- based on the statistical data analysis, it was determined that the losses in life potential from the cancer-related issues in the population stratum aged 15–64 years amounted to 0.85 million man-years; due to the disposal of labor resources, the loss in labor potential amounted to 0.361 million man-years (which was amounted to 48.6 billion UAH);

- the hypothesis that economic losses due to a high incidence of such exogenous causes as neoplasms equaled to 1.24 % of GDP, while in the advanced countries the respective expenses were ranged from 0.1 to 0.5 % of GDP;
- the projected losses in Ukrainian economy due to premature losses in labor potential were amounted to 0.54 million man-years and 0.721 billion UAH, which equaled to 1.85 % of GDP;
- based on the statistical data analysis it was proved that, at the present stage of the Ukrainian economy's development, it would be necessary to take immediate and productive measures aimed to create an effective organizational and economic mechanism of the human capital self-preservation.

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# Formal and Informal vs. Alternative Institutions

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ABSTRACT

The subject of this article is to investigate the cause and effect relationship between legal (formal and informal) and illegal (alternative) institutions. The aim of this paper is to point out quasi-neoliberal causes of the permanent crisis transition, which caused major problems and deformities, creating a new dogma and new "elitist system". The specified relationship is determined through profound contradictions between individualism and collectivism, liberalism and dirigism, permissible and incomprehensible, private and group interests, irresponsible "rules-free games" and "rules-defined games". The basic hypothesis is that the main goals of the so-called. Of the "reformers" were of high interest, as evidenced by their enormous wealth and stratification in society. Our descriptive and critical analysis showed the correctness of the hypothesis. It is fully consistent not only with the long-standing media reports of scientific analysis, but also with visible practical manifestations. In conclusion, it is noted that alternative institutions have played a key role in realizing the interest motives of the "reformers".

## INTRODUCTION

A challenge of transitional changes appeared almost three decades ago in the post-socialist countries when they were burdened with "Legitimacy of the past and uncertainty of the future" (H. Wagener 1993, p. 27). However, a rational and efficient response was not found in most of those countries. We believe that the main cause lies in unsuccessful institutionalization, that is, in the action of alternative institutions (from the shadow).

There are very few articles in the economic literature that directly establish the existence and/or analyze the functioning of alternative institutions. While this is understandable for Western authors of economics, it seems that authors from transition countries unjustifiably neglect (ignore) the existence and functioning of alternative institutions. The fact is that they are associated with quasi-institutional actions (from the shadow, criminal), and therefore it is not easy to investigate them. However, there are many institutional and other indicators that directly or indirectly indicate their existence and negative impact on social and economic development in most transition coun-

tries. Among them are: the rule of law index, distribution of resources, index of economic freedom, the innovation capacity index, the corruption perceptions Index, the global competitiveness Index, the degree of inequality, etc.

## 1. LITERATURE REVIEW

Alternative institutions, as a relatively contemporary phenomenon, are not directly the subject of research in developed countries, because their existence and functioning are not (sufficiently) expressed, and therefore not scientifically researched. However, it is possible to look for some clues to alternative institutions in some western research, such as:

- "*Exploitative approach to the state*" within the "*interest approach*" (North, 1981, p. 22), theory of social (constitutional) choice (Buchanan, 1990),
- theory of "*rent-seeking motivation*" (Krueger, 1974; Posner, 1975; Buchanan, Robert and Tullock, 1980; Tullock, 1996; Rose-Ackerman, 1999; Acemoglu and Verdier, 2000; Congleton and Hillman, 2015),
- theory of externalities (Buchanan and Tullock, 1997),
- theory of "*predatory state*" (Evans, 1993; Robinson, 1999; Przeworski and Limongi, 1993; Marcouiller and Young, 1995),
- theory of "*total institutions*" (Goffman, 1968, p. 41),
- the influence of powerful administrative-bureaucratic groups (Mc Auley, 1991, p. 26),
- theory of "*violence*" ("*system with limited access to resources*" - North, Walis and Weingast, 2009),
- theory of opportunistic behavior and bounded rationality (Williamson, 1985; 1985a), and
- the „*rational bandits*" theory, who rule a predatory state, making most of the population deprived (Olson, 2010).

In other words, the existence of alternative institutions is not particularly compatible with the social and economic practices of developed countries. Unfortunately, it is usually a characteristic of poorly developed countries. This is evidenced by numerous sociopathological phenomena (corruption, non-market and illegal enrichment, interest-lobbystic log-rolling, monopoly, etc.), which are the subject of various economic, sociological, and other scientific researches, as well as various forms of market restrictions (externalities, government controls, market failures, asymmetric information). There are numerous reasons for this, from the path dependency (i.e. latter events depend on previous events: work habits, mentality, achieved level of industrial development, method of regulation of economy, level of investment in science, democratic achievements and traditions, economic, market and other freedoms, party pluralism, the development of economic, legal, and other institutions, network effect, coordination effect, the effect of cultural factors (mentality, education and social consent), and the effect of long term social capital (i.e. quasi-irreversibility of the original socialization), through foreign influences (the war environment, globalization, politics, economics, geopolitics, geoeconomics), to the reduced application of neo-liberal economic policy, which ignored the Pareto principle and allowed the dominance of economic freedoms over institutions (rather than their complementarity). This has led to the institutionalization of privileges of privileged individuals, procedural forms of domination, and sophisticated forms of totalitarianism.

## 2. CRITICISM OF INSTITUTIONAL MONISM

It is an opportunity to recall the controversial and apologetic interpretation of R. Kapelyushnikov (2019), who erroneously and ideally argues that in the theoretical "approach" of many Western authors (North, Walis and Weingast, 2009; Acemoglu and Robinson, 2012) formal institutions (economic and political) represent not only the main but in fact the sole driving force of the "histor-

ical process" (meaning the social and economic development - author's remark). According to this view, which Kapelyushnikov ambitiously calls the “Pan-institutionalism”, Western authors supposedly absolutize the importance of formal institutions (essentially: state institutions, political and economic). This means, in his view, that they relativize the objective existence (and role) of informal institutions. In a way, this means that Kapelyushnikov indirectly imputes to Western authors the idea of giving a dominant importance to institutional monism (i.e. the decisive role of state regulation).

We think this is wrong at first glance. Because, according to D. North (1981, pp. 7-8), the basic "blocks" of institutions are: a) property rights (as incentives for individual activities), b) specification and protection of property rights (by the state), and c) ideological (conditionally: political) influences on the behavior of individuals (which in fact are only a part of informal norms of behavior). North also emphasized the importance of coercive means for the implementation of rules and norms of behavior.

Furthermore, in the same article, it is noticeable that Kapelyushnikov, overwhelmed by the formalization of the research problem, completely “forgets” not only the positive results of the theory he criticizes, but also the culture, which in a conditional sense is a substitute for an informal institution (interpretation by Alesina and Guliano, 2015), but also the objective existence and functioning of alternative institutions. They are often the subject of our research, and they certainly exist in Russia, which is the largest transition country.

We must remind you that the aforementioned (and many other) authors differentiate "good" from "bad" institutions (Rodrik, 2007), extractive and inclusive regimes (Acemoglu and Robinson, 2012), "Limited Access Orders" (to resources) and "Open Access Orders" (to resources) - North, Walis and Weingast, 2009). Thus, both substantively and metaphorically, they referred to objective conditions and their basic characteristics in which alternative institutions could exist and operate. Undoubtedly, the protection of property rights is a major factor that has served them to differentiate good institutions from bad institutions.

Also, keep in mind that North, Walis and Weingast (2009) noted and described in detail the existence of anti-competitive economic institutions in the societies with “Limited Access Orders”. They attributed them to the conscious actions of the elites (especially those in government structures). Although they do not mention the existence and functioning of alternative institutions, they do analyze social violence, privileges, bastard feudalism, rent-seeking, redistribution, the rule of law for elites, and others. Due to all this, we conclude that the actions of elites lead to the creation of violence in society (which is carried out precisely through the mechanism of alternative institutions). The violence analyzed by these authors comes from elites, not the people. It directly leads to redistributive effects (that is, "conflicts," in J. Knight jargon, 1992), which go in favor of the ruling elites.

The foregoing statements confirm that we cannot agree with the one-sided and undoubtedly ideologized criticism of Kapelyushnikov (Ibid.), who clearly imposes institutional monism of the dirigist type. Seemingly, his only “originality” is the attempt to terminologically define the purported priority of formal institutions (“Pan-institutionalism”). Without any intention to justify and/or favor the views of Western authors in any way, it seems that Kapelyushnik's reasoning and overargumentation have fallen into the trap called "criticism for criticism."

In addition, the framework of an article (written by anyone, even by Kapelyushnikov) is certainly not sufficient to consider the complex of very significant issues of an entire economic area such as the "new institutionalism" proposed by O. Williamson (1975). It is interesting that Kapelyushnikov correctly states some Western authors' understanding of the negative role of elites and nomenclatures in power (Acemoglu et al., 2005), as well as privileged individuals (Clark, 2009), but fails to rise above the outlined ideological matrix and notice the conditions for the creation, strengthening, and functioning of alternative institutions.

## 3. NEOLIBERALISM AS AN IDEOLOGY OF ALTERNATIVE INSTITUTIONS

In the era of the strongest waves of neoliberalism (more specifically: quasi-neoliberalism as an ideology of alternative institutions and a particular form of quasi-institutional monism), we criticized it harshly, competently, and argumentatively, to the same extent as dirigism (another polarized form of institutional monism). We have always advocated institutional pluralism, which objectively exists in various combinations in all developed countries. Moreover, every criticism and theorizing, aimed at any monistic glorification of particular institutional order - is doomed to fail, because practice (in addition to the theory) convincingly denies them.

In the most the so-called "transition" countries (to which SEE countries also belong), the interest motivation of the "reformers" and nomenclature in power resulted in their enormous enrichment. From the beginning, it has been accompanied by the strengthening of alternative institutions, quasi-institutional violence, and quasi-institutional control. And all this is possible only in the conditions of immoral misuse of formal and informal institutions.

Demagogic and vulgar rhetoric on economic freedoms (and their "satellites") has essentially led to their massive marginalization. As a result, the abused "liberalization" dominated over real "institutionalization" and turned into quasi-institutionalization. The quasi-neoliberal macroeconomic recipe was purely ideological in nature (a market mask for non-market appropriation). Objectively, it could neither create a sound microeconomic environment nor solve the problem of reconciling the freedom of choice of individuals with collective interests. It was merely a theoretical and ideological basis for the creation and strengthening of quasi-institutional monism, the natural result of which was the gradual domination of alternative institutions. In this way, real institutional changes were prevented. They can act only under conditions of quality institutional control and institutional competition - key promoters of economic development.

The “alternative institutions” created anti-institutional action, intentional blockade of real institutional changes, promotion of quasi-institutional and meta-institutional changes, turning institutionalisation into its opposite.

<table>
<tr><td>Extensive sociopathological milieu</td><td>Subjective behavioural regulators</td><td>Inefficient formal and informal institutions</td><td>Powerful mechanism privileges</td></tr>
<tr><td>Insatiable economic appetites of the government and “new elites” (demonic enrichment)</td><td colspan="2" rowspan="4">ALTERNATIVE INSTITUTIONS</td><td>Deformed and reduced choices of economic agents, the economic reality, and the institutional structures</td></tr>
<tr><td>Opportunistic behavior</td><td>Poor control mechanisms</td></tr>
<tr><td>Deficit of the rule of law</td><td>Weak and non-transparent institutions</td></tr>
<tr><td>Conditions where the ruling elite uses political power in the unethical way and obstructs the functioning of the rule of law</td><td>Combination of two basic institutional monisms (the market and the state regulation)</td></tr>
</table>

| | | | |
|---|---|---|---|
| Disabled institutional control and adequate competition | | | Paternalism, nepotism, the tradition to obstruct legal norms, and the possibilities for safe and well-organized manipulations and compensations, log-rolling, lobbying, and rent-oriented behaviour |
| Deficit of market institutes, market infrastructure and culture, market cartelized | Disabled individualism and economic freedom for all (in a mass scale) | Pseudo-institutional violence (political, economic, and party) of an organized minority (over a disorganized majority | The domination of political (party) interests, totalitarian party control over significant economic processes and policies |

**Figure 1**. Institutional environment system of alternative institutions

Source: own creation

M. Delibasic (2016, p. 150; 2018) points out that the analysis of institutional models has showed that economic development includes not only an economic subsystem, but also the broad spectrum of non-economic variables, including formal and informal institutions, cultural and other systems of values, as well as all forms of opportunistic behavior, established by alternative institutions (Figure 2).

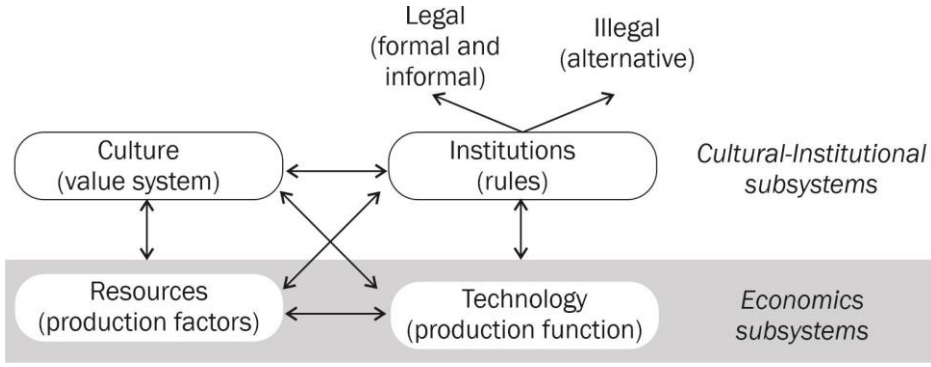


**Figure 2**: Interrelated developments in the social system

Source: adapted from Hayami and Godo, 1997, p. 11.

Neoliberalism, as the ideological foundation of alternative institutions in transition countries, has failed to satisfy a single element of the so-called "least common multiple" of economic success: integration into the world economy, high workforce mobility, high savings and investment rates, and the government's ability and commitment to achieve economic growth. Not even the most liberal countries in the world are in favor of an uncontrolled market, and especially not in favor of institutional monism. Quasi-institutional monism and the greater role of alternative institutions – are out of question! But, how to dominate global relations over underdeveloped countries if developed countries recommended their own recipes?! Delayed acknowledgments (after the global financial and economic crisis of 2008) for the mistaken beliefs in the efficiency of free markets (Nobel Committees M. Spence, A. Grispen, J. Williamson et al.) seemed burlesqueous and cynical.

Alternative institutions have an illegal, socio-psychological, and destructive character. They are primarily and exclusively personified, either individually or collectively. As such, they have, with their strengthening, directly and very strongly influenced the blockade of real institutional changes (primarily in the domain of formal institutions, which have a collectivistic character, and should express and protect collective interests). Therefore, it is necessary to analyze the functional relationship between the individual and the collective, through the prism of the creation and operation of alternative institutions. We believe that the uncivilized and dogmatic distortion of this relationship has significantly contributed to the institutional fiasco in many transition countries, which has resulted in the domination of alternative institutions and the deformation of the institutional structure of society.

## 4. THE RELATIONSHIP INDIVIDUAL-COLLECTIVE vs. ALTERNATIVE INSTITUTIONS

Institutional pluralism is a rational combination (synergy) of complementarily conditioned individualistic and collectivist actions, arrangements, efforts, and choices. It enables healthy and productive institutional competition. Ignoring institutional pluralism and forcing any form of institutional monism leads to the creation of perverted individualism of interest (of the rare and the privileged). Throughout the transition period, quasi-neoliberal dogma, utopia, and an illusion of individualism were applied in many countries. It is methodologically, epistemologically (understood as the difference between truth and "belief"), and ontologically in constant (inevitable) conflict with the theories of neoinstitutionalism (which promote institutional pluralism).

The aforementioned monistic dogma was essentially based on "market fundamentalism", which was ideally suited by the abstract and amoral story of a minimal state. Long ago, we have proved the methodological unsustainability of this primitive, vulgarized, and orchestrated "story" because it is not known whether it refers to a social, economic, political, or legal state. Minimizing each of them means reducing particular state functions.

In addition, the story of the "minimal state" ignores J.S.Mill's understanding of the balance between individual independence and social control, then the correct understanding of R. Nozick that the "minimization" of the state is justified when it is "*limited to the narrow functions of protection against force, theft, fraud, enforcement of contracts, and so on*," as well as A. Smith's statement: "*The public interest is better promoted by each person caring for his own welfare*." The practice has shown that K. Popper's paradoxes can not be solved without the presence of efficient and developed institutions. Although they point to the need for a "mini-state", they do not prove that there are defined boundaries of such a state. On the contrary, they create conditions for new forms of totalitarianism and economic reductionism (Draskovic, 2017; 2018).

The boundless quasi-neoliberal dynamics of experimental deregulation breached the moral and institutional limitations of economic reality and rational human behavior. Because of that, transitional reforms need to be seriously implemented. Government structures have opted for recombined institutions, which have enabled the establishment of various forms of quasi-institutional relations. Forcing institutional monism (market type) has caused enormous consequences of the crisis. Various market restrictions have contributed to the boom of uncontrolled market forms, which do not have any common elements with the institution of effective market regulation.

There was a logical consequence - the crisis elements were *reproduced* (low standard of living, social stratification, poor motivation system, unemployment, decline in production and all economic indicators, rapid social pathology, criminalization of economy and society, systemic corruption, gray economy, insufficient government rights, etc.). That has deformed and reduced economic reality and the general institutional structure. These conditions are characterized by an insurmountable gap between suppressed massiveness and privileged individualism, which exists paral-

lelly with the debt dependence growth, inefficient models of governance, systemic corruption at all levels, and many other social costs of anti-development strategy.

| |
|---|
| Reversing the social, economic and institutional dialectics as well as the civilized behavioral norms by methods of neoliberal rhetoric and practice |
| ↓ |
| A paradoxical gap between promises and slogans on massiveness and its negation in practice |
| ↓ |
| Domination of "good players" (elite) instead of "good rules" (institutions) |
| ↓ |
| Ignoring the Pareto optimum, i.e. restrictions on individual freedoms with regard to legality, morality and unpunished harm to others |
| ↓ |
| Turning interest greed into a sinister urge for quick realization and magnification of illegitimate wealth (and supporting power) |
| ↓ |
| Misuse and subjugation of institutions and economic policies that began to serve the private and party interests |
| ↓ |
| Creating and strengthening alternative institutions that strive for domination and total control |

Table 1. The logic of creating and strengthening alternative institutions

Source: own creation

Our criticism has no political nor ideological motives, it is purely scientifically driven. We recognized the transitional quasi-neoliberal "shock therapy" as a wrong and velvet revolutionary path, which supported the individual interests of a small number of privileged individuals. Many traditional values and living standards of the population have been sacrificed and destroyed. The evolutionary development, based on the interests of the state and the people, has been ignored, which is contrary to the interests of political parties, groups, and individuals. It is indisputable that they exist in every society where there are elitist (nomenclature) and citizens' interests. The individualism of all (on a massive scale) is reduced to the individualism of rare, privileged, privileged, and non-market selected individuals.

## CONCLUSION

The post-socialist process of pulling a snow job on the people (neoliberal, party, identity, and others) has shown that *dirigism*, as institutional monism, does not have to originate solely from state (collectivist) sources but can also originate from private (individualistic) sources. Thereby, it is clear that both sources are the result of a systemic and institutional fiasco, which allows the dominance of priviledged choices and alternative institutions. The aforementioned fiasco causes many misuses, manipulations, and all the resulting consequences.

The imposition and domination of individualism over institutionalism was interest-driven: due to the redistribution of national wealth and the enormous illegitimate benefits of privileged individuals from the segment of government nomenclature. The organized use of privileges has led to monopoly rents, great enrichment of minorities, and impoverishment of the majority. A privilege mechanism was activated through alternative institutions, through which the latent exploitation of large groups was realized, which were collectively alienated from propagated individualism and massively "freed" from real economic freedoms. In paradoxical ways, individual "efficiency and rationality" is superior to social efficiency.

Alternative institutions are essentially the result of total government control over formal institutions and macroeconomic policies. Any total control brings with it the challenges of misuse, which was the case in many transition countries. Even the renamed incarnations of compromised neo-liberalism are based on the same ideas, centered on alternative institutions which control the mainstream financial flows and the corresponding illegal ("metaphysical") constructions.

The propaganda of "absolute truths" (neoliberalism) has always been an introduction to apologetics, misuses (quasi-neoliberalism), the creation of alternative institutions (the promoter of the interests of privileged nomenclature), and the paradoxical realization of the concept of omnipotence.

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# Transfer Pricing In Emerging Markets

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## ABSTRACT

Purpose. The purpose of this article is to study the relevant areas of using transfer pricing as a corporate strategy, a model of commercial operations, and a mechanism for managing corporate finances. Methodology. The methodological basis of the study is a set of proposed tools and models for researching corporate business operations. Along with a model for analyzing the economic operations of an integrated enterprise based on improving the structural and functional approach and quantitative and analytical tools for functions assets risks analysis. The quantitative and analytical tools for the qualitative assessment of business operations of integrated operating assets of developing countries as part of holding-type parent groups have also been improved. Approach. The methodological approach takes into account the general requirements of the legislation of developing countries on the example of the CIS countries. The article describes the results of the systematization of the main characteristics of the transfer and transfer pricing. The authors examine in detail the transfer pricing methods that are most often found in the tax laws of developing countries. On the example of the CUP-method, recommendations on the use of this method in various business operations are described in detail. Findings. The article describes the experience from real practice of applying a methodological approach to the analysis of corporate operations, used by leading world-class consulting companies. The results can be applied both in scientific research of issues related to transfer pricing and in the practice of preparing tax reporting of assets from developing countries.

## INTRODUCTION

Owing to global integration processes, many large industrial enterprises of developing countries in recent years have joined the large transnational integrated corporate associations (holdings and groups). The competitive advantages that these business structures have and use are based on the use of optimization schemes and tools of the corporate management system, which include

the transfer pricing mechanism. The main goal of the corporate business structure is to maximize consolidated profits, and among the key strategies, the priority is occupied by the functional ones:

– price;
– commodity;
– marketing;
– innovation and investment;
– strategic development of personnel;
– IT and logistics (Adams and Drina, 2008; Forkiewicz et al., 2015).

It should be noted that the pricing strategy requires the observance of clear principles of pricing tactics. Managerial internal prices and tariffs are established for goods, services and other objects of transfer of holding structures between themselves. An effective mechanism must be created that establishes the principles for conducting business operations at special internal (transfer) prices (tariffs). Goals, methods, approaches to setting prices (tariffs) should be defined, as well as instruments of influence and implementation of holding strategies (Ugrovata, 2014; Worldwide Transfer Pricing Reference Guide, 2015). The point at issue is the transfer pricing mechanism. This mechanism is most often used by enterprises and companies that are part of a single holding business structure, when carrying out commercial operations among themselves. In this case, such prices and tariffs are used that do not necessarily correspond to the market level. Thus, a kind of redistribution of the financial resources of the holding is carried out, aimed at optimizing the consolidated profit at the highest level of the corporation. In particular, this is achieved by the following:

– reduction of production costs (due to savings on the services of related companies, ensuring the successful flow of key operational business processes at internal corporate prices/tariffs);
– tax optimization. Hence, if there are enterprises and companies (in the portfolio of the holding group) that are located outside the national economy, i.e. in places where the income tax rate (corporate tax) is lower, the company receives a large profit in this case. This is what allows owners of large corporate structures to optimize (reduce) the taxable income of a business (Dicken, 2007; Daxkobler, 2014, Fomina).

It is worth noting that at present, practically all over the world, transfer pricing is a fairly common strategy, pricing model and mechanism at the same time, which is used by corporate structures of various business sectors. This is due to the effectiveness of using this mechanism (Baker, 2014; Sadang, 2017). Besides, most often, the effect of using transfer pricing is determined by the strategy of location of cost centers (manufacturing enterprises) in developing countries and countries with weak economies. At the same time, income centers are opened in offshore and low tax jurisdictions, and head offices – in developed countries with a strong economy and a working legal base (Forkiewicz et al., 2015; Garcia-Bernardo et al., 2017).

Such a strategy is very beneficial for the holding itself, but it harms the state budgets of developing countries as a result of a shortfall in part of the fairly earned profit of the national manufacturing enterprises that are part of such holding structures. After all, redistributed capital through the use of transfer pricing is sent to offshore zones and countries where it is taxed at minimum or zero rates (Model Tax Convention on Income and on Capital, 2010; Model Double Taxation Convention between Developed and Developing Countries, 2011).

This problem stimulates both national state bodies of developing countries and international organizations (in particular, the OECD, specialized UN units, etc.) to look for ways to counter the withdrawal of capital from developing countries (economies). Such measures include BEPS, MLI, etc. (OECD, 2010; Hofmann and Riedel, 2020). However, there is a problem of revealing the facts of the use of transfer pricing by national enterprises and corporations, since the tax authorities' control systems (of such cases) in developing countries have not yet been developed. This necessitates the analysis of intra-group corporate commercial operations adapted for developing countries

(economies), which, in fact, is the subject of this study (Gudehus and Kotzab, 2012; Cooper et al., 2017). Thus, the research issues addressed in this study are as follows:

- study the terminology of transfer pricing, propose an approach to the classification of corporate transfers, objects of international internal corporate operations;
- analyze the tax laws of developing countries (on the example of the CIS region);
- develop a methodological approach (adapted for developing countries) to analyze the use of transfer pricing in commercial transactions between linked assets of international corporations.

## 1. LITERATURE REVIEW

Most often, transfer pricing refers to the process of generating prices for goods or services that are different from the market level, for assets that are linked together within integrated structures (holdings and groups) (Klassen et al., 2017; Davies et al., 2018). The results of the analysis of existing scientific approaches to the definition of the concept and scope of transfer prices indicate the following. The transfer price is an extremely important object of corporate accounting and planning in companies that are part of the organizational structures of transnational integrated holdings and groups. The optimization effect of transfer prices in the system of corporate management accounting in the activities of integrated enterprises and companies is aimed at maximizing the efficiency of the holding (group) as a whole (Adams and Drina, 2008; Sadang, 2017).

It should be noted that in the world, especially in developing countries (including countries of the CIS region, China, India, UAE, Turkey, etc.), the number of scientific publications in the field of transfer pricing is growing every year, more and more scientists are joining to study this issue (The Law of the Republic of Kazakhstan, 2008; Federal Law of Russia, 2011; Baker, 2014; Arnold, 2016; Cabinet of Ministers Resolution of Ukraine, 2016). Many scientists offer their own approaches to the definition of the terms “transfer price”, “transfer pricing”, but everyone agrees that these are:

- parent group’s control mechanisms;
- cash flow management tools within the holding structure;
- instruments of protecting transnational corporations (TNCs) from adverse taxes, foreign exchange control, tariffs, state restrictions on operations with profit (Countries updates – Global transfer pricing insights within reach, 2017; Nagpal and Dutta, 2019).

In general, the category “transfer price” consists of two economic terms – “price” and “transfer”. The category “price” is fundamental and already well-studied in economic science and thus the authors have decided to focus on the essence of the term “transfer”. This term has a multiple spectrum of meanings, but most often it is used to denote free movement of cash or material assets between subjects of economic relations. In particular, in the budget process, it means the transfer of funds between entities of the general government sector on an irrevocable and gratuitous basis. In the preparation of the country's balance of payments – the free provision of economic values (goods, services or financial assets), in banking – the transfer of funds without changing their owner, etc. Often, authors disclose the economic nature of transfer pricing using the categories of “internal firm value” and “internal firm marginal utility” within the framework of value and marginalist price theories. Such authors also note that in organizations with a high degree of decentralization of managerial functions, structural units have significant freedom in making economic decisions (transfer prices carry out accounting, measuring, balancing, stimulating, redistributive functions, etc.- Curtis, 2008; McNair et al., 2010).

On the other hand, in the conditions of strict centralization of internal business processes, the transfer price is primarily informative, that is, to perform only an accounting and measuring function. From the point of view of researchers, in the framework of the theory of enterprise economics,

the transfer price should be considered as an important component of the internal economic mechanism of the enterprise. While such a mechanism is based on decentralized management and the expansion of the responsibility of structural divisions for business results (Forkiewicz et al., 2015). Among the methods of transfer pricing, the market method is primarily used, double transfer pricing is also of interest. This system is often based on a synthesis of two approaches to setting the transfer price, namely:

- the market method for departments: an intermediate product is bought in the domestic market and, after its processing into the final one, it is sold in the foreign market;
- cost method for departments that produce an intermediate product and then sell it to other departments. Double transfer prices do not allow obtaining balanced data in management accounting, which requires the introduction of certain adjustments to units' performance. Double transfer pricing is not very common in practice, since it does not stimulate cost savings and does not give clarity to responsibility center managers on the level of decentralization (OECD, 2010; Model Double Taxation Convention between Developed and Developing Countries, 2011).

Currently, general accounting in TNCs (transnational corporations) can be divided, as a rule, into two subsystems – external financial and internal – management (production, operational). The management accounting system is associated with responsibility centers acting as accounting objects. In turn, the object of management accounting is the results, which can also be taken into account at the place of occurrence of costs and cost carriers. In the process of comparing the costs and results of various accounting objects, the effectiveness of production and economic activity is revealed. To ensure economic relations between the internal divisions of the enterprise, a transfer pricing system is being created (Porter and Schwab, 2008; The official website of OECD, 2020). The transfer price is the price used in the calculations between the internal structural divisions of the enterprise, they transfer products, works and services to each other (Urquidi, 2008; Worldwide Transfer Pricing Reference Guide, 2015). At the same time, in a number of international publications (devoted to transfer pricing), it is noted that transfer pricing is the process of establishing internal estimated prices (other than market) between units of one control center, as well as the sale of goods and services in a circle of related parties. The transfer pricing mechanism is inherent in transactions between related parties and is based on non-market factors, in business practice it is customary to refer to one of the classical optimization schemes of tax planning. In this regard, the main task and, accordingly, the starting point for building the foreign economic policy of tax legislation is to achieve a balance of interests of the jurisdiction and the taxpayer. So that the latter, for the purpose of reducing the tax burden, will not go beyond both geographical and legal borders. The authors argue that transfer prices are used in various sectors of the economy:

- by state statistics authorities when calculating price indices;
- in the banking sector, the transfer price is equal to the concept of the transfer rate that is established for the distribution of income and expenses in the structural divisions of one bank (Dicken, 2007; United Nations, 2013).

There is also another approach to the interpretation of the transfer price, according to which the transfer price is the internal estimated price at which the sale of goods (services) takes place. This proposal of scientists does not sufficiently reveal the essence of the use of transfer prices in modern business conditions. Adherents of this approach believe that transfer prices are used as a tool for:

- implementing the planning and control functions;
- regulation of corporate relations based on specialization and cooperation of production;
- implementation of planned volumes and structure of production;
- provision of raw materials and supplies within a single technological cycle;
- ensuring high quality of products (Pendse, 2012; Helminen, 2016).

In general, in the practice of corporate relations, the transfer price performs the same functions as the market price. Among these functions, the most important are measuring and stimulating. The first is manifested through the accounting of production costs for an intra-company transaction, the second – through the profit accounting, which is calculated in accordance with the structure of the transfer price. Regarding the scope of application, transfer prices apply:

- firstly, in profit centers and investment centers of large corporate structures. Sometimes they are used in cost centers. The motivation for using transfer prices is based on the regulation of cash flows between enterprises and tax optimization in the process of product sales by one structural unit of the corporate structure to another;
- secondly, transfer prices can be applied within the framework of one legal entity, but this person is a structural unit of the corporate structure and most often is the center of profit. The goal of this company is to maximize the profits of the entire corporation by increasing the profits of individual financial responsibility centers (hereinafter – FRC) participating in the production chain (OECD, 2010).

# 2. METHODS

## 2.1 Research Design

Let us consider the main aspects and highlight the legislative and regulatory framework for transfer pricing of developing countries on the example of the countries of the CIS region. Thus, in the CIS countries (such as Russia, Ukraine, Kazakhstan), there are laws establishing and regulating the transfer pricing mechanism at national enterprises that are parts of corporate integrated structures. Namely, laws on amendments to the tax codes of countries regarding transfer pricing (for example, in Russia such a law was adopted in 2011, in Ukraine – since 2013) (The Law of the Republic of Kazakhstan, 2008; Federal Law of Russia, 2011; Cabinet of Ministers Resolution of Ukraine, 2016).

Articles of tax codes related to transfer pricing, enshrined in these laws, are mostly based on "OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations" (2010). The key principle of using transfer pricing in corporate business transactions is the principle of an outstretched hand, the main point of which is to comply with the principle of market price that related companies must follow. The aforementioned laws usually regulate that transfer prices are applied in transactions between related parties, the volume of which exceeds the established limit for the corresponding calendar year, that is, these transactions will be treated as controlled. Besides, according to the laws, operations equated with controlled operations may fall under control. As in international practice, and in accordance with the national laws of the CIS countries, the latter include operations in the field of foreign economic activity. While the subject of foreign economic agreements-goods of world exchange trade (oil, metal, mineral fertilizers and other goods) and one of the parties is a non-resident having offshore status.

Analyzing the legislative framework on transfer pricing of a number of developing countries, it is easy to notice their close relationship and common features among themselves. In the case of the CIS countries, this is due to a common historical past, the principles of economic activity by enterprises and their associations. Many key legal acts and regulations contain similar information, distinguishing features are found in the following:

- establishment of operations equated to controlled. This criterion includes operations between persons who are not related, if they do not perform any additional functions in the agreement, except for the sale of goods (services) to a person associated with the participant in the operation. It is also interesting to consider the position of the legislator on the inclusion in this criterion of transactions with enterprises that declare losses for the last two tax periods.

– according to the norms of the tax legislation of the CIS countries, a business transaction may be deemed controlled by a court decision.

At the moment, the United States has the most developed legislative and scientific-methodological base in the field of the functioning of the transfer pricing mechanism at integrated companies. The US has accumulated rich experience in controlling transfer pricing. Transfer Pricing is governed by section 482 of the United States Tax Code (Internal Revenue Code Section 482) (Transfer pricing in the USA, 2019). It is worth noting that the theoretical and methodological basis of the United States Tax Code, like most developing countries, is the "OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations". Despite the latter, the American analog contains specific practical recommendations based on the experience of world transnational corporations in various fields of business and economic activity. Another important fact is that the American transfer legislation, unlike the analogs of developing countries, regulates in more detail the procedure for applying a certain pricing method in relation to specific types of transactions. For some types of transactions, pricing methods are explicitly specified in the regulatory document. The use of a method not stipulated in the tax code in the United States is allowed only if the taxpayer proves that this method most reliably complies with the "arm's length principle". Evidence must be documented. At the same time, the taxpayer takes all the same measures as in the case of justifying the stipulated pricing method (Transfer pricing in the USA, 2019).

In the recommendations on documentation when concluding a price agreement, the legislation of developing countries (for example, the CIS – Russia, Ukraine, Kazakhstan) discloses the order of evidence in a way similar to that in the USA. Namely, each of the recommended methods is consistently assessed and by exclusion the optimal pricing method is selected (The Law of the Republic of Kazakhstan, 2008; Federal Law of Russia, 2011; Cabinet of Ministers Resolution of Ukraine, 2016). When considering the Law "On Transfer Pricing" in the Republic of Kazakhstan, it should be noted that it has been adopted earlier than in Ukraine and Russia (2013 and 2011, respectively) – back in 1995. Its last revision – July 5, 2008. Among the features of the Law, there are many differences in the interpretation of the main provisions (despite the similarities in essence):

– Firstly, the detailed description in this law of the "arm's length principle". The principle that is used to determine the market price taking into account the price range. It is based on a comparison of the terms of transactions between related parties with the terms of transactions between independent parties performing transactions at a market price, determined in the manner prescribed by this law;
– Secondly, the presence of such categories and concepts as differential, price range, price information source, etc. The very concept of transfer price (transfer pricing) in the legislation of Kazakhstan is the price that is formed between related parties and (or) differs from the objectively forming market price, taking into account the price range (controlled by this law) for transactions between independent parties.
– Thirdly, the differences between determining the composition of participants, which can be characterized as "related parties", a broad approach to determining the procedure for monitoring cases, etc.

Essential common features are sole methods for determining the transfer price in the legislation of all three countries – Kazakhstan, Russia and Ukraine; the use of the "arm's length principle", a system of certain fines and sanctions in relation to violation of the law, etc. It should be noted that the system of legislation in Kazakhstan in this area is distinguished by the presence of a wide database of information resources, the data of which in one form or another are recognized by the courts as the basis for applying adjustments. The number of similar features of the legislation regarding transfer pricing (adopted at the moment in more than 60 countries of the world) can be explained by the fact that the legislation of post-Soviet countries is mainly based on the provisions of the OECD guidelines. However, such legislation still has local specificity and, unfortunately, does not yet contain practical recommendations based on the experience and realities of the economic activities of national companies.

## 2.2 Data Analysis

In this section, the authors analyze in more detail the main factors influencing the use of transfer pricing, its methods. On a specific example, the authors consider the correct choice of the transfer pricing method. Typically, the transfer prices are determined by the internal policies of the corporate structure – the group or holding. Transfer prices are extremely important because they determine the taxable base of profit in the countries in which the group units (involved in business operations) are registered. These are the operations on the sale of finished products, purchase of raw materials, stocks, semi-finished products, financial transactions, including provision of loans in favor of related parties, etc. Hence, transfer pricing is an object of close attention on the part of:

- tax management of international groups, as this may affect the amount of profit subjected to income tax (corporate tax) in various jurisdictions in which international group's structural business units are involved in intercompany transactions with each other in order to generate the maximum amount of total corporate profit;
- tax authorities that are concerned that the use of this mechanism by groups can negatively affect the amount of income earned on income taxes (corporate tax) in their country.

Therefore, international companies and tax authorities require a certain standard to agree on what the transfer price should be. The standard in question is applied in the jurisdictions of most developed countries of the world, and is based on the "arm's length principle" proposed by the OECD. This principle determines whether the terms of transactions (that fall under the transfer pricing rules) comply with the following conditions. Namely, the conditions that would have occurred when similar transactions were carried out between entities independent of each other (OECD, 2010). In practice, it is practically impossible to find identical market operations between independent companies that could be compared with the analyzed controlled operation. Therefore, it will be optimal to find the most approximate transaction between unrelated companies that have the same subject of operation (referring to the object of transfer – goods, services, works, loans, etc.). Besides, these companies should operate in similar financial and commercial conditions, use the same business strategies in the market, have similar functions and risks. These conditions are a kind of parameters and are used in functional analysis, and also affect the choice of the pricing method by which the controlled operation will be tested in the economic analysis.

In accordance with the articles of the tax codes of developing countries (using the example of the CIS region), most often five transfer pricing methods can be applied, namely:

- comparative uncontrolled price method;
- resale price method;
- "cost plus" method;
- net profit method;
- profit distribution method (The Law of the Republic of Kazakhstan, 2008; Federal Law of Russia, 2011; Cabinet of Ministers Resolution of Ukraine, 2016).

On the other hand, the choice of the method is also significantly affected by the structure of the transaction (composition of its participating companies) and the degree of its complexity. The structure of the transaction may include the following:

- manufacturers;
- distributors;
- transport companies;
- logistics operators;
- service providers (repair services, equipment installation, etc.);
- financial facilities;
- banking structures;

- management companies of the group (for example, in purchase-sale transactions of large assets, corporate rights to enterprises, etc.);
- end consumers, etc.

The specificity of pricing mainly affects the availability and accessibility of information on the conditions for the implementation of similar transactions between independent companies. The latter is necessary for a comparative analysis in the preparation of documentation and a report on controlled transactions. Basically, this is information about:

- prices (comparative uncontrolled price method, resale price method);
- financial and accounting reporting data of companies necessary for calculating profitability indicators (Cost Plus methods, net profit method);
- calculating the market interquartile range;
- ability to conclude whether the price in the analyzed operation is included in a given price range or profitability.

The authors consider in more detail the comparable uncontrolled price method (hereinafter – CUP method), used in OECD Transfer Pricing Guidelines for Multinational Enterprises and Tax Administrations. Let us consider the conditions for using this method and give practical examples that will allow one to more clearly understand how and where exactly this method is the most optimal for use. In general, the CUP method involves comparing the price used in a controlled operation with the price set for identical or homogeneous goods. Besides, the analyzed operation is compared with independent operations between independent counterparty companies. In order to apply this method, it is necessary to use information on agreements concluded for the purchase/sale of identical (or homogeneous) goods by the taxpayer or other persons, in comparable financial and commercial conditions in the relevant goods market. In the practice of transfer pricing in the CIS countries (Russia, Ukraine, Kazakhstan), the CUP method is usually used in two cases:

- based on information about comparable business transactions of a company participating in a controlled operation. The operations of this company with other independent counterparties are analyzed whose operations are not subject to the control of transfer pricing rules in the state;
- based on information about comparable transactions in general between third unrelated counterparties and comparing them with the price in the analyzed controlled transaction.

Let us give an example of the application of CUP method. In the example, it is proposed to consider the application of the CUP method when analyzing external prices. This is a more frequent case and is explained by the fact that it is usually quite difficult to find other operations of the company in question with unrelated counterparties. Namely, the operations that occur under conditions comparable to the studied one, or the subject of which is completely similar goods or services. *Example. 5 May 2016. Company A, located and registered in accordance with US law, exported coal mined in its own mine to a related Ukrainian company B. The price of goods is X dollars per ton. Delivery is carried out under the terms of CIF for the Ukrainian logistics metal center through Odessa State Commercial Port (Odessa, Ukraine). The price does not include all shipping costs associated with the delivery of goods.*

Thus, in this example, the commodity that is the subject of the transaction – coal – is included in the approved (in accordance with the Cabinet of Ministers' Decree as of September 8, 2016 No. 616) list of goods to be quoted on world exchanges (Cabinet of Ministers Resolution of Ukraine, 2016). Namely, it belongs to the group “Coal, anthracite, pulverized or non-pulverized, but not agglomerated, other” (according to Ukrainian classification of goods of foreign economic activity UCGFEA). In order to establish compliance of the conditions of controlled operations with the “arm's length principle”, namely the search for homogeneous operations for the export of coal, it is

advisable to use the information available on the following resources for this group of goods. Namely, such as European Energy Exchange (EEX), Intercontinental Exchange, Chicago Mercantile Exchange (CME) and New York Mercantile Exchange (NYMEX). It is worth noting that it is necessary to start searching for external comparable quotes in the case when one is convinced that the company in question has not carried out other uncontrolled transactions with unrelated persons. Namely, the transactions that are homogeneous in relation to the controlled company. Thus, it will be possible to use the internal price method to apply the CUT method. On the CME portal, average quotes (that is, average consumer prices) for coal on the European market were found, which, for example, are presented in the Platts agency database published for the period from May 1, 2016 to May 30, 2016. It is worth noting here that in the search process it is necessary to pay attention to:

- comparable types of coal that are listed on the exchange according to the European classification and decide whether they can be compared with the domestic type B coal.
- delivery basis according to INCOTERMS classification (in this case, it would be appropriate to look for delivery conditions CIF European ports).
- coal is supplied from the producer (as in this case), or through resellers, in which case one needs to reject such quotes.

The authors also draw attention to the fact that in this case spot prices are indicated (not long-term prices), that are formed on the market at a certain point in time (in this case, on a date close to the contract under consideration). The latter allows judging that this is exactly the price at which independent producers sell their goods to independent distributors. Let us assume that we have been able to find comparable quotes for coal for the selected period – May 2016. Next, one forms a sample, and now a task is to calculate the market price range in order to determine whether the price in the analyzed controlled operation is included in this range. That is, whether it is a market price (if included) or a transfer price (if not included in the calculated range). However, before this can be done, the necessary adjustments must be made. For this it is necessary: *firstly*, to adjust for the amount of freight (if quotes are found for contracts that differ from the CIF conditions, for example, FOB). In this case, one should pay attention to the fact that CIF includes freight, and FOB – not, therefore, if one does not make the necessary adjustments, the prices will be quite significantly different from each other; *secondly*, adjust for transportation costs. Different delivery ports and distances also affect the shipping cost included in the price of goods. It is also necessary to evaluate, whether the price in question includes the cost of transporting cargo to the enterprise after its shipment, let us say, in the port of Mariupol. In our case, the price of coal does not include the cost of delivery and thus it is possible to make an adjustment. In other cases, it is very difficult to distinguish these delivery costs from the total price of the goods, which makes it difficult to use the CUP method. In some cases, it may also be necessary to conduct an economic analysis and find out the average delivery rate per ton in the period under review. In our case, this is May 2016. For example, in the studied sample, there may be contracts under the terms of CIF Rotterdam, that is, coal is unloaded at the port of Rotterdam (Netherlands), and then, for example, it can be transported to the customer. Therefore, one needs to see what difference in the cost of delivery will be between such a contract and the analyzed operation; *thirdly*, attention should be paid to the difference in the currency of the contracts under which operations are carried out. For example, if an operation is found in euros, then one needs to convert the price of coal into US dollars in accordance with the euro/US dollar rate on the date of transaction; *fourthly*, attention should be paid to the possible use of discounts or premiums on goods. This can be a one-time operation, but usually, operations at a spot price are carried out for fixed volumes of goods delivery, that is, discounts on large tonnage are possible, or, on the contrary, allowances that can be charged for small and/or one-time consignments. In this case, the price will also need to be adjusted for the size of such allowances or discounts. The considered case, when the CUP method is used in operations with goods (that are listed on exchanges) is quite common. Besides, as already noted, it is often used in financial transactions.

## 3. RESULTS

A theoretical analysis of the national base of scientific economic sources also did not reveal exact definitions of “transfer mechanism”, “mechanism of transfer pricing”. In order to give an exact definition, it was decided to pay attention to existing approaches to determining the most important component of this concept – “transfer” and possible areas of its use. An analysis of the results of research and development of scientists found that modern scientific sources of information lack exact definitions of “transfer” (as an object of corporate distribution processes), “transfer mechanism”, and “transfer pricing mechanism”. Only a superficial attempt was made to develop methodological approaches to the classification of corporate transfers, transfer mechanisms operating in large industrial holdings and groups. It is proposed to consider “transfer” as an economic category that is used to determine the objects of transfer between related divisions within the same corporate structure on financial and commercial terms that are different from market ones. The main goal of such a transfer is to optimize the pricing process and to avoid double counting of these objects of movement in order to optimize corporate taxation. Theoretical approaches to the definition of “transfer” are summarized, systematized and illustrated in Figure 1.

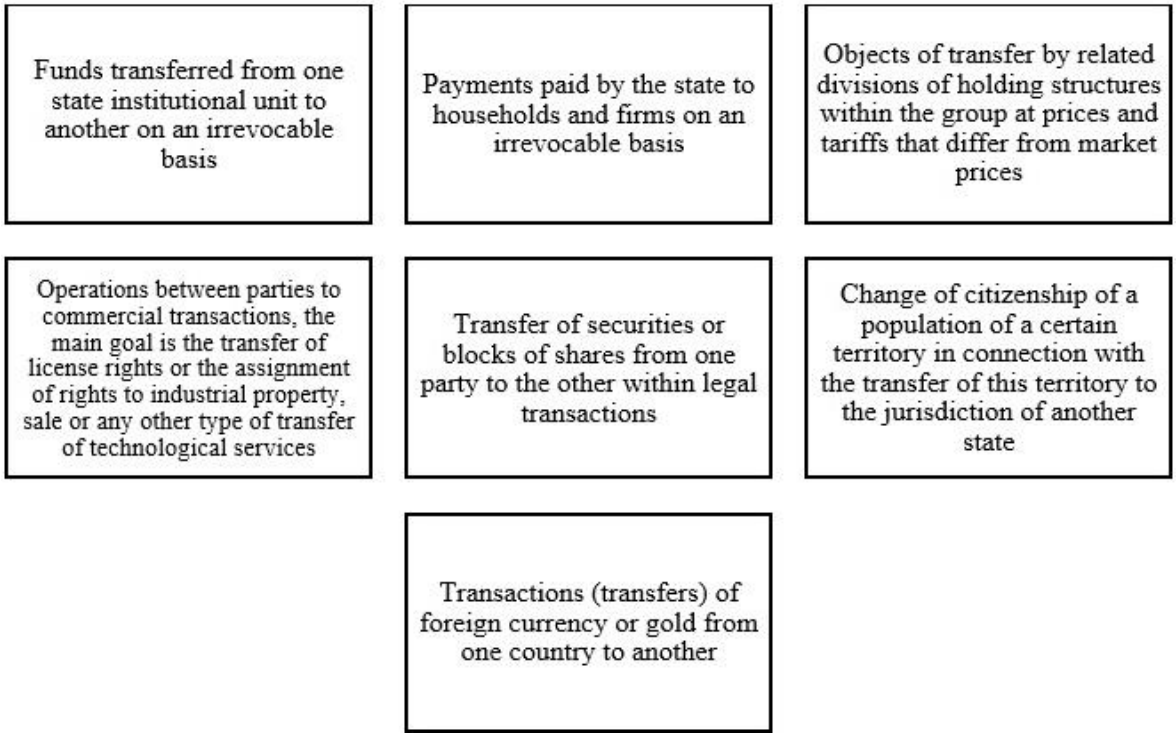


**Figure 1**. Theoretical approaches to the definition of "transfer"

Source: elaborated by the authors

In the current study, it was decided to clarify the concept of “transfer” specifically applicable to intragroup corporate operations at prices and tariffs other than market ones. According to this, the scope of operation is transnational corporate structures (holdings and groups). In general, it is worth noting that it is necessary to develop a theoretical and methodological framework for the functioning of transfer pricing mechanisms in an integrated enterprise. Thus, national enterprises will be able to prove that prices set for manufactured products or services are ordinary and not transfer. They will also have the opportunity not to adjust their tax base, paying the amount that the state loses as a result of applying transfer prices (which is required by national legislation in this area). Besides, the state tax authorities will be able to create a kind of mechanism that will

allow controlling the amounts that the state budget loses due to the use of transfer pricing mechanism by integrated enterprises. In addition, this will allow the company to optimize its own pricing system and taxable income base. Methodological approach to effectiveness analysis of transfer pricing mechanism in an integrated enterprise (hereinafter – methodological approach) is illustrated in Figure 2.

| | |
|---|---|
| Methodological approach to analyzing the impact of the corporate transfer pricing strategy on business operations | 1. Grouping and systematization of information on the totality of company's business operations for the reporting period - use of international financial reporting databases (developing countries use: SPARK, AMADEUS, RUSLANA, TEUMPHSON ROEYTERS, Blumberg) |
| | 2. The formation of a database of comparable operations of companies-counterparties:<br>-comparative characteristics of markets<br>-systematization of financial and commercial conditions for comparable operations |
| | 3. Operations analysis:<br>-subject analysis<br>-functional analysis - FAR (Functions / Assets / Risks)<br>- economic analysis |

Figure 2. Methodological approach to analyzing the impact of the corporate transfer pricing strategy on business operations

Source: elaborated by the authors

It should be noted that this methodological approach was developed on the basis of the practice of commercial relations between production and marketing companies that are part of international corporations in a number of business segments (The official website of OECD, 2020; The official website of the group “Marsegaglia”, 2020; The official website of the group “SCM”, 2020; The official website of the Group ArselorMittal, 2020). It is necessary to develop an algorithm for detecting controlled operations of an enterprise that uses a transfer price system. The comparative analysis procedure should be structured for comparability of commercial and financial conditions of transactions of an integrated enterprise. For these purposes, it is recommended to use a model for verifying whether integrated enterprise's business operations:

- can be controlled;
- comply with regulatory provisions of national legislation on transfer pricing and practical recommendations of OECD and UN Department of Economic and Social Affairs.

Typically, such models are described in tax law. Particular attention in the proposed methodological approach is also focused on the functional analysis of operations. It was decided to improve functional analysis in the form of FAR (Functions Assets Risks) – analysis described in OECD methodologies. This analysis is a three-step analysis of the following:

- functions performed by enterprises that are parties-contractors in relation to each other under the contracts of sale of goods (works, services);
- risks that the parties assume in the production and sale of goods;
- assets that the parties attract to produce goods or provide works/services.

It is also important to analyze the commercial business strategies of the counterparties and the main sales markets for goods. The assets of the holding or group operate according to a single global strategy, respectively, the process of its implementation is controlled by the managing company. It is also necessary to take into account the nature of the financial obligations undertaken by the parties, to analyze the features of the established relations and the terms of contracts between the parties to the transaction, and analyze the economic conditions of the parties to the transaction. Functional analysis opens up an idea concerning company's interaction with its interdependent and associated enterprises and companies and their respective functional roles in controlled operations. This view allows one to understand how corporate relations between companies of one integrated holding affect the price of goods (works/services) in a transaction and the level of profit that is received as a result of a transaction. From the point of view of the OECD and the UN Department of Economic and Social Affairs, high income can be obtained as a result of transactions with the highest level of asset utilization and the highest risk. Characteristics of the level of risks, functions and assets are reflected by the corresponding symbols for the degree of growth (*, **, ***). It is proposed to improve this methodology by supplementing it with the ten-point rating scale. Accordingly, the lowest levels of risks, functions and asset utilization correspond to 1-3 points; the average level – 4-7 points, and the highest – 8-10 points. Thus, an improved quantitative and analytical toolkit for a qualitative assessment of the business operations of integrated companies within a holding/group is presented in Table 1.

**Table 1**. Quantitative and analytical tools for the qualitative assessment of business operations of integrated operating assets as part of holding-type parent groups in developing countries

| OECD Symbol | Ten-point rating scale | Risk level | Functional Comparison | Asset utilization |
|---|---|---|---|---|
| - | 0 | Minimum | Minimum functions | Virtually no assets used |
| * | 1-3 | Least risk | Low functions set | Minimum asset utilization |
| ** | 4-7 | Medium risk | Middle functions set | Average asset utilization |
| *** | 8-10 | Highest risk | Maximum functions set | High asset utilization |

Source: elaborated by the authors based on Ugrovata (2014), OECD (2010)

These results can be embodied as the basis for improving transfer pricing models (as part of tax planning strategies) used by developing countries in the post-BEPS world. These are typical CA, FFD, LRD models. Besides, in the structure of these models (as a direction for future research), it is recommended to add protection tools for the still rather weak tax legislation of developing economies. That is, protection against the withdrawal of profits from the states in which such profits are created to low-tax jurisdictions that are “convenient” for corporations in order to minimize general corporate taxation, which, in turn, affects the budgets of developing countries.

## 4. DISCUSSION

It is believed that the transfer pricing mechanism should be considered as an integral element of the internal subsystem of the system for ensuring the functioning of transfer mechanisms in integrated holdings, along with the following:

- corporate clearing mechanism (which is a transfer one);
- the internal corporate insurance and credit mechanism (the system of functioning of funds created by the holding management company structure, implemented through effective inter-

nal mutual lending);
– the movement of capital and other financial resources in both domestic and international directions (Carson et al., 2000). From the authors' point of view, these conclusions are true, but it should be noted that in this case only the financial aspects of transfer mechanism functioning in corporations are covered (Adams and Drina, 2008; Daxkobler, 2014).

Many tax specialists note that the use of the transfer pricing mechanism along with the negative consequences has a positive factor – it eliminates the problem of corporate double taxation. Double taxation in an international vertically integrated structure can be divided into:

– domestic taxation;
– external taxation (OECD, 2010; Helminen, 2016).

Internal double taxation occurs when the same tax is levied on each structural business unit of the holding in the process of moving inventory flows in cash within one country. External double taxation causes a contradiction in the definition of the object of taxation in the national laws of different countries where the holding's main and subsidiary companies are located (Porter and Schwab, 2008; Tsindeliani, 2016). However, at the same time, other scientists rightly note that in most developing countries of the world, where the cost centers of international corporations are located, transfer pricing is still used for reducing the corporate tax burden. The consequence is the lack of sufficient income to the state budget for corporate income tax (Plasschaert, 2005; Lifting the mist, 2019).

The most common methods for eliminating the problem of international double taxation in the country where holding is registered are tax credit, tax exemption and tax benefits (Plasschaert, 2005; Hofmann and Riedel, 2020). Undoubtedly, pricing is one of the important tools for managing the economy of enterprises (Gburová et al., 2013; Stevens, 2020). Currently, for large enterprises, the establishment and control of prices for settlements with relatively separate structural units are relevant. The problem is that a clear definition of domestic prices has not yet been formulated in accordance with national standards for accounting, reporting and current legislation. Therefore, for domestic enterprises, it is necessary to take into account world experience in the formation and use of domestic prices, which in holding structures are defined as transfer prices (Forkiewicz et al., 2015; Garcia-Bernardo et al., 2017).

The presented provisions and facts prove once again that the financial result of production may decrease not only due to a deterioration in the efficiency of these enterprises, but as a result of the manifestation of special cash flow management mechanisms that belong to transfer pricing mechanisms (Edmonds et al., 2016; Cooper et al., 2017). Transfer pricing mechanisms in the current global economy are of great importance in managing the economies of industrial enterprises from developing countries. The proper use of these mechanisms should reflect the economic interests of not only owners, but also society and the state as a whole.

## CONCLUSION

The processes of corporatization and consolidation have affected almost all areas of business in developing countries of the world. Thus, there is a need to revise traditional approaches to determining and analyzing the performance of industrial enterprises as part of international corporate structures. New methods and tools of enterprise management should also be developed. With the advent of the latest pricing mechanisms, which include the transfer pricing mechanism, it became possible for multinational companies to use profit tax optimization schemes by: a) transfer of goods to related companies within the framework of one business structure at prices below market (transfer); b) sale of goods at market prices; and c) – payment of taxes and fees to the budget in offshore zones, or countries with a preferential tax regime.

A study of the legislative and tax base of developing countries on the example of the CIS region on transfer pricing demonstrates the need to reform and supplement it in order to eliminate the main shortcomings indicated in the article and to strengthen the integration of national business in world market conditions. Despite the damage caused to the national economy as a result of non-payment of the objective amount of income tax, it should be recognized that transfer pricing is not only a means of tax evasion, but also an effective tool for: a) managing and increasing the competitiveness of transnational integrated holding structures; and b) economic growth in subordinate enterprises.

Transnational holding structures use the transfer pricing mechanism to improve business performance. In the organizational structure of the holding, a significant role is played by the delegation of duties and responsibilities of each unit for its economic results. This gives the base for the parent company to plan and implement strategic management activities at all levels of the hierarchical structure in order to optimize the cash flows. Corporate assets are allocated to centers of responsibility: centers of costs, investments, revenues and profits.

The main result of the study is the development of a methodological approach to the analysis of the impact of corporate transfer pricing strategy on business operations. The implementation of the proposed methodological approach in practice also focuses on the following: a) comparison of markets for goods (the geographical position of markets and their size, the presence on the market of homogeneous goods (works/services), the presence of competition in the markets and the relative competitiveness of sellers and buyers in the market, supply and demand, the level of government intervention in market processes, etc.); b) analysis of market (commercial) business strategies of the parties (market expansion strategies; supporting market strategies, etc.); c) clarification of the nature of financial obligations affecting the price of the transaction (credit agreements, sureties, etc.); and d) analysis of other financial and commercial conditions that significantly affect the price of goods (services/works) in the agreement.

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# Governmental Programming of Regional Budgetary Self-Sufficiency

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## ABSTRACT

In the paper, the impact of the features of the Russian model of performance budgeting on the problem of stably low levels of regional budgetary self-sufficiency is discussed. A methodical approach to the structural analysis of the governmental programs of territorial development is proposed, which makes it possible to check territorial proportions and levels of regional budgetary self-sufficiency at the stage of their development. The proposed approach is applied to the "Development of the North Caucasian Federal District until 2025" Governmental Program of the Russian Federation. It is assumed that the predominance of program activities (i.e. the provision of subsidies and budget investments in capital construction) of social nature in the Governmental Program unfolds a spiral of budget expenditures, contributing to the preservation or even reduction of regional budgetary self-sufficiency. Two experiments using mathematical methods for processing statistical data are performed. First, a hypothesis about the presence of negative feedback between the share of program activities of a market nature in the expenditures of the regional consolidated budget and the share of non-repayable transfers in its revenues is substantiated. Secondly, an approach to estimate the validity of the volumes of federal transfers allocated to the regions is proposed. For this purpose, an indicator of regional budgetary self-sufficiency potential is introduced. The information and analytical database of the research includes data on the execution of the regional consolidated budgets in 2001-2017 from the Russian Federal Treasury, as well as budget classification of the Russian Ministry of Finance. Conclusions and results of the work can be used by participants of the national strategic, including budget, planning to improve legislative and methodological foundations of the governmental program management. Further study is supposed to analyze the influence of the principles of the Russian budget system on the process of developing both federal and regional governmental programs, on the nature of relationship between them and, ultimately, on regional development.

# INTRODUCTION

One of the indicators of social and economic development is the regional budgetary self-sufficiency (hereinafter BSS), meant as the ability of regional administration to execute the expenditures of regional consolidated budget at the expense of internal sources of financing. Formally, the BSS indicator can be represented as one minus the share of non-repayable receipts[1] in the revenues of regional consolidated budget. Russia is practicing a rigid model of fiscal federalism, which is characterized by a high degree of centralization[2] of budgetary and fiscal powers. Under these conditions, federal intergovernmental transfers (hereinafter FITs), whose share is more than 90% in non-repayable receipts of the Russian regional consolidated budgets, are the main source of co-financing for the governmental territorial development programs.

FITs, however, do not have a noticeable effect on socio-economic performance of the Russian regions. Thus, when assessing the influence of FITs on fiscal behavior of regional authorities in the period of 1996-2006, the authors (Idrisova and Freinkman, 2010) identified the presence of the Flypaper effect, which traditionally refers to disproportionate impact of FITs on regional expenditures. Weak influence of the regional development programs on the socio-economic situation in the Russian macroregions in 1998-2006 was demonstrated in (Tatevosyan et al., 2004; Tatevosyan et al., 2009). In particular, it was revealed that during the specified period subjects of the South Federal District, as well as of the Trans-Baikal region and of the Far East, in which by 2006 the first stages of the corresponding regional development programs (namely, "The South of Russia" (2002-2006) and "Economic and social development of the Far East and the Trans-Baikal region for 1996-2005 and until 2010") had been completed, either did not change their position in the rating, or even worsened it. Another study (Yermakov, 2017) for the period of 1995-2013 also found no statistically significant effect of FITs on the problem of high inequality between the Russian regions in terms of socio-economic performance and BSS. Using data of public administration performance in the Russian regions, the authors (Gagarina et al., 2017) show that in 2011-2015 out of eighty subjects of the Russian Federation, only nine had a degree of socio-economic potential, measured with the help of 30 selected indicators, exceeding 40%. Dynamics of regional budgetary insufficiency[3] for subjects of the Russian Federation included in the North Caucasian Federal District (hereinafter the NCFD subjects) in 2001-2017, presented in Tables 1 and 2 generally confirms conclusions of the mentioned authors. Annual values of this indicator do not show a tendency to a steady decline, which is poorly consistent with the regular appeals of the federal center to the search for and activation of internal sources of regional development.

**Table 1.** Budgetary insufficiency levels of the NCFD subjects, 2001-2008, %

| *Region* | *Years* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *2001* | *2002* | *2003* | *2004* | *2005* | *2006* | *2007* | *2008* |
| North Caucasian Federal District | 62,52 | 66,74 | 64,83 | 65,42 | 64,52 | 63,93 | 69,90 | 67,35 |
| Stavropol Territory | 30,68 | 40,10 | 31,24 | 22,02 | 35,73 | 30,38 | 33,22 | 34,56 |
| Republic of North Osetiya-Alaniya | 55,71 | 64,17 | 70,72 | 63,85 | 63,31 | 60,31 | 61,95 | 72,37 |
| Republic of Ingushetia | 81,04 | 89,83 | 88,25 | 88,25 | 90,47 | 89,13 | 96,36 | 91,45 |
| Karachay-Cherkess Republic | 68,49 | 77,62 | 71,91 | 61,63 | 63,00 | 66,67 | 67,17 | 70,88 |
| Kabardino-Balkarian Republic | 56,48 | 69,39 | 72,78 | 65,06 | 65,36 | 57,63 | 60,09 | 57,37 |
| Republic of Dagestan | 83,06 | 79,95 | 78,99 | 77,57 | 79,12 | 76,59 | 78,50 | 72,86 |
| Chechen Republic | 99,51 | 82,68 | 87,63 | 92,89 | 86,85 | 88,82 | 92,67 | 90,68 |

[1] In accordance with article 3 of paragraph II (Classification of budget revenues) of the Guidelines on the Budget Classification of the Russian Federation (Approved by Order of the Ministry of Finance of Russia dated July 01, 2013 No. 65н) non-repayable receipts are an external source of the revenues of consolidated budgets of the Russian budget system.

[2] See articles 50 and 51 of the Russian Budget Code.

[3] In this paper budgetary insufficiency of a subject is defined as the share of non-repayable receipts in the revenues of its consolidated budget. That is, budgetary insufficiency and budgetary self-sufficiency, as can be seen from the definition of the latter, are indicators that are opposite in meaning.

**Table 2.** Budgetary insufficiency levels of the NCFD subjects, 2009-2017, %

| *Region* | *Years* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | *2009* | *2010* | *2011* | *2012* | *2013* | *2014* | *2015* | *2016* | *2017* |
| North Caucasian Federal District | 69,08 | 63,93 | 65,55 | 64,25 | 60,97 | 60,86 | 60,26 | 56,55 | 58,32 |
| Stavropol Territory | 37,85 | 33,87 | 38,07 | 33,84 | 33,55 | 32,46 | 30,78 | 27,89 | 30,32 |
| Republic of North Osetiya-Alaniya | 66,77 | 59,98 | 58,82 | 59,25 | 56,30 | 56,54 | 55,50 | 47,58 | 48,75 |
| Republic of Ingushetia | 90,73 | 89,03 | 83,82 | 86,40 | 85,03 | 86,50 | 84,61 | 85,98 | 81,30 |
| Karachay-Cherkess Republic | 71,07 | 68,20 | 63,85 | 72,92 | 68,52 | 64,96 | 65,64 | 59,30 | 65,47 |
| Kabardino-Balkarian Republic | 56,57 | 53,95 | 58,96 | 55,56 | 56,17 | 53,93 | 49,98 | 47,25 | 52,23 |
| Republic of Dagestan | 78,66 | 73,66 | 73,96 | 72,22 | 69,98 | 70,05 | 68,55 | 65,86 | 69,71 |
| Chechen Republic | 90,64 | 86,60 | 86,88 | 85,12 | 81,36 | 81,57 | 83,33 | 78,49 | 80,38 |

Calculated using the data on execution of regional consolidated budgets of Russia in 2001-2017 [6].

At the same time, the issue of the most important factors of low, and in some cases critically low, levels of regional BSS is not sufficiently studied. In this paper we propose to evaluate the impact of program structure (Premchand, 1989, p. 327), which means the list of planned (that is, timed and funded) subprograms, program activities and types of expenditures of a governmental program, on the dynamics of regional BSS. Program structure reflects logical links between program objectives and the means to achieve them.

## 1. GENERAL CHARACTERISTICS OF THE "DEVELOPMENT OF THE NORTH CAUCASIAN FEDERAL DISTRICT UNTIL 2025" GOVERNMENTAL PROGRAM OF THE RUSSIAN FEDERATION

The term of the "Development of the North Caucasian Federal District until 2025" Governmental Program of the Russian Federation (hereinafter the Program) is divided into 3 stages[4] and is 13 years. In 2013-2015 the first, preparatory, stage of the Program was completed. Most of its activities were implemented within the organizational framework of the federal special-purpose programs, which, as a residual[5] phenomenon, are included in governmental programs at the subprogram level. Therefore, program structure analysis at this stage is not carried out in this work.

During the second, main (2016-2020), and the third, prognostic (2021-2025), stages, the Program[6] involves implementation of twelve subprograms, namely:

- №1-№7 – subprograms of socio-economic development of the subjects of the North Caucasian Federal District: Stavropol Territory, the Republic of North Ossetia-Alania, the Republic of Ingushetia, Karachaevo-Cherkessia, Kabardino-Balkaria Republic, the Republic of Dagestan and the Chechen Republic);
- №8 – the "Development of the tourism cluster in the North Caucasian Federal District, the Krasnodar Territory and the Republic of Adygea" subprogram;

[4] Order of Russia's Council of Ministers of December 17, 2012 No. 2408-p "On adoption of the "Development of the North Caucasian Federal District until 2025" Governmental Program of the Russian Federation" and Resolution of Russia's Council of Ministers of April 15, 2014 No. 309 "On adoption of the "Development of the North Caucasian Federal District until 2025" Governmental Program of the Russian Federation".

[5] See paragraph 5 of Article 47 of the Federal Law No. 172 (June 28, 2014) "On Strategic Planning in the Russian Federation".

[6] Resolution of Russia's Council of Ministers of 27.02.2016 No. 148 "On Amendments to the "Development of the North Caucasian Federal District until 2025" Governmental Program of the Russian Federation".

- №9 – the subprogram of "Ensuring the implementation of the Governmental program of the Russian Federation "Development of the North Caucasian Federal District" for the period up to 2025";
- №10 – the subprogram of "Developing the infrastructure of the state information policy in the North Caucasian Federal District";
- №11 – the subprogram of "Creating a medical cluster in the territory of the Caucasian Mineral Waters and implementing investment projects of the North Caucasian Federal District";
- №12 – Federal special-purpose program of "Socio-economic development of the Republic of Ingushetia in 2010 - 2016".

The administrator of the Program is the Federal Ministry of the North Caucasus. The projected total funding of the Program is 319.9 billion rubles (in prices of corresponding years). It is well known that a program is a means of solving problems (Optner, 1969; Fonotov, 1972; Popov and Kosov, 1980; Agafonov, 1990). This is confirmed by examples from the world and Russian experience, such as the National electrification plan of 1921 in the USSR, the New Deal programs in the USA, national space programs, regional and infrastructure programs such as the Tennessee Valley Administration or the construction of Baikal-Amur Mainline, the French developmental programs of 1960-1970s for traditional and high-tech industries (De Long and Eichengreen, 1991; Tatevosyan and Magomedov, 2016; Langley, 2015). However, the current Procedures[7] for developing governmental programs in Russia do not provide techniques of problem analysis and alternative decision making. Objectives of the Program as a whole, as well as of its subprograms, do not reflect specific problems of this macro-region and consist in "creating favorable conditions for the growth of real economy of the North Caucasian Federal District" and in "improving the quality of life and well-being of its community". At the same time, the Program's administrator is going[8] to solve the problem of stably high levels of budgetary insufficiency of the NCFD subjects only through the implementation of program activities that contribute to "maximally possible tax and non-tax revenues of the Russian budget system from the development of new production sectors".

Thereby it is ignored that any budget is drawn up on the basis of the balance method (Yermakova, 2010). Consequently, a projected increase in tax and non-tax revenues cannot per se act as an indicator characterizing a decrease in the level of regional budgetary insufficiency and needs to be weighed against changes in expenditures of a regional consolidated budget. However, such an obvious omission is most likely a consequence of the practice of incremental financing (Berry, 1990), which has not yet been eradicated by Russian budget planners. Unfortunately, the current program budgeting model in Russia is unable to solve this problem. According to the Guidelines[9], a governmental program is retrospectively considered to be effective if its budget was distributed in time and in full. Article 22 of the Guidelines states that each program objective should be provided with "relevant and quantifiable indicators". Moreover, "*if the indicator is not included in the official statistics data, … explanatory documents for the draft governmental program should contain information on the procedure of collecting information and the method of its calculation*". Unfortunately, despite the fact that regional budgetary insufficiency is a quantitatively measurable indicator (see above) it is not found in the list of the Program's objectives.

[7] Decree No. 588 of Russia's Council of Ministers of 02.08.2010 "On adoption of Procedures of development, implementation and effectiveness evaluation of governmental programs of the Russian Federation".
[8] See the "Objectives of the Program" section of the Program's memorandum and the "Expected results of the subprogram" section of the memoranda of the subprograms for social and economic development of NCFD subjects in the wording of the Decree No. 390 of Russia's Council of Ministers of March 31, 2017 "On Amendments to the "Development of the North Caucasian federal district until 2025" Governmental Program of the Russian Federation".
[9] See article 55 of the "Guidelines for the development and implementation of the federal governmental programs" (approved by Order of the Ministry of Economic Development of September 16, 2016, No. 582).

# 2. PROGRAM STRUCTURE ANALYSIS

## 2.1 Subprograms

Since the federal budget is the only source of funding for the Program, subprogram analysis provides an idea of the nature of the federal policy in the North Caucasus Federal District. As can be seen from Tables 3 and 4, it is planned to distribute practically the same amounts of the Program's budget between the NCFD subjects (see subprograms №1-№7) despite significant differences in their geographical and socio-economic characteristics and the specifics of their problems. On the other hand, the distribution of funds between subprograms № 8, № 11 and № 12 demonstrates a significant bias in favor of some subjects of the North Caucasus Federal District due to the limitation of financial resources for the development of the others.

**Table 3.** Distribution of the Program's projected budget between subprograms in 2016-2020, %

| | *Main period* | | | | | |
|---|---|---|---|---|---|---|
| | *2016* | *2017* | *2018* | *2019* | *2020* | *Total* |
| *SP* № 1* | 5,3 | 4,2 | 3,7 | 4,2 | 4,1 | 4,2 |
| *SP № 2* | 0,9 | 4,2 | 3,7 | 4,2 | 4,1 | 3,8 |
| *SP № 3* | 2,6 | 4,2 | 3,7 | 4,2 | 4,1 | 3,9 |
| *SP № 4* | 10,9 | 4,2 | 3,7 | 4,2 | 4,1 | 4,6 |
| *SP № 5* | 4,8 | 4,2 | 3,7 | 4,2 | 4,1 | 4,1 |
| *SP № 6* | 10,4 | 4,2 | 3,7 | 4,2 | 4,1 | 4,6 |
| *SP № 7* | 6,9 | 4,2 | 3,7 | 4,2 | 4,1 | 4,3 |
| *SP № 8* | 9,4 | 22,7 | 25 | 34,7 | 38 | 28,9 |
| *SP № 9* | 4,2 | 1,7 | 1,7 | 1,4 | 1,3 | 1,7 |
| *SP № 10* | 0,6 | 0,3 | 0,3 | 0 | 0 | 0,2 |
| *SP № 11* | 17,2 | 45,8 | 47,1 | 34,7 | 32,3 | 37,4 |
| *SP № 12* | 26,7 | 0 | 0 | 0 | 0 | 2,3 |
| *Total* | 100 | 100 | 100 | 100 | 100 | 100 |

SP* – subprogram.

**Table 4.** Distribution of the Program's projected budget between subprograms in 2021-2025, %

| | *Prognostic period* | | | | | | *2016-2025* |
|---|---|---|---|---|---|---|---|
| | *2021* | *2022* | *2023* | *2024* | *2025* | *Total* | |
| *SP* № 1* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,2 |
| *SP № 2* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,1 |
| *SP № 3* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,1 |
| *SP № 4* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,5 |
| *SP № 5* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,2 |
| *SP № 6* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,5 |
| *SP № 7* | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 14,1 | 9,3 |
| *SP № 8* | 0 | 0 | 0 | 0 | 0 | 0 | 14,1 |
| *SP № 9* | 1,6 | 1,6 | 1,6 | 1,6 | 1,6 | 1,6 | 1,7 |
| *SP № 10* | 0 | 0 | 0 | 0 | 0 | 0 | 0,1 |
| *SP № 11* | 0 | 0 | 0 | 0 | 0 | 0 | 18,2 |
| *SP № 12* | 0 | 0 | 0 | 0 | 0 | 0 | 1,1 |
| *Total* | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

SP* – subprogram.

Thus, subprogram № 11 of "Creating a medical cluster in the territory of the Caucasian Mineral Waters and implementing investment projects of the North Caucasian Federal District" is located in the area of the Caucasian Mineral Waters, which is part of the Stavropol Territory. Activities of the "Development of the tourism cluster in the North Caucasian Federal District, the Krasnodar Territory and the Republic of Adygea" subprogram № 8 are implemented in the territory of Karachay-Cherkessia, Kabardino-Balkaria and the Chechen Republic in some years of 2016–2018. The impact of these facts on the regional distribution of the Program's budget is shown in Tables 5 and 6.

**Table 5.** Distribution* of the Program's projected budget between the NCFD subjects in 2016-2020, %

| *Regions* | *Main period* | | | | | |
|---|---|---|---|---|---|---|
| | *2016* | *2017* | *2018* | *2019* | *2020* | ***Total*** |
| Stavropol Territory | 23,7 | 51,1 | 51,8 | 39,4 | 36,8 | **42,3** |
| Republic of North Osetiya-Alaniya | 0,9 | 4,3 | 3,8 | 4,2 | 4,1 | **3,8** |
| Republic of Ingushetia | 30,8 | 4,3 | 3,8 | 4,2 | 4,1 | **6,3** |
| Karachay-Cherkess Republic | 16,4 | 4,3 | 3,8 | 16 | 16,9 | **11,4** |
| Kabardino-Balkarian Republic | 10 | 15,9 | 16,5 | 16 | 16,9 | **15,8** |
| Republic of Dagestan | 11 | 4,3 | 3,8 | 4,2 | 4,1 | **4,7** |
| Chechen Republic | 7,2 | 15,9 | 16,5 | 16 | 16,9 | **15,6** |
| *Total* | *100* | *100* | *100* | *100* | *100* | *100* |

**Table 6.** Distribution* of the Program's projected budget between the NCFD subjects in 2021-2025, %

| *Regions* | *Prognostic period* | | | | | | *2016-2025* |
|---|---|---|---|---|---|---|---|
| | *2021* | *2022* | *2023* | *2024* | *2025* | ***Total*** | |
| Stavropol Territory | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 27,9 |
| Republic of North Osetiya-Alaniya | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 9,2 |
| Republic of Ingushetia | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 10,4 |
| Karachay-Cherkess Republic | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 12,9 |
| Kabardino-Balkarian Republic | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 15 |
| Republic of Dagestan | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 9,6 |
| Chechen Republic | 14,3 | 14,3 | 14,3 | 14,3 | 14,3 | **14,3** | 14,9 |
| **Total** | **100** | **100** | **100** | **100** | **100** | **100** | **100** |

* Since the activities of subprograms No. 9 and No. 10 are of an auxiliary nature and are evenly distributed among all the subjects of the North Caucasian Federal District, their budgets are not included in the analysis.

It should be noted that there is a strong disproportionality in distributing the Program's budget between the NCFD subjects in its main period. Program budget of the Stavropol Territory exceeds the same indicator for the Republic of Dagestan by 9 times, given that these NCFD subjects are comparable[10] in terms of area, population and gross regional product. It should be borne in mind that the negative consequence of such a regional budget policy is the differentiation growth of socio-economic development in the NCFD subjects. The prognostic period of the Program is characterized by the same distribution of its budget both by year and by region. Both patterns can be viewed as a consequence of methodological failures of the modern Russian practice of public ad-

[10] The Gross regional product (at current basic prices) in 2015 and the territory of the Stavropol Territory exceed the same indicators of the Republic of Dagestan by 1.1 and 1.3 times, while the Republic of Dagestan is the leader in terms of population (1.1 times higher in 2015). Source: "Socio-Economic Indicators - 2017". Statistical database of Rosstat. Retrieved from: http://www.gks.ru (access date: 09/09/2018).

ministration to comply with the basic rules of performance budgeting (Yerznkyan and Magomedov, 2018; Artsishevskiy, 2014; Tambovtsev and Rozhdestvenskaya, 2016). Among them is a violation of the integrity principle of a regional program, which "does not boil down to a simple sum of individual events, but is an organic, multidimensional system of interrelated activities, which, although developed according to its own special laws, is entirely devoted to solving a regional problem" (Shniper, ed., 1981, p.111).

The violation of the integrity principle of a regional program in the modern Russian practice of public administration is possible due to the following facts, namely:

1) the process of developing governmental programs is subordinated to the budget planning process, as a result of which control events of any governmental program can be scheduled in detail only for every three years of the medium-term budget planning;

2) Administrator of a governmental program is entitled to change[11] program structure, namely the list of activities and the amount of their funding that appears from paragraph 2 of article 174.2. of the Budget Code of the Russian Federation and from article 30 of the Procedures;

3) the requirement of paragraph 6 of the Guidelines, stating that "governmental program of territorial development should coordinate activities to achieve the objectives of the socio-economic development of the relevant territory, as well as to ensure the implementation of complex projects that cannot be fully attributed to one of the sectoral governmental programs" is not fulfilled.

As a result, the Program itself is a list of autonomous developmental subprograms of the NCFD subjects. Eventually, when analyzing the Program' memorandum it is impossible to identify the future image of the regional landscape. The above is proof that governmental programs continue to put into practice the policy of incremental budgeting, although initially they were meant[12] to replace it.

## 2.2 Program Activities

First, all program activities were analyzed regionally on three characteristics, namely:

- ratio between the projected budget allocations to business sector and social sphere both for the whole program period and for certain years (table 7);
- ratio of individual subsectors (i.e. manufacturing sector, agro-industrial complex, transport and logistics, tourism and recreation) within business sector in program structure of the NCFD subjects for the entire program period and by years (table 8);
- stability of program expenditure flows distributed annually between individual subsectors within the business sector of each NCFD subject.

The analysis made it possible to distinguish three groups of the NCFD subjects, namely:

- first group: Stavropol Territory and Republic of Severnaya Osetiya-Alaniya;
- second group: Karachay-Cherkess Republic, Kabardino-Balkarian Republic and Chechen Republic;
- third group: Republic of Ingushetia and Republic of Dagestan.

[11] For example, as noted above, during 2012-2017 Russia's Council of Ministers approved four significant changes in the structure of the Program.
[12] Order of the Russia's Council of Ministers of 30.06.2010 No. 1101-p "On Adoption of the Program of the Russia's Council of Ministers on Improving the Efficiency of Budgetary Expenditures for the Period up to 2012".

**Table 7.** The Program's Projected expenditures on social development (SD) and on business sector (BS) in the NCFD subjects, %

| *No.* | *Regions* | *Years* | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | *2016* | *2017* | *2018* | *2019* | *2020* | *2021* | *2022* | *2023* | *2024* | *2025* | *2016-2025* |
| 1. | Stavropol Territory | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 76,4 | 97 | 97,5 | 97,3 | 96,6 | 86,7 | 88,8 | 88,8 | 88,8 | 88,8 | 94,1 |
| | social development | 23,6 | 3 | 2,5 | 2,7 | 3,4 | 13,3 | 11,2 | 11,2 | 11,2 | 11,2 | 5,9 |
| 2. | Republic of North Osetiya-Alaniya | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 0 | 74,5 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 98,4 |
| | social development | 100 | 25,5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,6 |
| 3. | Republic of Ingushetia | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 7,7 | 69,6 | 58,1 | 58,4 | 72,9 | 40,8 | 40,8 | 40,8 | 40,8 | 40,8 | 40,2 |
| | social development | 92,3 | 30,4 | 41,9 | 41,6 | 27,1 | 59,2 | 59,2 | 59,2 | 59,2 | 59,2 | 59,8 |
| 4. | Karachay-Cherkess Republic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 34,7 | 68,9 | 100 | 100 | 90,1 | 61,1 | 77,7 | 73,8 | 66 | 47,1 | 74,1 |
| | social development | 65,3 | 31,1 | 0 | 0 | 9,9 | 38,9 | 22,3 | 26,2 | 34 | 52,9 | 25,9 |
| 5. | Kabardino-Balkarian Republic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 49,2 | 96,9 | 100 | 100 | 90,1 | 100 | 100 | 53 | 55,8 | 52,7 | 83,4 |
| | social development | 50,8 | 3,1 | 0 | 0 | 9,9 | 0 | 0 | 47 | 44,2 | 47,3 | 16,6 |
| 6. | Republic of Dagestan | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 0 | 0 | 46,3 | 58,9 | 58,2 | 23 | 16,2 | 18,7 | 0 | 0 | 16,9 |
| | social development | 100 | 100 | 53,7 | 41,1 | 41,8 | 77 | 83,8 | 81,3 | 100 | 100 | 83,1 |
| 7. | Chechen Republic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | business sector | 0 | 90,1 | 95,2 | 94 | 81,8 | 84 | 97,9 | 97,9 | 97,9 | 97,9 | 90,7 |
| | social development | 100 | 9,9 | 4,8 | 6 | 18,2 | 16 | 2,1 | 2,1 | 2,1 | 2,1 | 9,3 |

**Table 8.** Structure of the Program's projected expenditures in the NCFD subjects, %

| | indicator/year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2016-2025 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. | Stavropol Territory | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | IMC | 100 | 94,43 | 95,06 | 91,73 | 91,97 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 70,48 |
| | MSA | 0,00 | 3,34 | 3,17 | 4,83 | 5,31 | 60,00 | 60,98 | 60,98 | 63,41 | 63,41 | 18,25 |
| | AIC | 0,00 | 2,23 | 1,78 | 3,44 | 2,73 | 40,00 | 39,02 | 39,02 | 36,59 | 36,59 | 11,27 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2. | Republic of North Osetiya-Alaniya | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | AIC | 0,00 | 49,04 | 50,00 | 50,00 | 50,00 | 50,00 | 50,00 | 50,00 | 50,00 | 50,00 | 49,97 |
| | MSA | 0,00 | 31,34 | 30,00 | 30,00 | 30,00 | 30,00 | 30,00 | 30,00 | 30,00 | 30,00 | 30,05 |
| | TLC | 0,00 | 9,81 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 9,99 |
| | TRC | 0,00 | 9,81 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 10,00 | 9,99 |
| 3. | Republic of Ingushetia | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | AIC | 0,00 | 48,74 | 54,03 | 53,36 | 59,75 | 50,89 | 50,89 | 50,89 | 50,89 | 50,89 | 51,87 |
| | MSA | 100 | 51,26 | 45,97 | 46,64 | 40,25 | 32,97 | 32,97 | 32,97 | 32,97 | 32,97 | 36,58 |
| | TLC | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 16,14 | 16,14 | 16,14 | 16,14 | 16,14 | 11,55 |
| 4. | Karachay-Cherkess Republic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | TRC | 100 | 0,00 | 0,00 | 73,49 | 73,05 | 28,49 | 25,22 | 32,82 | 37,79 | 23,00 | 46,94 |
| | MSA | 0,00 | 79,66 | 88,93 | 24,46 | 22,71 | 62,95 | 68,04 | 66,66 | 62,21 | 77,00 | 49,05 |
| | AIC | 0,00 | 20,34 | 11,07 | 2,06 | 4,25 | 8,56 | 6,74 | 0,52 | 0,00 | 0,00 | 4,01 |
| 5. | Kabardino-Balkarian Republic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | TRC | 100 | 78,86 | 82,99 | 82,96 | 87,66 | 7,80 | 12,48 | 11,31 | 10,52 | 8,22 | 52,58 |
| | MSA+AIC | 0,00 | 21,14 | 17,01 | 17,04 | 12,34 | 92,20 | 87,52 | 88,69 | 89,48 | 91,78 | 47,42 |
| 6. | Republic of Dagestan | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | TLC | 0,00 | 0,00 | 23,83 | 15,93 | 16,82 | 54,16 | 100 | 100 | 0,00 | 0,00 | 51,39 |
| | MSA | 0,00 | 0,00 | 67,03 | 78,77 | 77,93 | 35,40 | 0,00 | 0,00 | 0,00 | 0,00 | 43,51 |
| | AIC | 0,00 | 0,00 | 9,14 | 5,30 | 5,25 | 10,44 | 0,00 | 0,00 | 0,00 | 0,00 | 5,09 |
| 7. | Chechen Republic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| | TRC | 0,00 | 80,87 | 81,00 | 78,15 | 80,42 | 0,00 | 0,00 | 0,00 | 0,00 | 0,00 | 38,72 |
| | MSA | 0,00 | 8,62 | 9,28 | 9,08 | 4,69 | 72,69 | 83,24 | 77,17 | 63,22 | 53,49 | 39,87 |
| | AIC | 0,00 | 10,51 | 9,72 | 12,78 | 14,89 | 27,31 | 16,76 | 22,83 | 36,78 | 46,51 | 21,41 |

Abbreviations: IMC - innovation medical cluster; MSA - manufacturing sector activities; AIC - agro-industrial complex; TLC - transport and logistics complex; TRC - tourist and recreation complex.

For the Stavropol Territory and the RNO-Alania, belonging to the first group, the share of business sector in their aggregate program budgets is 94.1% and 98.4%, respectively. Moreover, in the Stavropol Territory at the main stage of the Program (2016-2020), more than 90% of these funds are planned to be spent on activities to create an innovative medical cluster, and at the second stage (2021-2025) - an average of about 62% of the annual regional program budget is supposed to be invested in manufacturing sector. Program structure of the RNO-Alania during 2016-2025 is characterized by an even distribution of funds invested in business sector between agro-industrial, industrial, tourist and recreation, transport and logistics complexes in proportion of 5: 3: 1: 1.

The second group is characterized by a slight lag behind the leader in terms of the share of business sector in aggregate regional program budget. For the entire program period of 2016-2025 its values are 74.1%, 83.4% and 90.7% for Karachay-Cherkessia, Kabardino-Balkaria and

Chechnya, respectively. However, high values of this indicator in the period of 2016-2020 are the result of the influence of subprogram No. 8 on the development of tourist cluster in the territories of these NCFD subjects. This circumstance was the decisive factor to form the second group. At the final, third, stage of the Program in this group, there is a shift in priorities in favor of manufacturing sector, which occupy at least 60% in the structure of business sector in some years.

The distinctive feature of the third group is approximately equally low share of the Program's expenditures on manufacturing industry in total spending on business sector within the entire program period (36,6% and 43,5% for Ingushetia and Dagestan, respectively), burdened by a comparatively low share of business sector in their aggregate program budgets (40,2% and 16,9% for Ingushetia and Dagestan, respectively). Moreover, the program structure of Dagestan is aggravated by the absence of business sector activities on its territory within the first two and last two years of the Program.

The demonstrated results lead to the conclusion that increasing the level of BSS is practically unattainable for the members of the third group. Obviously, the prevalence of government spending on social sphere in the program budget (e.g. construction of schools, hospitals, social protection institutions, etc.) unfolds a spiral of public expenditures (e.g. payment of salaries and welfare to employees of public institutions, the provision of subsidies, government purchases of goods, works and services, capital repair and maintenance of government property, etc.), thus leading to a shrinkage of the regional business sector and its reduced ability to self-service the increased social sphere. This suggests an analytical hypothesis that regional BSS depends on the ratio of measures (that is, subsidies and budget investments in capital construction) of a market and non-market nature in a medium-/long-term regional development program.

Undoubtedly, from the perspective of the federal authorities, there are two important positive consequences of budget expenditures on social sphere, namely, public peace and predictable growth of the main macroeconomic indicators, such as tax and non-tax revenues, assigned as program targets. However, if the increase in taxes on personal incomes of the employees of government-financed organizations and on economic activity (assuming that it is transparent and profitable) of government counterparties is exceeded by increasing government spending, then this will require, with more or less lag, additional volumes of federal transfers, i.e. will increase the level of regional budgetary insufficiency.

Market program activities aimed at ensuring the implementation of investment projects for the production of goods, works and services is a completely different matter. The results of such projects increase regional revenues without opposing factors noted for budget investments in the social sphere. The above program structure analysis give rise to two interrelated hypotheses (with their subsequent experimental verification by calculations on the data of seven NCFD subjects), suggesting the presence of:

- the negative feedback between the share of market activities in the expenditures of regional consolidated budget (variable $X_1$) and the share of FITs in the revenues of regional consolidated budget (variable $Y_1$);
- the positive feedback between the share of market activities in the expenditures of regional consolidated budget (variable $X_1$) and the share of business taxes in the revenues of regional consolidated budget (variable $Y_2$).
    - Testing these hypotheses involves a two-step procedure, namely:
- selection of data to determine values of the variables $X_1$, $Y_1$ and $Y_2$;
- correlation analysis between the specified variables.

## 3. EXPERIMENT No. 1

The informational and analytical background of the study are the data of the Federal Treasury of the Russian Federation on the execution of regional consolidated budgets and budget classification codes approved by the Russian Ministry of Finance. Since the functional and economic content of the Russian budget classification during 2001-2017 was subject to change[13], let us explain how the data were interpreted and selected to determine values of the variables $X_1$ and $Y_2$ for the period of 2015-2017.

Market activities are reflected in the following subsections of the "National Economy" section of the Russian classification of budget expenditures, namely: 1) General economic issues; 2) Fuel and energy complex; 3) Agriculture and fishing; 4) Transportation; 5) Road facilities (road funds); 6) Other issues of national economy. These subsections include expenditures on the measures to promote employment, as well as expenditures on state support of economic agents, that is producers of goods, works and services of market nature.

The reason why the rest of subsections of the "National Economy" section and all other sections of the functional classification of budgetary expenditures were excluded from the analysis as not relevant to market activities is given in (System of National Accounts of 2008, p.62). It states that "principal functions of government are to assume responsibility for the provision of goods and services to the community or to individual households and to finance their provision out of taxation or other incomes; to redistribute income and wealth by means of transfers; and to engage in non-market production". That is, the vast majority of budget expenditures concentrated in the excluded sections and subsections of the budget classification provide non-market[14] output. Then, the following types of expenses within the selected subsections were summed up for each NCFD subject:

- (code 412) "Budgetary investments for the purchase of real estate";
- (code 414) "Budgetary investments in capital construction";
- (code 450) "Budget investments to other legal entities";
- (code 810) "Subsidies to legal entities (except non-profit organizations), individual entrepreneurs, individuals producing goods, works and services".

The values of variable $Y_1$ are given in table 1.

To determine the values of variable $Y_2$, the following types of business taxes were used:

- tax on profits;
- tax levied on taxpayers who have chosen income as an object of taxation;
- tax levied on taxpayers who have chosen income, reduced by the amount of expenses, as an object of taxation;
- single tax on imputed income for certain types of activities;
- single agricultural tax;
- sales tax.

In order to substantiate the formulated hypotheses, a correlation analysis (namely, Spearman rank correlation coefficients) of the ranking results of the NCFD subjects by two specified pairs of

[13] See the Guidelines on the procedure for applying the budget classification of the Russian Federation, approved by: 1) Orders of the Ministry of Finance of the Russian Federation: No. 38н dated May 25, 1999 and No. 127н dated December 11, 2002 – for 2001-2004; 2) Orders of the Ministry of Finance of the Russian Federation: No. 72н dated August 27, 2004; No. 114н dated December 10, 2004; No. 152н dated 21.12.2005; No. 168н dated 08.12.2006 – for 2005-2007; 3) Orders of the Ministry of Finance of the Russian Federation: No. 74н dated August 24, 2007; No. 145н dated December 25, 2008; No. 150н dated 12.30.2009; No. 190н dated December 28, 2010; No. 180н dated December 21, 2011; No. 171н dated 21.12.2012 – for 2008-2014; 4) Order of the Ministry of Finance of Russia No. 65н dated July 01, 2013 – for 2015-2017.

[14] Non-market output consists of goods and individual or collective services produced by non-profit institutions serving households (NPISHs) or government that are supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole [20, p.627].

variables is applied. Calculations show (see Tables 9 and 10) negative correlation dependence between variables $X_1$ and $Y_1$ and positive, with small exceptions, correlation dependence between variables $X_1$ and $Y_2$, both varying over the years of 2001-2017.

**Table 9.** Ranks and Spearman rank correlation coefficients, variables $Y_1$, $X_1$

| *Year* | *Ranks $Y_1$ / $X_1$* | | | | | | | *Spearman rank correlation coefficient* |
|---|---|---|---|---|---|---|---|---|
| | *ST* | *RNO* | *RI* | *KCR* | *KBR* | *RD* | *CR* | |
| 2001 | 7 / 4 | 6 / 1 | 3 / 2 | 4 / 5 | 5 / 3 | 2 / 6 | 1 / 7 | -0,643 |
| 2002 | 7 / 6 | 6 / 5 | 1 / 7 | 4 / 2 | 5 / 3 | 3 / 4 | 2 / 1 | 0,143 |
| 2003 | 7 / 1 | 6 / 6 | 1 / 7 | 5 / 3 | 4 / 4 | 3 / 5 | 2 / 2 | -0,429 |
| 2004 | 7 / 6 | 5 / 1 | 2 / 4 | 6 / 2 | 4 / 5 | 3 / 3 | 1 / 7 | -0,321 |
| 2005 | 7 / 2 | 5 / 7 | 1 / 1 | 6 / 3 | 4 / 4 | 3 / 5 | 2 / 6 | -0,036 |
| 2006 | 7 / 3 | 5 / 6 | 1 / 2 | 4 / 7 | 6 / 1 | 3 / 4 | 2 / 5 | -0,107 |
| 2007 | 7 / 3 | 5 / 7 | 1 / 1 | 4 / 6 | 6 / 4 | 3 / 2 | 2 / 5 | 0,321 |
| 2008 | 7 / 2 | 4 / 5 | 1 / 6 | 5 / 4 | 6 / 1 | 3 / 7 | 2 / 3 | -0,679 |
| 2009 | 7 / 6 | 5 / 5 | 1 / 7 | 4 / 2 | 6 / 1 | 3 / 4 | 2 / 3 | -0,214 |
| 2010 | 7 / 5 | 5 / 4 | 1 / 3 | 4 / 2 | 6 / 1 | 3 / 7 | 2 / 6 | -0,250 |
| 2011 | 7 / 4 | 6 / 6 | 2 / 3 | 4 / 2 | 5 / 1 | 3 / 5 | 1 / 7 | -0,250 |
| 2012 | 7 / 4 | 5 / 7 | 1 / 1 | 3 / 3 | 6 / 2 | 4 / 5 | 2 / 6 | 0,179 |
| 2013 | 7 / 4 | 5 / 5 | 1 / 1 | 4 / 3 | 6 / 2 | 3 / 6 | 2 / 7 | -0,071 |
| 2014 | 7 / 3 | 5 / 5 | 1 / 1 | 4 / 4 | 6 / 2 | 3 / 7 | 2 / 6 | -0,143 |
| 2015 | 7 / 3 | 5 / 6 | 1 / 1 | 4 / 4 | 6 / 2 | 3 / 5 | 2 / 7 | -0,107 |
| 2016 | 7 / 2 | 5 / 7 | 1 / 4 | 4 / 3 | 6 / 1 | 3 / 5 | 2 / 6 | -0,500 |
| 2017 | 7 / 3 | 6 / 7 | 1 / 6 | 4 / 4 | 5 / 1 | 3 / 5 | 2 / 2 | -0,107 |

Abbreviations: ST – Stavropol Territory; RNO – Republic of North Osetiya-Alaniya; RI – Republic of Ingushetia; KCR – Karachay-Cherkess Republic; KBR – Kabardino-Balkarian Republic; RD – Republic of Dagestan; CR – Chechen Republic.

**Table 10.** Ranks and Spearman rank correlation coefficients, variables $Y_2$, $X_1$

| *Year* | Ranks $Y_2$ / $X_1$ | | | | | | | Spearman rank correlation coefficient |
|---|---|---|---|---|---|---|---|---|
| | *ST* | *RNO* | *RI* | *KCR* | *KBR* | *RD* | *CR* | |
| 2001 | 1 / 4 | 3 / 1 | 6 / 2 | 2 / 5 | 5 / 3 | 4 / 6 | 7 / 7 | 0,195 |
| 2002 | 1 / 6 | 5 / 5 | 7 / 7 | 6 / 2 | 4 / 3 | 3 / 4 | 2 / 1 | 0,230 |
| 2003 | 1 / 1 | 5 / 6 | 7 / 7 | 4 / 3 | 2 / 4 | 3 / 5 | 6 / 2 | 0,545 |
| 2004 | 1 / 6 | 5 / 1 | 6 / 4 | 2 / 2 | 3 / 5 | 4 / 3 | 7 / 7 | 0,125 |
| 2005 | 1 / 2 | 4 / 7 | 7 / 1 | 2 / 3 | 5 / 4 | 3 / 5 | 6 / 6 | 0,090 |
| 2006 | 1 / 3 | 3 / 6 | 7 / 2 | 2 / 7 | 4 / 1 | 5 / 4 | 6 / 5 | -0,294 |
| 2007 | 1 / 3 | 2 / 7 | 6 / 1 | 4 / 6 | 3 / 4 | 5 / 2 | 7 / 5 | -0,259 |
| 2008 | 1 / 2 | 5 / 5 | 6 / 6 | 2 / 4 | 3 / 1 | 4 / 7 | 7 / 3 | 0,405 |
| 2009 | 1 / 6 | 3 / 5 | 6 / 7 | 2 / 2 | 5 / 1 | 4 / 4 | 7 / 3 | -0,085 |
| 2010 | 1 / 5 | 4 / 4 | 6 / 3 | 2 / 2 | 5 / 1 | 3 / 7 | 7 / 6 | -0,015 |
| 2011 | 1 / 4 | 3 / 6 | 6 / 3 | 2 / 2 | 4 / 1 | 5 / 5 | 7 / 7 | 0,370 |
| 2012 | 1 / 4 | 2 / 7 | 6 / 1 | 4 / 3 | 3 / 2 | 5 / 5 | 7 / 6 | -0,085 |
| 2013 | 1 / 4 | 3 / 5 | 6 / 1 | 4 / 3 | 2 / 2 | 5 / 6 | 7 / 7 | 0,300 |
| 2014 | 1 / 3 | 2 / 5 | 6 / 1 | 3 / 4 | 4 / 2 | 5 / 7 | 7 / 6 | 0,160 |
| 2015 | 1 / 3 | 2 / 6 | 6 / 1 | 3 / 4 | 4 / 2 | 5 / 5 | 7 / 7 | 0,125 |
| 2016 | 1 / 2 | 3 / 7 | 6 / 4 | 2 / 3 | 4 / 1 | 5 / 5 | 7 / 6 | 0,440 |
| 2017 | 1 / 3 | 3 / 7 | 6 / 6 | 4 / 4 | 2 / 1 | 5 / 5 | 7 / 2 | 0,195 |

Developing the analysis of the stably low levels of BSS in the NCFD subjects, let us consider the extent to which non-repayable receipts correspond to the regional ability to independently cover total expenditures for economic and social purposes (that is, how much a certain amount of federal transfers is justified by the regional need for it). The proposed approach to answering this question is similar to the above calculations of the rank correlation.

# 4. EXPERIMENT No. 2

In this case, the dependent variable Y is the same percentage share of non-repayable receipts in the revenues of consolidated budget of the NCFD subjects. Let us identify it, as before, through $Y_1$. This variable determines the places of the NCFD subjects in the rating of six subjects (without the Chechen Republic, for which there is no information necessary for the calculations). As for the ranked variable X, it is considered as an indicator characterizing the potential of regional budgetary self-sufficiency. The logic of its construction is as follows. The potential of regional budgetary self-sufficiency, which downside is the level of the region's need for non-repayable receipts, is directly related to the share of the revenues of consolidated budget of the *i*-th subject, formed from its own sources (denoted by $Z_i$). On the other hand, it is appropriate to assume that a given value of $Z_i$ is more or less sufficient relative to the budget needs of both the economy, measured by the value of gross regional product ($GRP_i$), and the population, measured by its size ($PS_i$). According to these considerations, we define the variable X as a vector $X_{3i}$ with components $Z_i/GRP_i$ and $Z_i/PS_i$.

Further, for each year of 2001-2016, ranks in the rating of the NCFD subjects by values of $X_{3i}$ are determined. To build this rating, a method of ranking multidimensional objects based on pair-wise comparisons (Belen'kiy and Grebennikov, [2013) by two criteria (namely, $Z_i/GRP_i$ and $Z_i/PS_i$) is used. The weights of these criteria are endogenous, that is, they are calculated by a specific rule rather than given by experts. The rank correlation coefficients between the results of ranking regions by the variables $X_{3i}$ and $Y_1$ are shown in Table 11.

**Table 11.** Ranks and Spearman rank correlation coefficients, variables $Y_1$, $X_{3i}$

| *Year* | *Ranks $Y_1$ / $X_{3i}$* | | | | | | *Spearman rank correlation coefficient* |
|---|---|---|---|---|---|---|---|
| | *ST* | *RNO* | *RI* | *KCR* | *KBR* | *RD* | |
| 2001 | 6 / 2 | 5 / 1 | 2 / 4 | 3 / 5 | 4 / 3 | 1 / 6 | -0,886 |
| 2002 | 6 / 1 | 5 / 2 | 1 / 4 | 3 / 5 | 4 / 3 | 2 / 6 | -0,829 |
| 2003 | 6 / 1 | 5 / 2 | 1 / 4 | 4 / 3 | 3 / 6 | 2 / 5 | -0,771 |
| 2004 | 6 / 1 | 4 / 3 | 1 / 5 | 5 / 2 | 3 / 4 | 2 / 6 | -0,943 |
| 2005 | 6 / 1 | 4 / 3 | 1 / 6 | 5 / 2 | 3 / 4 | 2 / 5 | -1,000 |
| 2006 | 6 / 1 | 4 / 3 | 1 / 6 | 3 / 4 | 5 / 2 | 2 / 5 | -1,000 |
| 2007 | 6 / 1 | 4 / 3 | 1 / 6 | 3 / 4 | 5 / 2 | 2 / 5 | -1,000 |
| 2008 | 6 / 1 | 3 / 3 | 1 / 6 | 4 / 4 | 5 / 2 | 2 / 5 | -0,943 |
| 2009 | 6 / 2 | 4 / 4 | 1 / 6 | 3 / 3 | 5 / 1 | 2 / 5 | -0,886 |
| 2010 | 6 / 1 | 4 / 4 | 1 / 6 | 3 / 3 | 5 / 2 | 2 / 5 | -0,943 |
| 2011 | 6 / 1 | 5 / 4 | 1 / 5 | 3 / 3 | 4 / 2 | 2 / 6 | -0,771 |
| 2012 | 6 / 1 | 4 / 3 | 1 / 6 | 2 / 4 | 5 / 2 | 3 / 5 | -0,943 |
| 2013 | 6 / 1 | 4 / 2 | 1 / 6 | 3 / 4 | 5 / 3 | 2 / 5 | -0,943 |
| 2014 | 6 / 1 | 4 / 3 | 1 / 6 | 3 / 4 | 5 / 2 | 2 / 5 | -1,000 |
| 2015 | 6 / 2 | 4 / 4 | 1 / 6 | 3 / 3 | 5 / 1 | 2 / 5 | -0,886 |
| 2016 | 6 / 2 | 4 / 4 | 1 / 6 | 3 / 3 | 5 / 1 | 2 / 5 | -0,886 |

It is obvious that the financial relations between the federal center and the regions should follow the rule "the greater the potential of budgetary self-sufficiency of a region, the smaller the share of non-repayable receipts in the revenues of its consolidated budget". As can be judged by the calculated values of the Spearman coefficient shown in Table 11, this rule is satisfied for the entire period considered in the analysis. The proposed method allows us to assess whether it works for another period or another group of regions. In our future study, we propose to carry out a similar experiment using examples from a number of other macro-regions of the Russian Federation in a period comparable to that analyzed in this work.

## CONCLUSION

Among the most serious methodological shortcomings of the Russian model of performance budgeting that affect the quality of the governmental territorial development programs' design are the following:

- lack of problem analysis procedures that consider heterogeneity and regional development differentiation of the Russian economy;
- lack of procedures for the development of alternative means of achieving program objectives, which makes it impossible to assess the budgetary efficiency[15] of the state program;
- violation of the integrity principle of the regional program, expressed, in particular, in ignoring the requirement of interconnection of program activities.

The "Development of the North Caucasian Federal District until 2025" Governmental Program of the Russian Federation is a list of independent subprograms for socio-economic development of the NCFD subjects. Almost all of these subprograms, in turn, consist of an eclectic set of program activities, for the most part not corresponding to the federal status of territorial development program. As a result, the problem of forming a single socio-economic territory in the North Caucasus Federal District remains unresolved, which, first of all, is due to the lack of institutional foundation for territorial planning in Russia. Being an element of the federal executive branch, formed according to the sectoral principle, the Ministry for the Affairs of the North Caucasus simply does not have an infrastructure (i.e. legislative support, a network of subordinate departments) sufficient to solve inter-subject problems.

One of the most important factors influencing the level of regional budgetary self-sufficiency is the ratio of market and non-market measures in the expenditure part of regional consolidated budget, formed as a set of governmental programs. The study found that program structures of the Republic of Dagestan and the Republic of Ingushetia, with the predominance of social activities, plays the role of a kind of "trap for budgetary insufficiency", making it impossible to solve the problem of reaching the stable trajectories of social and economic development without regular budgetary injections from the federal center.

Elimination of the above shortcomings could make a reasonable contribution to improving the efficiency of joint work of federal and regional executive authorities aimed at improving the quality of territorial development in Russia.

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[15] See Art. 34 of the Budget Code of the Russian Federation.

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- For published conference proceedings - Surname, Initials (year of publication), "Title of paper", in Surname, Initials (Ed.), *Title of published proceeding which may include place and date(s) held*, Publisher, Place of publication, Page numbers.

e.g. Draskovic, V., Grego, Z., Draskovic, M. (2011), “Media Concentration, Neoliberal Paradoxes and Increase in Virtuality” in *Media Concentration proceedings of the international conference in Podgorica,* Montenegro, 2011, Elit, Podgorica, pp. 33-45.

- For working papers - Surname, Initials (year), “Title of article”, working paper [number if available], Institution or organization, Place of organization, date.

e.g. Draskovic, V. (2007), “Specificities and problems of Montenegrin transition”, working paper, No. ..., Leeds University Business School, TIGER, Warsaw, September.

- For newspaper articles (authored) - Surname, Initials (year), “Article title”, *Newspaper*, date, pages.

e.g. Miller, M. C. (1997), “The Crushing Power of Big Publishing”, *The Nation*, 17 March, p. 10.

- For newspaper articles (non-authored) - *Newspaper* (year), “Article title”, date, pages.

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- For electronic sources - If available online, the full URL should be supplied at the end of the reference, as well as a date that the resource was accessed.

e.g. Compaine, B.M. (2005), „The Media Monopoly Myth: How New Competition is Expanding our Sources of Information and Entertainment”, available at: http://www.NewMillennium Research.org//archive/ final_Compaine_Paper_050205. pdf (accessed 10 december 2011).