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CONTENTS

LIQUIDITY RISK IMPLICATIONS FOR MARKET RISK ASSESSMENT IN EMERGING MARKETS

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Abstract

Classical financial market theories built upon the assumption of a perfect market have been coping with frictions on both developed and emerging markets. There are numerous factors affecting the operation of financial markets and their participants' behavior, but illiquidity is a continuous problem that has important consequences on the financial asset prices and the degree of competition between market participants. Moreover, investments that yield high profits are often the ones related to less liquid financial assets from emerging markets. Since investment decisions are based on risk preferences and investors are commonly risk averse, they tend to limit their risk exposure while defining their investment strategy. Various risk measures can be used to estimate the level of risk. Value at Risk (VaR) is a widely accepted summary measure of market risk that is also recommended by the financial industry regulatory authorities as a risk management tool. The usage of VaR models is rapidly expanding; thus, it is used by both financial and non-financial institutions in order to estimate exposure to financial risks, complement allocation of capital, set trading position limits and evaluate performance of trading strategies. However, the last global financial crisis that occurred in 2007-2008 highlighted some of the weaknesses of this measure as a measure of market risk. The lack of a liquidity parameter in methodologies used to compute VaR significantly decreased the effectiveness of this measure. Therefore, the objective of this research is to examine the implications of asset liquidity risk on market risk assessment, which is obtained by using VaR.

The most frequently used technique for VaR estimation is the parametric (analytic) method, but the constant search for precise prediction models results in a large number of variations of basic parametric and non-parametric methods. Thus, in this research, the parametric VaR and volatility models are implemented on a sample representing the stock indices of the European emerging markets in the period from 2009 to 2017.

The results of this study indicate that the application of a liquidity constraint in the VaR

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model provides more accurate assessment of potential loss, especially in emerging markets, and enables investors to detect the liquidity risk and its effect in comparison with a conventional VaR.

Keywords: *liquidity risk, Value at Risk, emerging markets.*

JEL classification: *C22, G11, G15*

Introduction

The liquidity of financial markets has many dimensions and can be analyzed from different perspectives. Therefore, this problem remains elusive, despite the fact that liquidity is often considered to represent an important feature of the investment environment. Considering the fact that liquidity shortage had an important role in the development of many financial crises, illiquidity of financial markets could be observed as a key determinant of macro economy as a whole. Although the causes of crises cannot be generalized, the analyses of impact of various factors indicate that financial systems, particularly financial systems of the developing economies, are vulnerable to an abrupt change of the dynamics of capital flows (Tirol, 2002). Recent researches generally perceived the liquidity problem through the forms of central bank liquidity, market liquidity and funding liquidity (Nikolaou, 2009). Due to the financial services convergence, these forms of liquidity could be closely interrelated. During the global financial crisis of 2007-2008, many central banks assisted in maintaining liquidity through the prevention of bankruptcy of systemically important institutions, maintaining the liquidity of the interbank market and increasing the liquidity in financial markets (BIS, 2017). Sudden shifts in market liquidity and funding liquidity are mutually reinforcing and could lead to a liquidity spiral. Therefore, the central bank policy could have important implications on market liquidity during a liquidity crisis (Brunnermeier and Pedersen, 2009).

Market liquidity is an important factor for portfolio managers and large institutional investors and it refers to the ability to execute a trade promptly, at low cost or no cost, risk or inconvenience (Dowd, 2002; Roy, 2004). This notion implies that the degree of market liquidity is determined by the following determinants: (1) tightness, which refers to low transaction costs, (2) depth, which indicates the market ability to absorb the orders without making price change, and (3) resilience of the market, which refers to the speed with which underlying prices are restored after a disturbance (Kyle, 1985) and (4) immediacy, which refers to the time needed to complete a trade (Black, 1971). In order to estimate the liquidity risk, various measures can be applied – either dimensional or multi-dimensional. However, the Amihud's measure (2002) is considered the most generalized one which follows the presented Kyle's (1985) price impact definition of liquidity (Minović, 2011) more closely.

Nevertheless, investments that yield high profits are often the ones in less liquid financial assets from emerging markets. Since investment decisions are based on risk preferences and investors are commonly risk averse, they tend to limit their risk

exposure while defining their investment strategy. Various risk measures can be used to estimate the level of risk and Value at Risk (VaR) as a widely accepted summary measure of market risk that is also recommended by the financial industry regulatory authorities as a risk management tool. In terms of illiquidity, the conventional VaR fails to capture the costs of investing in illiquid financial assets. Therefore, the aim of this paper is to complement the existing research by testing the performance of the liquidity-adjusted VaR model in emerging and frontier markets. The group of selected markets consists of Serbian, Croatian, Greek and Romanian stock markets.

The paper is structured as follows. In the second part of the paper, the existing methodologies for incorporating liquidity risk in VaR models are discussed. The third part presents a liquidity-adjusted Value at Risk model (L-VaR), while the results of the analyses are discussed in the fourth part. The fifth part of the paper presents the concluding remarks.

Literature review

Following classical financial market theories built upon the assumption of a perfect market, the conventional VaR provides assessment of market risk by assuming that assets will be liquidated at mid-price. In reality, most markets, especially the emerging ones, are less than perfectly liquid. In those terms, neglecting the liquidity risk leads to an underestimation of the overall market risk, which could, due to the regulatory recognition of VaR measure, result in inaccurate assessment of capital for the safety of financial institutions (Le Saout, 2002). From the perspective of an investor and risk manager, liquidity risk is the potential loss due to the time-varying cost of trading, which is often ignored. Research studies reveal that liquidity can have significant impact in market risk estimation, but liquidity risk modeling and predictability is difficult in spite of the numerous models proposed in literature.

The selection of a liquidity risk model is determined by the purpose and type of asset, as well as the data available. Prior research proposed the theoretical model of an optimal trading strategy for liquidating portfolios in order to find an optimal balance between price impact costs and delay cost caused by timing a transaction. The study of Lawrence and Robinson (1995) appeared among the first ones to investigate the impact of liquidity risk on VaR calculation and proposed a simple rule that adds the time estimated to liquidate the investor's position to the time horizon of VaR calculation. If the time horizon increases, due to the illiquidity of the portfolio, VaR will also increase in order to reflect higher risk. This model, however, assumes that investor's position can be liquidated in a single transaction and ignores bid-ask spread volatility over time. Similarly, Haberle and Persson (2000) propose a method of VaR calculation based on the assumption of orderly liquidation that assumes the investor's ability to liquidate a fraction of the daily trading volume without a significant impact on the market price. A solution of an optimal trading strategy within a given liquidation horizon is proposed by Almgren and Chriss (2000), who construct a liquidity-adjusted VaR. This approach was extended by including non-linearity in the price impact (Almgren, 2003) and considering the special case of "coordinated variation" in which liquidity

and volatility vary together (Almgren, 2012). However, the implementation of these models does not provide assertive and consistent results on market illiquidity.

Depending on the data used in measuring the liquidity risk, there are models based on bid-ask spread data, models based on volume or transaction data and models based on limit order book data (Stange and Kaserer, 2009).

Considering the fact that data on bid and ask prices are available for most assets, Bangia et al. (1999) defined a parametric liquidity-adjusted VaR by adding the time-varying empirical bid-ask spread to the price risk modeled using the mean-variance approach. The empirical application of this model showed that ignoring the liquidity risk could underestimate the total VaR by 25-30% in emerging market currencies (Bangia et al., 1999), but also the total VaR of illiquid stocks on developed markets by more than 50% (Le Saout, 2002). In the Indian debt market, the liquidity risk component can be as high as 20% of the total VaR (Roy, 2004). If liquidity risk is considered on the level of the intraday time horizon, liquidity can constitute on average 30% of the VaR for small-price stocks in Hong Kong stock market (Lei and Lai, 2007). Estimating the spread distribution and providing the more precise results is achieved by the application of a Cornish-Fisher approximation (Ernst et al. 2009).

Nevertheless, the availability of high-frequency and detailed financial data on emerging economies is often limited. The insufficiencies of data, as well as the characteristics of emerging markets, could lead to an inadequate liquidity estimation if the liquidity measures from developed markets are used. Specifically, the bid-ask spread is the most used measure and the most demonstrable indicator of overall liquidity, but data on bid and ask prices are not always available for all assets or for all time periods. Therefore, the usual approach for liquidity risk modeling in emerging and frontier markets uses proxies. Some of the most used liquidity measures calculated on the basis of low-frequency data are: Roll's spread (Roll, 1984), LOT measure and zero return days (Lesmond et. al, 1999), the Amihud's measure (Amihud, 2002), the Amivest measure (Cooper et al., 1985) and the Pastor-Stambaugh measure (Pastor and Stambaugh, 2003). Although alternative measures of liquidity reflect different aspects of liquidity, in the emerging markets there is a significant within-country correlation between all liquidity proxies, especially during a period of crisis (Lesmond, 2005; Yeyati et al., 2008).

In case of the Serbian capital market, results of illiquidity estimation using two measures - zero rates and price pressure of non-trading, showed that this market was low liquid and that this lack of liquidity was persistent during the period 2005-2009 (Minović, 2011). During the crisis period, the level of market illiquidity measured by illiquidity of stocks constituting Belexline index, as well as the level of illiquidity of the most liquid stocks constituting Belex15 index, increased and it caused the sudden increase in systematic risk by 58.7% in the post-crisis period in Serbia (Minović and Živković, 2010). The Croatian capital market has been facing significant changes in recent years. Despite its numerous improvements, the market remains insufficiently liquid. Although the applied measures of liquidity showed certain variations and inconsistency of achieved results, they undoubtedly implied higher levels of illiquidity

in Croatian capital market compared to the developed markets (Benić and Franić, 2009). However, the Croatian capital market is less illiquid than the Serbian capital market according to the values of the zero rates measure (Minović, 2012).

The Bucharest Stock Exchange is a large and important part of Romanian capital market. However, this exchange is characterized by a relatively small number of days when trades of both liquid and illiquid stocks were recorded, and it is also characterized by an inconsistent pattern of relationship between illiquidity and stock returns (Vidović et al., 2014). According to the number and value of transactions in the period of the financial crisis, it could be concluded that market liquidity did not reduce, and that the Bucharest Stock Exchange remained an attractive investment opportunity (Geambasu and Stancu, 2010). On the other hand, the Athens Stock Exchange is considered an emerging market, which implies that it improves its efficiency as time goes by and especially with respect to their degree of global integration (Bekaert and Harvey, 1997). Although all emerging markets may not experience the same degree of liquidity improvements, the Greece stock market in the pre-crisis period improved its liquidity significantly (Jun et al., 2003).

Realizing the importance of liquidity risk in investment decision-making and considering the applicability of existing liquidity-adjusted risk models in the observed developing markets, in this study we will use the widely accepted parametric (analytic) method of VaR calculation.

Data and Methodology

Considering the lack of transparency and readily accessible information about financial assets traded in the selected frontier and emerging markets and the relatively short time-series samples, this analysis is adjusted to the obstacles observed. Therefore, the liquidity proxy is determined by the available data and implemented in the recognized market risk assessment model – liquidity-adjusted Value at Risk proposed by Bangia et al. (1999).

In order to estimate the model parameters, data sets were divided into two sub-samples. To allow enough data for fitting the volatility models, the first sub-sample period starts at the beginning of October 2009 and lasts until the end of 2016. It is considered an in-sample period. The second sub-sample period starts at the beginning of 2017 and lasts until the beginning of October 2017. It is considered an out-of-sample period. On the in-sample data, we estimate parameters of log-returns and cost of liquidity distributions, while the second period data are used for the validation of all proposed types of VaR models.

Data description

The Value at Risk model in this study is applied to the stock indices of capital markets that are categorized as emerging markets and frontier markets according

to the Standard and Poor's (S&P) and MSCI (Morgan Stanley Capital International) categorization. Regarding indicators that include measures of size (market capitalization and the number of listed domestic companies) and liquidity (the value of traded shares), selected stock markets of the Republic of Serbia, the Republic of Croatia and the Republic of Romania are classified as frontier markets, while the Greece stock market is classified as emerging[1]. As data presented in Table 1 indicate, the market capitalization of selected frontier markets is rather low. If it is compared to the market capitalization of regarded emerging market expressed in US dollars, the market capitalization of the frontier stock exchanges is smaller by a factor ranging from 2.08 to 6.02. The gap is even bigger if we consider market liquidity (smaller by a factor ranging from 4.69 to 7.62) and the turnover ratio (smaller by a factor ranging from 2.92 to 14.61) of the Serbian, Croatian and Romanian stock market compared to the aforementioned emerging market. However, the relevant indices of these stock markets are rated as blue-chip indices and included in the MSCI Frontier Emerging Market Index and SandP frontier indices. Thus, it can be concluded that these markets can be investment-grade, mostly because they provide significant diversification benefits for international investors due to the low correlation between the frontier and developed markets (Speidell and Krohne, 2007; Jayasuriya and Shambora 2009; Berger et al. 2011).

Table 1. Stock market development indicators for 2012

Country	Stock exchange	Market capitalization		Market liqui-dity[*]	Turnover ratio[**]	Number of listed domestic companies	S&P/ Global Equity Indices[***]
		$ millions	% of GDP				
Greece	Athens Stock Exchange	44,876	18.3	6.1	33.6	262	24.7
Serbia	Belgrade Stock Exchange	7,451	19.9	0.8	3.7	751	-
Romania	Bucharest Stock Exchange	15,925	9.4	1.3	11.5	77	9.8
Croatia	Zagreb Stock Exchange	21,560	36.4	0.8	2.3	211	-5.2

[*]Value of shares traded presented as a percentage of GDP
[**]Value of shares traded presented as a percentage of market capitalization
[***]S&P Global Equity Indices measure the U.S. dollar price change in the stock markets covered by the S&P/IFCI and S&P/Frontier BMI country indices
Source: The World Bank (available at http://wdi.worldbank.org/table/5.4, retrieved on September 20, 2017)

In order to evaluate the performance of financial markets as a whole, we use the daily closing values of the selected stock exchange indices that represent the most liquid stocks on the market: for the Athens Stock Exchange – Athex, Belgrade Stock Exchange – Belex15, the Zagreb Stock Exchange – Crobex10 and the Bucharest Stock Exchange – BET. The data period is 8 years long – from October 2009 until October 2017. The data sets are obtained from the official stock exchanges' websites and are expressed in national currencies. In this study, we use continuously compounded returns r_t on stock market indices calculated as a change in logarithms

of the daily stock index level.

The statistical analysis of the observed stock market indices (Table 2) shows that the mean of the daily return series of all indices is very low - approximately zero, while the volatility of these returns measured by the standard deviation is relatively high. The kurtosis of all index returns is higher than three, which means that extreme values are observed more frequently than for the normal distribution. The right-skewed distribution of daily lognormal returns on the Crobex10 index indicates that there is a probability greater than normal to achieve extreme gains, while the left-skewed distributions of returns of the Athex, Belex15 and BET indices indicate that there are substantial probabilities of extreme negative returns. The results of the Jarque-Bera test of normality prove that the null hypothesis of normal distribution in the case of every index can be rejected.

Table 2. The descriptive statistics of selected indices log-return series in the period October 2009 – October 2017

	Athex	BET	Belex15	Crobex10
N	1970	2014	2018	2000
Mean	-0.000645	0.000286	-0.000068	-0.000037
Median	-0.000101	0.000453	-0.000074	-0.000150
Max	0.134311	0.076737	0.082290	0.115709
Min	-0.177129	-0.110125	-0.074080	-0.040754
Standard deviation	0.022577	0.010872	0.008621	0.007586
Skewness	-0.304937	-0.738114	-0.037003	1.638302
Excess Kurtosis	5.389181	12.478579	11.569365	28.273119
Jarque-Bera Test *p*-value	2399.75 (0.000000)	13178.72 (0.000000)	11193.68 (0.000000)	67158.21 (0.000000)
ADF Test *p*-value	-11.52 (0.01)	-11.99 (0.01)	-11.63 (0.01)	-10.91 (0.01)
Ljung–Box Test *p*-value	49.70 (0.000000)	17.56 (0.06279)	87.54 (0.000000)	22.58 (0.01234)
ARCH Test *p*-value	80.15 (0.000000)	287.32 (0.000000)	615.41 (0.000000)	5.59 (0.8485)

Source: Authors' calculation

Further statistical tests provide more insight into the characteristics of the financial time series observed. The results of the Augmented Dicky-Fuller (ADF) unit root tests indicate that all series are first difference stationary. The Ljung and Box Q-statistics on the 10th lag of the return series sample autocorrelation functions indicate significant serial correlation for all markets. However, the ARCH effects are evident in all return series, except the returns on Crobex10 index, according to the results of Engle's ARCH tests (1982). Therefore, the returns on this index will be modeled under the assumption that there is no volatility clustering using the Exponentially Weighted Moving Average (EWMA) model. Considering the results of the analysis conducted, the returns on the Athex, BET and Belex15 indexes will be modeled using the non-linear ARMA(m,n)-GARCH(p,q) model that can include a wide range of characteristics

of volatility. The implementation of the GARCH(p,q) model of order $p \leq 2$ and $q \leq 2$ in most cases confirms that modeling volatility using this model provides satisfactory results (Xiao and Aydemir, 2007). Therefore, the most commonly applied model GARCH (1,1) will be used in this study. Since the Gaussian GARCH model could not explain the leptokurtosis exhibited by returns on the stock indices analyzed, we will use two types of this model replacing the assumption of conditional normality of innovations with that of conditional Student's t distribution.

Therefore, the following conditional variance specifications were adopted:

$$\text{EWMA: } \sigma_t^2 = \lambda \sigma_{t-1}^2 + (1-\lambda)\varepsilon_{t-1}^2 \tag{1}$$

$$\text{GARCH(1,1): } \sigma_t^2 = \omega + \beta_1 \sigma_{t-1}^2 + \alpha_1 \varepsilon_{t-1}^2 \tag{2}$$

where $0 \leq \lambda \leq 1$ is the smoothing parameter and its value is set to $\lambda=0.94$; $\omega>0$, $\alpha_1 \geq 0$, $\beta_1 \geq 0$ are parameters of the used GARCH model that should meet the following stationary condition $\alpha_1+\beta_1<1$; error term ε_t is a function of z_t, which is a random component with the properties of white noise.

The conditional mean will be modeled as a linear process due to a significant return autocorrelation, whereby the number of lags is limited to 2.

Table 3. The parameters of ARMA(m,n)-GARCH(p,q) models applied on the selected indices log-return series in the period Oct. 2009 – Dec. 2016

Index	Model	Parameters	
Athex	ARMA(2,2)-GARCH(1,1) (Normal distribution)	AR_1 = 1.170734 AR_2 = -0.846087 MA_1 = -1.127093 MA_2 = 0.797536	ω = 0.000018 α_1 = 0.099878 β_1 = 0.871892
	ARMA(2,2)-GARCH(1,1) (Student's t distribution)	AR_1 = 1.116292 AR_2 = -0.839086 MA_1 = -1.067576 MA_2 = 0.804878	ω = 0.000027 α_1 = 0.099568 β_1 = 0.851874
BET	ARMA(2,2)-GARCH(1,1) (Normal distribution)	AR_1 = 0.106013 AR_2 = -0.880503 MA_1 = -0.065377 MA_2 = 0.895344	ω = 0.000005 α_1 = 0.188192 β_1 = 0.780888
	ARMA(2,2)-GARCH(1,1) (Student's t distribution)	AR_1 = 0.456507 AR_2 = -0.997423 MA_1 = -0.452884 MA_2 = 0.996286	ω = 0.000005 α_1 = 0.150047 β_1 = 0.813198

| Belex15 | ARMA(2,2)-GARCH(1,1) (Normal distribution) | AR_1 = 1.328373
AR_2 = -0.362489
MA_1 = -1.195407
MA_2 = 0.250217 | ω = 0.000004
α_1 = 0.133084
β_1 = 0.815944 |
| | ARMA(2,2)-GARCH(1,1) (Student's *t* distribution) | AR_1 = 1.136307
AR_2 = -0.185718
MA_1 = -1.009894
MA_2 = 0.091118 | ω = 0.000003
α_1 = 0.127721
β_1 = 0.827727 |

Source: Authors' calculation

According to the determined parameters of the models (Table 3), it can be concluded that the stationary condition for GARCH(*p,q*) model is met. Regarding the ARCH parameter (α_1) in the cases of BET and Belex15 index, its value is greater than 0.1, which implies the fact that the volatility of these series is very sensitive to changes on observed stock markets (Alexander, 2008). The value of the GARCH parameter (β_1) is ranging from 0.7809 in the case of BET index to 0.8719 in the case of Athex index, which implies that there are different levels of volatility convergence to the long-term mean value. However, the long-term volatility effect ($\beta_1 > 0.9$) is not observed in any series analyzed.

Cost of Liquidity

Since liquidity is difficult to observe directly, literature about market liquidity focuses on one or several kinds of liquidity proxy. Each of the proxies provides information on different aspects of liquidity. On the other hand, market liquidity indices can combine different aspects of liquidity and they are usually based on measures of tightness and depth dimensions of market liquidity. The widely used liquidity measure in the liquidity-adjusted VaR is the bid-ask spread. However, in emerging markets, detailed transaction data on bid-ask spreads are not widely available, especially for long time series. Hence, we employ Amihud (2002)'s illiquidity measure that can be calculated using only daily data. Regarded as a ratio of the daily absolute return to the trading volume in monetary units, this measure of liquidity reflects a generalized approach to liquidity that captures both the exogenous illiquidity and the endogenous illiquidity. Applying this liquidity proxy, the illiquidity of stock *i* in day *t* is calculated in the following manner:

$$ILLIQ_t^i = \frac{\left| r_t^i \right|}{V_t^i} \tag{3}$$

where r_t and V_t are the return and volume (in ten millions of monetary units) for stock *i* on day *t*, respectively. In this paper, we use stock market indices and therefore, we will calculate the average liquidity measure for the stock markets selected.

Due to market capitalization changes during the observed period of time, we construct the scaled series $(m_h / m_1)ILLIQ_t^t$, where m_h is the total value of market capitalization

at the end of period h corresponding to day t, and m_1 is the total value of market capitalization at the beginning of October 2009. Finally, the applied illiquidity measure is calculated in the following manner:

$$CoL_t^i = \min\left\{\frac{m_h}{m_1} ILLIQ_t^i, 10.00\right\}$$ (4)

The statistical analysis of the observed market liquidity proxies presented in Table 4 shows that the mean of the daily liquidity cost varies depending on the market. The average daily cost of liquidity is relatively low on Athens Stock Exchange and Bucharest Stock Exchange, while on Belgrade Stock Exchange and Zagreb Stock Exchange, the recorded values are higher, as well as the volatility of these proxies measured by the standard deviation. The kurtosis of all liquidity cost indices is higher than three, which means that extreme values, i.e. the periods of illiquidity, are observed more frequently than for the normal distribution.

Table 4. The descriptive statistics of the average liquidity cost for selected markets in the period Oct. 2009 – Oct.2017

	Athex	BET	Belex15	Crobex10
N	1970	2014	2018	2000
Mean	0.003347	0.003902	0.021546	0.028404
Median	0.002467	0.002697	0.014870	0.021042
Max	0.036824	0.059383	0.302384	0.618868
Min	0.000005	0.000001	0.000000	0.000052
Standard deviation	0.003293	0.004378	0.023221	0.028969
Skewness	2.655806	3.858059	3.773677	5.524178
Excess Kurtosis	13.712940	27.364393	27.530531	88.831179
Jarque-Bera Test p-value	17634.22 (0.000000)	67501.47 (0.000000)	68182.89 (0.000000)	664411.75 (0.000000)
ADF Test p-value	-8.24 (0.01)	-8.22 (0.01)	-9.62 (0.01)	-9.323 (0.01)
Ljung–Box Test p-value	351.72 (0.000000)	890.98 (0.000000)	652.72 (0.000000)	224.39 (0.000000)
ARCH Test p-value	80.19 (0.000000)	287.33 (0.000000)	615.41 (0.000000)	5.59 (0.8485)

Source: The authors' calculation

Selected statistical tests prove that the characteristics of the observed liquidity cost series are very similar to the characteristics of the respective series of log-returns. According to the results of these statistical tests, it can be concluded that the liquidity cost series are first difference stationary, but significant serial correlation can be observed. On the other hand, the ARCH effects are evident in the series of liquidity cost on the Greek, Serbian and Romanian stock exchanges and the conditional standard

deviation in these cases will be modeled using the aforementioned model GARCH (1,1). In the case of Croatian stock exchange, the conditional standard deviation of the liquidity cost will be modeled using the EWMA model. The conditional mean will be modeled as a linear process due to the significant return autocorrelation, whereby the number of lags is limited to 2.

Table 5. The parameters of ARMA(*m*,*n*)-GARCH(*p*,*q*) models applied on the average cost of liquidity for selected markets in the period Oct. 2009 – Dec. 2016

Index	Model	Parameters	
Athex	ARMA(1,2)-GARCH(1,1) (Normal distribution)	$AR_1 = 0.963565$ $MA_1 = -0.952457$ $MA_2 = 0.069665$	$\omega = 0.000000$ $\alpha_1 = 0.118552$ $\beta_1 = 0.855067$
	ARMA(1,2)-GARCH(1,1) (Student's *t* distribution)	$AR_1 = 0.928010$ $MA_1 = -0.911016$ $MA_2 = 0.049594$	$\omega = 0.000001$ $\alpha_1 = 0.092486$ $\beta_1 = 0.827463$
BET	ARMA(2,2)-GARCH(1,1) (Normal distribution)	$AR_1 = 1.537242$ $AR_2 = -0.545388$ $MA_1 = -1.391565$ $MA_2 = 0.427536$	$\omega = 0.000001$ $\alpha_1 = 0.178504$ $\beta_1 = 0.811220$
	ARMA(2,2)-GARCH(1,1) (Student's *t* distribution)	$AR_1 = 1.306964$ $AR_2 = -0.340071$ $MA_1 = -1.208105$ $MA_2 = 0.283971$	$\omega = 0.000001$ $\alpha_1 = 0.102582$ $\beta_1 = 0.852534$
Belex15	ARMA(2,2)-GARCH(1,1) (Normal distribution)	$AR_1 = 1.823969$ $AR_2 = -0.826516$ $MA_1 = -1.706360$ $MA_2 = 0.717409$	$\omega = 0.000036$ $\alpha_1 = 0.132643$ $\beta_1 = 0.784878$
	ARMA(2,2)-GARCH(1,1) (Student's *t* distribution)	$AR_1 = 1.354941$ $AR_2 = -0.378114$ $MA_1 = -1.246051$ $MA_2 = 0.298331$	$\omega = 0.000021$ $\alpha_1 = 0.094400$ $\beta_1 = 0.870893$

Source: Authors' calculation

The covariance stationary condition for GARCH(*p*,*q*) model is met, since the sum of determined parameters of the models is less than 1 in all cases (Table 5). Regarding the ARCH parameter (α_1), in the case of BET index, its value is greater than 0.1, which implies the fact that the volatility of this series is very sensitive to changes on the observed stock market. The value of the GARCH parameter (β_1) implies that there are different levels of volatility convergence to the long-term mean value, but the long-term volatility effect ($\beta_1 > 0.9$) is not observed in any series analyzed.

Liquidity-Adjusted Value at Risk

In order to incorporate the liquidity risk into the VaR model, we use the liquidity-adjusted VaR (L-VaR) methodology developed by Bangia et al. (1999), which calculates L-VaR

in the following manner:

$$L - VaR_t^i = VaR_t^i(r_t^i) + \frac{1}{2}VaR_t^i(CoL_t^i)$$ (5)

where the symbols used represent VaR_t – conventional VaR for each stock index *i* in time *t*, CoL_t – cost of liquidity of each index *i* in time *t* that is constructed under the assumption that the liquidity cost is calculated using Amihud's measure of illiquidity (formula 4).

Using the mean-variance framework for measuring the market risk, the relative liquidity-adjusted VaR measure can be calculated using the following formula:

$$L - VaR_t^i = \mu_t^r + z_{1-\alpha}^r \sigma_t^r + \frac{1}{2}(\mu_t^P + \hat{z}_{1-\alpha}^P \sigma_t^P)$$ (6)

The conventional parametric VaR model used in this study is given by the first two terms on the right-hand-side of equation (6), where μ_r is the mean of daily log-returns, σ_r is the volatility of daily log-returns and $z_{1-\alpha}(r)$ is the standard normal variation for the chosen confidence level for VaR calculation. The VaR estimated in this manner is then augmented with a time-varying liquidity proxy by deducting the cost of half the worst values of the proxy, which implies that only one-way transaction costs are considered, as determined by μ_P - the liquidity proxy mean, σ_P - the liquidity proxy volatility and $z_{1-\alpha}(P)$ - the standard normal variation for the chosen confidence level for VaR of liquidity cost calculation.

Table 6. The conventional VaR prediction performance – results of the unconditional and conditional tests

Index	1-α$_{\%}$	%Violation		LR$_{UC}$		LR$_{CC}$		VaR$_{AVG}$	
		VaR$_{Gn}$	VaR$_{Gt}$	VaR$_{Gn}$	VaR$_{Gt}$	VaR$_{Gn}$	VaR$_{Gt}$	VaR$_{Gn}$	VaR$_{Gt}$
Athex	5.0	2.12	1.06	4.18602	8.99346	7.75404	9.03647	-2.22	-2.37
	2.5	0.53	0.53	4.41906	4.41906	4.42976*	4.42976*	-2.65	-2.83
	1.0	0.00	0.00	3.79903*	3.79903*	3.79903*	3.79903*	-3.14	-3.36
BET	5.0	1.60	1.06	6.17406	6.17406	6.27189	6.27189	-1.20	-1.22
	2.5	0.53	0.53	4.37906	4.37906	4.38982*	4.38982*	-1.44	-1.46
	1.0	0.00	0.00	3.77893*	3.77893*	3.77893*	3.77893*	-1.71	-1.74
Belex15	5.0	1.06	1.06	8.91221	8.91221	8.95545	8.95545	-1.05	-1.05
	2.5	1.06	1.06	2.02192*	2.02192*	2.06516*	2.06516*	-1.25	-1.26
	1.0	0.00	0.00	3.77893*	3.77893*	3.77893*	3.77893*	-1.48	-1.49

Index	1-α$_{\%}$	EWMA VaR			
		%Violation	LR$_{UC}$	LR$_{CC}$	VaR$_{AVG}$
Crobex10	5.0	4.79	0.022904*	0.647826*	-1.13
	2.5	4.25	1.933736*	2.889228*	-1.35
	1.0	2.66	3.560592*	3.833850*	-1.60

LR$_{UC}$ – the unconditional coverage test Likelihood Ratio statistic, LR$_{CC}$ – the conditional coverage test Likelihood Ratio statistic, VaR$_{AVG}$ – average value of VaR

Source: Authors' calculation

In order to highlight the importance of liquidity risk for market risk assessment, we decompose the total risk into components and define the relative liquidity impact as:

In this study, we predicted a one-day-ahead VaR for confidence levels of 95%, 97.5% and 99%, using a sliding window of 7 years (the number of trading days is different for each market). The results of EWMA and ARMA-GARCH-type models applied in modeling the conventional VaR were tested using the unconditional (Kupiec, 1995) and conditional (Christoffersen, 1998) test. In all cases, ARMA-GARCH-type models provide acceptable results of the calculated VaR, except for a VaR with a 99% confidence level (Table 6). The GARCH-type volatility models with Student's *t* distribution of innovations provide more adequate results for the calculation of a VaR with a 97.5% confidence level, especially in the case of log-returns on Belex15 index.

The back testing conducted on the predicted conventional VaR of log-returns on Crobex10 index proved that the applied EWMA model is adequate for modeling VaR with all levels of confidence.

$$l_t^i = \frac{L - VaR_t^i - VaR_t^i}{VaR_t^i} \qquad (7)$$

This ratio can be observed as the measure of liquidity's relative significance in market risk assessment.

Results and discussion

In this study, we analyzed the significance of liquidity risk for the adequate estimation of market risk using the widely accepted parametric Value at Risk model. The worst liquidity cost was modeled using Amihud's measure and added to the conventional VaR model in order to calculate the liquidity-adjusted VaR as it was shown in the previous section. For the estimation of price risk and liquidity risk, we used the analytical VaR model and estimated the parameters of the model using the EWMA and ARMA-GARCH-type of models. In this study, we used two GARCH(1,1) models for volatility modeling: the GARCH(1,1) model that assumes that the innovation term follows a standard normal distribution and the GARCH(1,1) model with Student's *t* distributed innovations. By combining the estimations of these models, we obtained two models for L-VaR in the case of Athex, Belex15 and BET index and one EWMA model for calculation of L-VaR in the case of Crobex10 index.

Following similar researches on liquidity risk in developed and developing markets (Lesmond, 2005; Stange and Caserer, 2009), we can conclude that more developed markets have lower liquidity risk. In this study, the lowest liquidity risk is observed in the Athens Stock Exchange, since the relative liquidity impact on total market risk is in the range of 3.04 to 5.12% (Table 7). All tested L-VaR models are acceptable regarding the results of conditional and unconditional back tests. However, the standard deviation of the results achieved is smaller in the case of ARMA(1,2)-GARCH(1,1) model with Student's *t* distribution of innovations and it ranges from 0.38 to 0.53%.

Table 7. The mean predicted value of L-VaR and the liquidity component *l* in the case of Athex index

Index	1-α%	Liquidity-adjusted Value at Risk model			
		ARMA(1,2)-GARCH(1,1)		ARMA(1,2)-GARCH(1,1)	
		(Normal distribution)		(Student's *t* distribution)	
		L-VaR	*l*	L-VaR	*l*
Athex	5.0	-2.28	3.04	-2.47	4.01
	2.5	-2.75	3.77	-2.96	4.62
	1.0	-3.28	4.37	-3,53	5.12

Source: Authors' calculation

Depending on the size and level of development, there is also a significant difference in the liquidity risk on the Belgrade Stock Exchange and the Zagreb Stock Exchange on one side, and the Bucharest Stock Exchange on the other side. The illiquidity of the Bucharest Stock Exchange can increase the value of total liquidity-adjusted VaR by 8.07 to 13.48% (Table 8). According to the results of used back tests, both types of models are acceptable for modeling the market risk including liquidity implications, but results obtained by implementing the ARMA(2,2)-GARCH(1,1) model, assuming that innovations are Student's *t* distributed, are more stable, since the standard deviation is ranging from 0.38 to 0.54% compared to the standard deviation of L-VaR ranging from 0.44 to 0.64% in the case of Gausian distributed innovation process assumption.

Table 8. The mean predicted value of L-VaR and the liquidity component *l* in the case of Belex15 and BET index

Index	1-α%	Liquidity-adjusted Value at Risk model			
		ARMA(2,2)-GARCH(1,1)		ARMA(2,2)-GARCH(1,1)	
		(Normal distribution)		(Student's *t* distribution)	
		L-VaR	*l*	L-VaR	*l*
Belex15	5.0	-1.62	55.64	-1.83	73.88
	2.5	-2.09	68.14	-2.31	83.95
	1.0	-2.64	78.37	-2.87	92.20
BET	5.0	-1.20	8.07	-1.35	10.82
	2.5	-1.58	9.88	-1.64	12.29
	1.0	-1.91	11.35	-1.97	13.48

Source: Authors' calculation

Analyzing the liquidity of the least developed frontier markets – Serbian and Croatian, we can conclude that those markets have remained very low liquid even in the post-crisis period. The relative liquidity impact in the case of the Belgrade Stock Exchange is ranging from 55.64 to 92.20%, while on the Zagreb Stock Exchange, the liquidity

cost can increase the price risk by 53.27 to 94.92%. The L-VaR models applied on the log-returns of indices of these markets are acceptable regarding the results of the unconditional and conditional back tests. In the case of Belgrade Stock Exchange, more stable results are achieved using the ARMA(2,2)-GARCH(1,1) model with Gausian distributed innovation process (standard deviation ranges from 0.33 to 0.50%). However, the L-VaR in the case of Crobex10 index (Table 9) exhibit more volatility compared to the other markets, since the standard deviation of results obtained is ranging from 1.23 to 1.75%.

Table 9. The mean predicted value of L-VaR and the liquidity component *l* in the case of Crobex10 index

Index	$1-\alpha_\%$	Liquidity-adjusted Value at Risk model	
		EWMA volatility model	
		L-VaR	*l*
Crobex10	5.0	-1.89	53.27
	2.5	-2.52	76.14
	1.0	-3.25	94.92

Source: Authors' calculation

Although the results imply that liquidity risk still affects the evaluation of market risk in frontier markets significantly, recognizing the liquidity risk is important for a financial stability analysis. Considering the fact that the econometric estimation of VaR can be determined by the volatility model chosen (Bucevska, 2013; Miletić and Miletić, 2013), the proposed model for predicting the value of L-VaR can be considered adequate in the scope of this research. Regarding the importance of volatility modeling in emerging markets, future research will include testing of asymmetric GARCH-type models. However, according to the backtest results, the findings reported in this study can be used to detect the emerging vulnerabilities and define mitigating actions on the stock markets analyzed.

Conclusion

Liquidity risk is an aspect of market risk that has been largely neglected by conventional Value at Risk models. This negligence is partly due to the fact that there is a large number of various liquidity measures, but also a theoretical discussion on the effectiveness of a single measure to capture the various aspects of liquidity in financial markets. Having in mind that the Amihud's measure is considered the most generalized one, which more closely follows the presented Kyle's (1985) price impact definition of liquidity, in this study, we used this measure to estimate liquidity risk and apply it in the liquidity-adjusted Value at Risk model provided by Bangia et al. (1999) to measure market risk on the emerging and frontier European stock markets.

The results achieved show that frontier markets remain low liquid despite their constant improvements and development. Liquidity risk can increase the estimation

of market risk in these cases up to more than 90%. On the other hand, as the market develops and trades become more frequent, liquidity risk is lower. Therefore, more developed markets show a significantly lower level of liquidity risk that can increase the estimation of market risk by 14%. However, it can be observed that the preciseness of liquidity risk measurement is determined by the sample and liquidity proxy used. A longer sample with more varieties of events in the market will deliver a more accurate result. This conclusion opens some future research questions.

Given the data limitations in the stock markets analyzed, we can conclude that the historical data used may not contain the extreme shocks, since data samples started after the financial crisis. The severity of the liquidity problems observed and showed by the used L-VaR model is relative to the severity of the problems included in the considered sample. In order to obtain a more accurate prediction of L-VaR, extreme shocks could be simulated using the experiences from other developed and developing markets and in that manner, the robustness of the proposed model can be tested.

Also, it is important to recognize that there is no universal proxy that best captures liquidity across different emerging markets. Considering the availability of data, the proxies used in emerging markets are low-frequency proxies, but certain proxies are more suitable to a specific region or country than others. Although the Amihud's measure is the most effective price-impact proxy, further research may analyze other proxies in order to obtain more accurate results that can be implemented in financial decision-making.

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THE DETERMINANTS OF CORE INFLATION IN THE REPUBLIC OF MACEDONIA

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Abstract

We investigate the determinants of core inflation in Macedonia and show that the most important drivers of the cumulative core inflation in the post crisis period i.e. between 2010-16 relative to 2008-09 are underutilization of labor in the form of involuntary part-time employment and headline unemployment rate. Both indicators have contributed positively to cumulative core inflation since 2015 but headline unemployment rate much less so. The contribution of trend productivity growth has remained negligible. Sluggishness in core inflation faced against the background of relatively buoyant activity in the post-crisis period—has corresponded with slow pass through from declining unemployment rates to faster wage growth. We suggest that core inflation rates in Macedonia will likely remain low unless wage growth speeds-up beyond productivity growth more sustainably.

Keywords: *Core inflation, unemployment, productivity, underemployment*

JEL classifications*: E2, E24, C22*

1. Introduction

Low and stable inflation is essential for macroeconomic stability and sound financial system. High inflation erodes the purchasing power and distorts the income distribution in favor of high-income households. The role of the central bank is to achieve price stability which in turn will lead to predictable economic environment, hence improve income distribution and reduce poverty. The central bank can choose different tools and various monetary policy channels to achieve price stability.

Inflation has slowed-down markedly in many economies over the last 7-8 years. According to the IMF – WEO 2016 Report, the subdued inflation coincided with a

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sharp drop in oil and other commodity prices, thus core inflations, (i.e. price change of goods and services minus food and energy) remain below central bank targets for several consecutive years in most of the major advanced economies. Sluggishness in core inflation in Macedonia —a somewhat surprising factuality in view of relatively buoyant activity in the post-crisis period—has coincided with slow transmission of declining unemployment rates into faster wage growth. The analysis also reveals continued spare capacity in labor market as a key impediment: wage growth has been moderate because the proportion of workers involuntarily working part-time remains at a relatively high level. Namely, once firms and workers become more confident about the economic prospects, and once labor markets start reflecting consecutive positive net employment scores, wages should accelerate. As a consequence, the core inflation will eventually pick-up as well. However, the still weak productivity gains in the post-crisis period may have been a key drag behind the subdued wage growth.

To this end, the impact of year over year trend productivity growth on wage growth between 2013-15 has reached values beyond 1, but with rapidly propagating downward pattern. Moreover, in 2016 we observe less than one-for-one association between these two variables, which indicates that some of the productivity gains are translated into higher profits. Core inflation rates will likely remain low unless wage growth accelerates beyond productivity growth in a sustained way.

In this paper we employ regression analysis to determine the influence of a group of structural indicators on the core inflation in Macedonia. With this regard, we show that the most important factors behind the cumulative core inflation in the post-crisis period i.e. between 2010-16 relative to 2008-09 are underutilization of labor in the form of involuntary part-time employment and headline unemployment rate. Both indicators have contributed positively to cumulative core inflation since 2015 but headline unemployment rate much less so. The contribution of trend productivity growth has remained negligible.

The rest of the paper is structured as follows: Section 2 briefly reviews the field literature; Section 3 discusses the econometric method, along with the data we used, in parallel presenting the estimates we obtain; Section 4 concludes.

2. Literature review

A large array of studies empirically examines the nexus among budget deficit, output gap, money supply and inflation (Catao (2003), Gerald P. (2001) and Gerslach S (2006) among others). However, a recent strand in the literature put greater emphasis on the structural determinants like for instance, productivity, unemployment rate, underemployment, wages and labor costs. Some of these factors are analyzed in the context of core inflation in this work as well. To this end, Howel C. (1992) was arguing that productivity growth was the main reason behind the low inflation in the period 1990-1992. Hufner F. (2007) had the same conclusion arguing that wage growth has lagged productivity growth thus keeping unit labor costs down, and in turn contributing to low core inflation. This corroborates with Kim S. (2013) who argue that increase in labor productivity and Total Factor Productivity reduces Consumer price inflation.

Moreover, Caisha Bank Research (2018) presents evidence that the relationship between these two variables is actually ambiguous. They argue that on the one hand, the larger number of goods and services resulting from higher productivity should push down prices, given a certain rise in wages, but on the other hand higher productivity growth could also result in larger wage demands by workers and this could also affect prices, especially if such demands are greater than what would be justified by the productivity gains.

Underemployment represents a measure of employment and labor utilization in the economy that looks at how well the labor force is being utilized in terms of skills, experience and availability to work. Labor that falls under the underemployment classification are mainly part-time workers who would prefer to be full time but it also includes those workers who are highly skilled but working in low paying jobs[3]. Underemployment as a determinant of the inflation rate has being a part of a large number of empirical works. For instance, Mitchel W. (2013) was arguing that short-term unemployment rate constrains the annual inflation rate more than the overall unemployment rate and that the level of underemployment exerts a separate negative impact on the inflation process. Furthermore, underemployment is considered to be a reason behind the low wage growth which is also a determinant of the low inflation in the recent years (Blanchflower D. 2018).

Blanchflower D (2014) in the case of UK provides evidence that the rise in underemployment represents an additional amount of spare capacity that pushes down on wages, just as the inactivity rate does in the case of US. The IMF's World Economic Outlook 2017 is focusing on wage developments, and they find that the bulk of the wage slowdown can be explained by labor market slack (both headline unemployment and underutilization of labor in the form of involuntary part-time employment), inflation expectations, and trend productivity growth. Consequently, while involuntary part-time employment may have helped support labor force participation and facilitated stronger engagement with the workplace than the alternative of unemployment, it also appears to have weakened wage growth.

Our work follows the approach employed by Caisha Bank Research (2018). Their results show that, jointly, labor market slack (measured by headline unemployment rate and underemployment) and trend productivity growth account for two thirds of the core inflation dynamics between 2014 and 2016. They find, somewhat surprisingly, that the unemployment rate has limited predictive capacity. On the contrary, the remaining variables are good predictors of the core inflation trend, particularly the underemployment rate (23% of the trend observed). Perhaps the most interesting finding is that one third of the observed variation in inflation remains unexplained.

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3   According to Eurostat, an underemployed part-time worker is a person aged 15-74 working part-time who would like to work additional hours and is available to do so. Part-time work is recorded as self-reported by individuals. This statistical indicator covers persons who, in spite of being employed, do not work full-time and lack a sufficient volume of work, which is somewhat similar to being unemployed. The part-time requirement in the definition is important because the people who work full-time and still want to work more hours have a different profile: in spite of working many hours they have insufficient income; underemployed part-time, on the other hand, highlights situations of insufficient volume of work and underutilised labour among persons already employed.

3. Data and methodology in a nutshell

Core inflation in Macedonia averaged 1.8% between 2010-13, and it has oscillated around 0.6% since 2014 (i.e. between 2014-16). This paper finds that the bulk of the core inflation slowdown since 2014 can be explained by labor market variables (both unemployment rate as a headline or benchmark indicator and underutilization of labor in the form of involuntary part-time employment as a supplemental indicator aiming to provide somewhat richer picture about the labor market developments) , and trend productivity growth.

While involuntary part-time employment may help to sustain labor force participation, it also appears to have slowed-down wage growth. Figure 1 documents this status.

Figure 1. Wage elasticity of involuntary part-time employment shares, recursive coefficient estimates
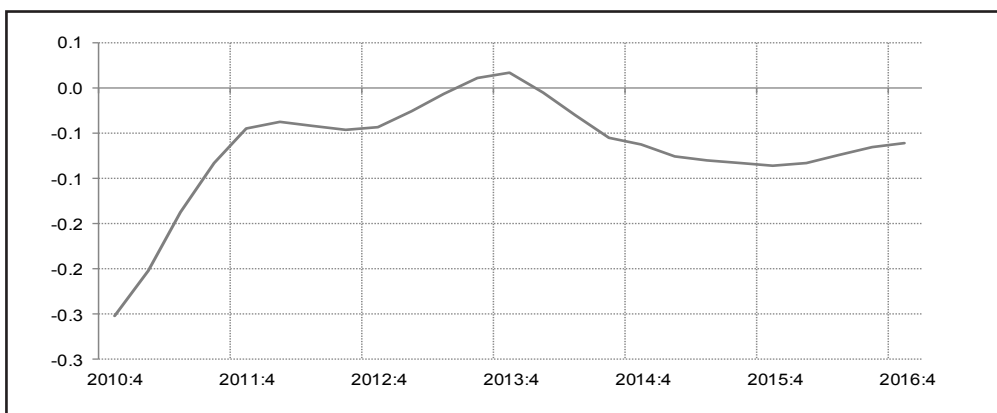
The coefficients at the beginning of the reporting period are, however, less precisely estimated than the later coefficients due to smaller samples
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

This factuality is observed despite the environment of continuously declining unemployment rate in the post-crisis period. Therefore, a more comprehensive outlook of the labor market emerges by taking into account supplementary indicators that in fact highlight some slack in the labor market that is not captured by headline unemployment rates.

Figure 2 documents that involuntary part-time employment between 2010-16, on average remains just slightly below the level registered during the crisis period (2008-2009). Moreover, in 2015 the involuntary part-time share of employment is even higher than it was during the crisis. This happens against the background of relatively rapid decrease of the underlying unemployment rate (unemployment rate in 2016 is 9.2 p.p. below the level registered in 2008-2009 on average).

Figure 2. Unemployment, productivity and labour underutilization, Difference relative to 2008-09 average (in p.p.)
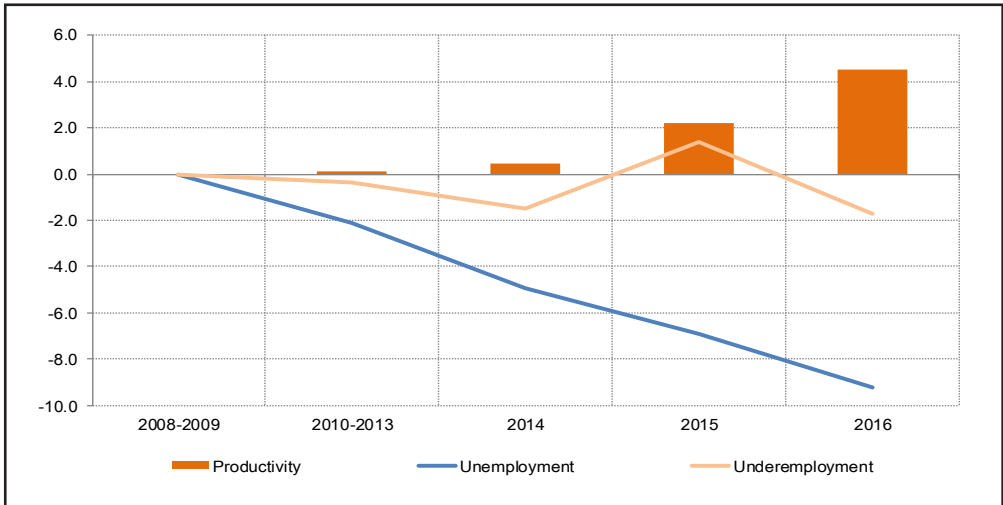
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

This subsection provides a quantification of each factor's impact on inflation. One useful benchmark is the IMF wage growth analysis for all developed economies. A similar methodology is used in this article but focusing on core inflation rather than wages. To this end, our work closely reflects Caixa bank research (2018).

Thus, analogous to Caixa bank research (2018) the following equation is estimated:
$\pi_{i,t} = \alpha + \rho_{\pi,t-1} + \beta u_t + \gamma prod_t + \delta sube_t + \varepsilon_t$, in which π denotes core inflation, u the unemployment rate, prod the three-year moving average of labour productivity growth, sube the underemployment rate, and ε the residual of the regression, t denotes the period of time. The sample consists of quarterly data between 2008 and 2016.

Table 1. Estimation output

Equation	β_1	β_2	β_3	β_4
$\pi_t = \beta_0 + \beta_1 \pi_{t-1} + \beta_2 u_t + \beta_3 \, prod_t + \beta_4 \, sube_t + e_t$	-0.243 (0.14)	-0.112 (0.41)	-0.015 (0.92)	-0.145*** (0.01)

The values in (.) are p-values. *** denotes the 1% significant level

The regression analysis indicates that only the involuntary part-time employment share as a broader measure of labor market slack is statistically significantly associated with the core inflation, with expected sign (negative coefficient). Namely, measured unemployment rates may not accurately capture the slack in the labor market in Macedonia. Furthermore, "to the extent that declining unemployment rates partly reflect workers forced into part-time jobs, increases in such types of employment may overstate the tightening of the labor market. Specifically, these workers may be willing to accept slower increases in wages and, at the same time, may continue to seek full-time employment and open-ended contracts. By doing so, they compete with workers

employed under more traditional arrangements and, so, weigh on their wage growth as well. True labor market slack may therefore be larger than suggested by headline unemployment rates" Caixa bank research (2018).

To this end, a higher share of involuntary part-time employment is associated with lower core inflation. On average, a 1 percentage point increase in the involuntary part-time employment share is associated with a 0.1 percentage point decline in core inflation. The coefficient is statistically significant.

Figure 3. Contribution to the core inflation, Difference relative to 2008-09 average (in p.p.)
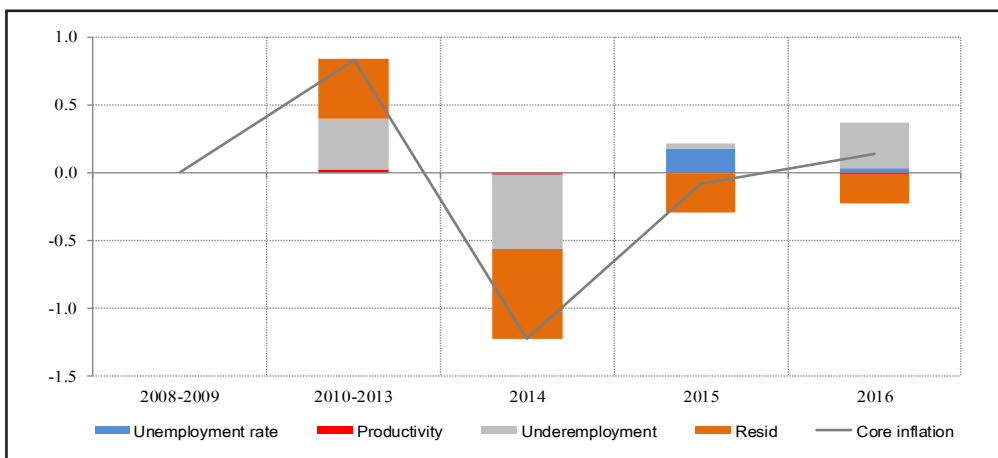
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

In addition, a 1 percentage point increase in the unemployment rate is associated with a 0.1 percentage point decline in core inflation. Although with the expected sigh, the coefficient is statistically insignificant.

A 1 percentage point increase in trend productivity growth is associated with a 0.01 percentage point decline in core inflation, but in this case as well, the coefficient is not statistically significant. This finding corroborates with Caixa bank research (2018), and it implies that larger number of goods and services resulting from higher productivity weigh down on prices, in an environment of subdued raise in wages.

The empirical evidence suggests that in the most recent period, the association between y-o-y nominal wage growth and the trend productivity growth turns smaller than one-for-one. To this end, in 2016 a 1 percentage point increase in trend productivity growth is associated with a 0.9 on average percentage point annual increase in nominal wages.

In 2016, the impact of trend productivity growth on wage growth (year over year growth rates) fell below 1.

Figure 4. Wage elasticity of trend productivity growth, Recursive coefficient estimates
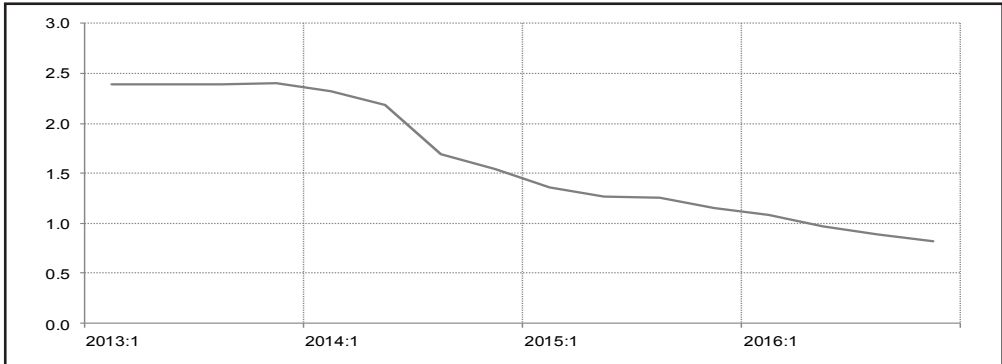
The coefficients at the beginning of the reporting period are, however, less precisely estimated than the later coefficients due to smaller samples
Source: Authors' calculations based on data from State Statistical Office

A coefficient smaller than 1 implies a less than one-for-one association between productivity growth and wage growth, and indicates that some of the gains from higher productivity growth translate into higher profits. Core inflation rates will likely remain low unless wage growth accelerates beyond productivity growth in a sustained manner.

The results also show that, together, these three factors (labor market slack (both headline unemployment and underutilization of labor in the form of involuntary part-time employment), and trend productivity growth) account for about one third of the cumulative core inflation between 2010 and 2016 (see the Figure 5). We find, somewhat surprisingly, that the unemployment rate and the trend productivity growth have very limited predictive capacity (accounting for around 7% and 2% of the trend observed). On the contrary, much better predictor of the inflation trend is the underemployment rate (around 62% of the trend observed).

Perhaps the most interesting finding is that 30% of the observed cumulative core inflation between 2010-16 remains unexplained.

Figure 5. Contribution to the core inflation trend, Cumulative difference
relative to 2008-09 average (in p.p.)
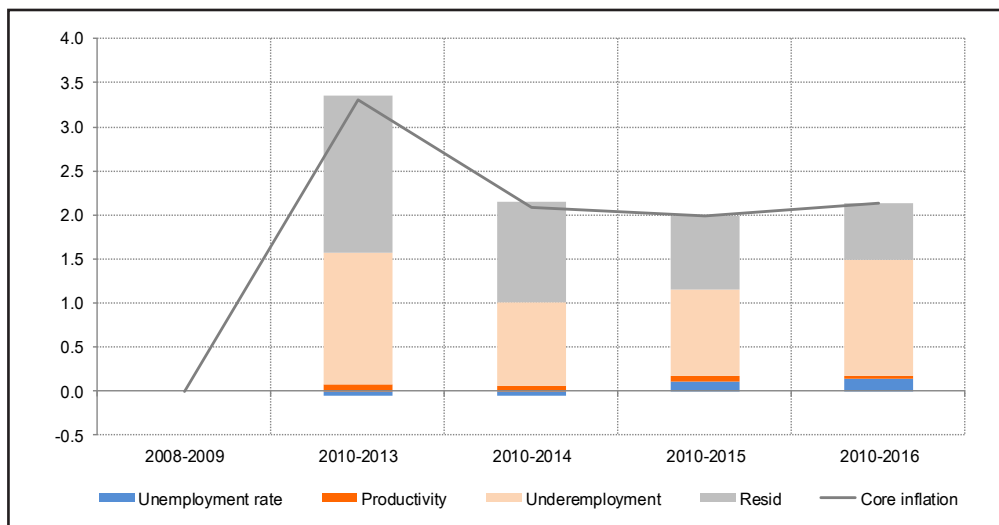
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

4. Conclusion

This paper aims at highlighting the empirical determinants of core inflation in Macedonia. To this end, we explore their relative contributions to the actual core inflation since 2008 to explain why core inflation is relatively sluggish in the post-crisis period. The findings show that the most important factors behind the cumulative core inflation in the post crisis period i.e. between 2010-16 relative to 2008-09 are underutilization of labor in the form of involuntary part-time employment and headline unemployment rate. Both indicators have contributed positively to cumulative core inflation since 2015 but headline unemployment rate much less so. The contribution of trend productivity growth has remained negligible. Relatively low inflation despite economic recovery has given rise to the question of "missing inflation" While GDP is on the rise, some slack may still be present [adaptation from ECON Committee Report from February 2018]. To this end, our work suggests that wage growth may continue to remain subdued until involuntary part-time employment diminishes or trend productivity growth picks up. Consequently, core inflation rates will also likely remain low unless wage growth accelerates beyond productivity growth more sustainably.

Appendix

Figure 1. Contribution to the core inflation
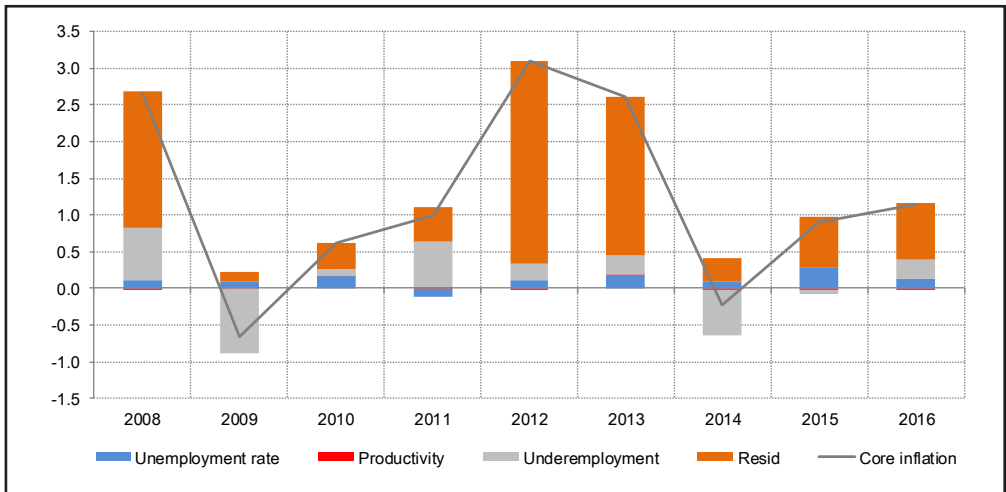
Source: Authors' calculations based on data from State Statistical Office and EUROSTAT

Figure 2. Sectoral contributions to annual growth rates of labour productivity (in p.p.)
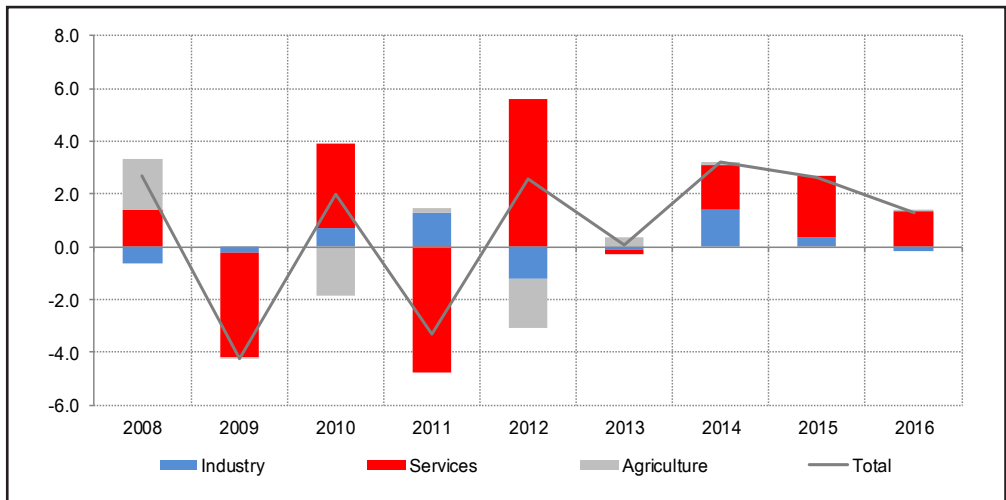
Source: Authors' calculations based on data from State Statistical Office

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EMPIRICAL EVALUATION OF WEAK-FORM EFFICIENT MARKET HYPOTHESIS IN UGANDAN SECURITIES EXCHANGE

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Abstract

An efficient stock market plays an important role in stimulating economic development through providing a channel for mobilising domestic savings and facilitating the allocation of financial resources from dormant to more productive activities. This paper evaluates the Ugandan Securities Exchange (USE) for evidence of a weak-form efficient market hypothesis in the context of random walk model, using both linear and non-linear models. The preliminary analysis from the USE daily returns, for the September 1, 2011 to December 31, 2016 period, shows negative skewness, leptokurtosis, and non-normal distribution. Estimates from the linear models show evidence of weak-form efficiency. Conversely, estimates from non-linear models show evidence against weak-form efficiency of the USE. The study concludes that USE returns may only be predicted using non-linear models and fundamental analysis. In other words, linear models and technical analyses may be clueless for predicting future returns.

Keywords: Weak-form efficiency, random walk, linear and non-linear models, Ugandan securities exchange

JEL Classification: G14

Introduction

An efficient stock market plays an important role in stimulating economic development through providing a channel for mobilising domestic savings and facilitating the allocation of financial resources from dormant to more productive activities (Emenike, 2009; Ntim, Opong, Danbolt and Dewotor, 2011; Maghanga and Quisenberry, 2015). Increased investment in productive activities, in turn, leads to employment creation,

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income generation, while a larger percentage of the population earning incomes, savings and consumption will result in a cycle of increased investment, increased production, and enhanced economic development. In addition, an efficient stock market encourages listed companies to observe better corporate governance through full disclosure requirements, hence leading to a greater transparency in the business sector and lower incidences of corruption. Even more so, an efficient stock market enhances the inflow of international capital through foreign portfolio investments. Understanding the level of stock market efficiency is thus very important for capital market authorities, stock market participants and scholars.

Efficient market hypothesis (EMH) is almost certainly the right place to start when thinking about stock market efficiency. The EMH states that in an efficient market, asset prices at all times fully reflect all available information (Fama, 1965). Thus, asset prices at any point in time are an unbiased reflection of all available information on the assets' expected future cash flow. Fama (1970) categorised market efficiency into three levels depending on how quickly information is impounded into prices: weak form EMH, semi-strong form EMH, and strong form EMH. The weak form efficiency, which is the lowest level of efficiency, asserts that stock prices already reflect all information that can be derived by examining market trading data such as the history of past prices, trading volume or short interest (Bodie, Kane and Marcus, 1999: 331). This implies that history of stock prices, trading volume or short interest is clueless for predicting future stock price changes. Semi-strong form EMH holds that security prices already fully reflect all publicly available information regarding the prospects of a firm. This means that market participants cannot consistently outperform the market by analysing published information, because such information is instantaneously adjusted into prices once it is released. Lastly, strong form efficiency posits that in addition to information on past prices and publicly available information, security prices reflect information available only to company's insiders. This study is concerned only with the weak form efficiency, which is the lowest level of market efficiency. Absence of weak form efficiency in the Ugandan Securities Exchange (USE) will imply absence of higher levels of efficiency, since as Wong and Kwong (1984) observe, the failure to prove weak form efficiency implies the failure to prove both semi-strong and strong form efficiency.

The enormous scholarly interest in stock market efficiency is built on the insight, now well researched, that there are close links between stock market efficiency and greater transparency in asset price discovery. Numerous empirical studies have examined weak form efficiency of stock markets in developed, emerging and developing countries (see for example, Kendal, 1953; Fama, 1965; Emenike, 2009; Lim, Huang, Yun, & Zhao, 2013; Alkhatib & Harasheh, 2014; Konak and Şeker, 2014;). Most of the studies conducted in developed economies agree that stock price changes are random and that past prices are not useful in predicting future price changes, particularly after transaction costs have been taken into consideration. The results of studies on weak-form efficiency from emerging markets have been mixed. In the Ugandan context, however, there is a dearth of empirical literature on stock market efficiency. This dearth of research, providing empirical evidence to support or dispute efficiency according to Simons and Laryea (2004), may explain why many African

countries have not attracted much portfolio or equity investment as the Asian and Latin American countries. The very few available literature pieces provide conflicting evidence (see, Ssemuyaga, 2012; Watundu, Kaberuka, Mwelu and Tibesigwa, 2015). Watundu, *et al.* (2015) for example, conclude amongst others, that USE is weak-form efficient based on absence of first order serial correlation in the daily returns increments for the 2005–2012 period. They attributed their findings to few listed companies and less liquidity. Ssemuyaga (2012) concludes that the USE is inefficient at the weak form for the 2006 to 2010 period. These studies also failed to identify the version of random walk model examined. There is therefore a need for empirical evidence-based knowledge on the nature of weak-efficiency of the USE.

The purpose of this study therefore is to evaluate whether weak-form efficient market hypothesis holds for USE by analysing serial correlation (RWM 3) and independence (RWM 2) in the market's returns increments. This study is useful to the investors, regulators and participants of the USE as well as to future researchers. To the investors for example, the findings highlight the extent to which history of prices influences current securities indices on the bourse. To the regulators, the study provides a basis for formulating policies that will enhance USE efficiency, which will, in turn, boost investors' confidence in the market. The study is also useful to scholars as it provides recent evidence on the nature of weak-form efficiency of the USE. It will serve as reference material to future researchers. The remainder of the paper is organised as follows: the next section presents an overview of the USE and theoretical framework. Section three contains data and techniques of analysis, while section four provides results and discussions. Section five provides the conclusions.

2. Overview of USE and Brief Review of Empirical Literature

2.1. Overview of USE

The Uganda Securities Exchange (USE) was established in 1997 as a company limited by guarantee and incorporated in Uganda under the Ugandan Companies Act. The USE was licensed to operate as an approved Stock Exchange in June 1997 by the Capital Markets Authority (CMA) of Uganda under the Capital Markets (Licensing) Regulations 1996 and the Capital Markets Authority Amendment Act 2016. The Exchange is governed by the Uganda Securities Exchange Limited Rules 2003. The principal activity of the Exchange is to provide a central place for trading of securities and regulation of licensed brokers/dealers. It provides a credible platform for raising capital through the issuance of appropriate debt, equity and other instruments to the investing public. The Exchange therefore provides essential facilities for the private sector and government to raise money for business expansion and enables the public to own shares in companies listed on the Exchange (Uganda Securities Exchange, 2015).

The exchange opened to trading in January 1998. At that time, the exchange had just one listing, a bond issued by the East African Development Bank. Trading was limited to only a handful of trades per week. As of July 2014, the USE traded 16 listed local

and East African companies[3] and had started the trading of fixed income instruments (Muhumuza, 2015). The exchange is a member of the African Stock Exchanges Association.

The USE launched the USE All Share Index (ASI) on the 31st of December 2001, with a base value of 100 basis points. The USE ASI tracks general market movement of all listed equities on the bourse regardless of capitalisation. The index is a market capitalization weighted average index with a base value of 100 points. The ASI is calculated on a daily basis, and adjusted for corporate actions, new listings, right issue and placing. As at 30 December 2017, the ASI stood at 1477 points.

During the first quarter of 2010, the USE automated a securities central depository, paving the way for clearing and settlement of securities to be done electronically. In the same year, the USE was the best performing stock exchange in Sub-Saharan Africa, with an All-Shares Index return of 74% between January and November 2010.

On 20 July 2015, the USE initiated its electronic trading platform, backed by three independent data servers, resulting in a T+3 trade settlement cycle from the previous T+5 cycle.

Trading of listed equity securities is conducted in sessions commencing at 9.00 a.m. and closing at 3.00 p.m. each day (USE Equity Trading Rule, 2015).

The transaction fee for equity trade is 2.1% of the trade value. This comprises the broker, 1.7%; the USE, 0.14%; the CMA, 0.14%; the compensation fund, 0.02%; and the Securities Central Depository 0.1% of the value of the trade (USE Fee, Charges and Penalties Rules, 2012).

The equities market of the USE comprises the Main Investment Market Segment[4] (MIMS) and the Growth Enterprise Market Segment (GEMS). The MIMS is the main market for established and large companies looking to raise funding, whereas the GEMS was introduced in recognition of the fundamental role of Small and Medium Sized Enterprises (SMEs) as a major driver of Ugandan economy and ultimately the overall financial system of Uganda. While the eligibility criteria on MIMS are stringent, the eligibility criteria for raising financing through the GEMS are significantly less stringent compared to those on the MIMS (USE Growth Enterprise Market Segment Rules, 2012). Companies on the MIMS segment must have a minimum share capital of Ush. 1 billion and net assets of Ush. 2 billion. The initial listing fees for MIMS, for example is 0.2% of the value of the security to be listed, but 0.1% for GEMS. Similarly, the annual listing fee for MIMS is 0.05% of market capitalization of the issuer subject to a minimum of 200 currency points and a maximum of 5,000 currency points, whereas it is 0.05% of market capitalization of the issuer subject to a maximum of 1000 currency points for GEMS (USE Fee, Charges and Penalties Rules, 2012).

The Fixed Income Securities Market (FISM) Segment provides a platform for fixed

3   See appendix I for details of listed companies.
4   The MIMS segment of the USE currently has 16 listed equities comprising of 8 locally listed equities and 8 equity securities which are cross listed from the Nairobi Securities Exchange in Kenya.

income securities. The FISM segment aims at providing a separate independent market for companies wishing to raise financing through issuance and listing of fixed income securities, such as corporate bonds, preference shares and debenture stocks. It also provides the market for investors wishing to trade the above securities at the exchange. The segment also lists other short-term financial instruments such as treasury bills and commercial papers. The FISM Segment currently has 6 corporate bonds and 39 Government of Uganda Treasury Bonds listed. The listing fees in FIMS is 0.1% of the value of securities to be listed subject to a minimum of 200 currency points, and the annual listing fee is 0.025% of market capitalization of the outstanding listed securities subject to a minimum of 150 currency points (USE Fee, Charges and Penalties Rules, 2012).

The Exchange has eight (8)[5] Securities Central Depository Agents (SCDAs) who are also licensed to act as both broker/dealers and Investment Advisors.

2.2. Efficient Market Hypothesis and Random Walk Hypothesis

The theory underpinning the examination of USE returns for evidence of weak-form efficiency is the Random Walk Hypothesis (hereafter, RWH). A random walk, according to Malkiel (1999: 24), is one in which future steps or directions cannot be predicted on the basis of past actions. When the term is applied to the stock market, it means that short-run changes in stock prices cannot be predicted. Investment advisory services, earnings predictions, and complicated chart patterns are useless. RWH holds that the news arrives randomly, and, because markets are efficient, security prices adjust to the arrival of news (Strong, 2003: 244). In other words, the direction, as well as the size of change in a stock price, is random and cannot be predicted from past information about share prices. Campbell, Lo and Mackinlay (1997, 31-33) summarize three versions of RWH based on the characteristics of increments. Random walk I (hereafter *RW1*) implies that price increments are independent and identically distributed. This implies that increments are uncorrelated and any nonlinear functions of the increments are also uncorrelated. The assumption of identically distributed increments, however, is not plausible for financial assets prices over long periods of time spans because of the changes in probability distributions of financial assets returns resulting from changes in the economic, technological, institutional and regulatory environment surrounding the asset prices (Emenike, 2016).

As a result of implausibility of identically distributed increments, Random walk II (*RW2*) assumes independent but not identically distributed (*inid*) increments and thus allows for heteroscedasticity in increments. The *RW2* therefore allows for unconditional heteroscedasticity, which is a particularly useful feature of time variation in volatility of many financial assets. Relaxing the identical distribution assumption in *RW2* does not change the main economic property of increments, that is, prediction of future price increments cannot be estimated using past price increments (Campbell, Lo & Mackinlay, 1997: 33).

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5   See Appendix I for the list.

Random walk III (*RW3*) is obtained by relaxing the independence assumption of *RW2* to include processes with dependent but uncorrelated increments. It only imposes a lack of correlation between subsequent increments.

3. Data and Techniques of Analysis

3.1. Data

Daily observations of the Ugandan Securities Exchange (USE) all-share indexes were obtained from the USE https://www.investing.com/indices/african-indices. The daily closing indices ranged from 01 September 2011 to 31 December 2016, totaling 1263 observations. This study period was chosen based on data availability, and captures increasing securities listing, as well as automation in securities depository and trading. The USE indexes were transformed to daily and monthly returns series by taking the first difference of the natural log series as follows:

$$R_t = Ln(I_t - I_{t-1}) * 100 \tag{1}$$

where R_t is a vector of the USE returns, I_t is the closing value of the indexes at time *t*, I_{t-1} is the previous day closing value of the indexes, and Ln is the natural logarithm.

3.2. Techniques of Analysis

To analyse the weak-form efficiency of the USE indexes, following Emenike (2016), I applied linear and nonlinear tests for serial dependence on the residuals of the USE random walk model, specified thus as follows:

$$R_t = \mu + \phi R_{t-i} + \varepsilon_t \tag{2}$$

where, μ is the drift parameter or the expected price change, ϕ is an autoregressive parameter that accounts for serial dependence in the returns, and ε_t is the residual term that assumed to be uncorrelated (for random walk 3), and independent but identically distributed (for random walk 2). Therefore, any shred of evidence of linear and/or nonlinear dependence in the USE daily or monthly returns series will be viewed as evidence against market efficiency. Such evidence will equally hold for higher levels of efficiency since, as Wong and Kwong (1984) observe, the failure to prove weak form efficiency implies the failure to prove both semi-strong and strong form efficiency.

The linear serial dependence tests applied in this study are autocorrelation function (ACF) and Ljung-Box Q (LBQ) tests, whereas autoregressive conditional heteroscedasticity Lagrange multiplier (ARCH-LM) test is the nonlinear dependence test. The ACF measures linear dependence between returns at the current period and the past periods. It is used to examine whether the serial correlation coefficients are

significantly different from zero under the null hypothesis $\rho_1 = 0$ versus the alternative

hypothesis $\rho_1 \neq 0$. The lag-*i* sample autocorrelation of r_t is specified thus as follows:

$$\rho\ell = \frac{\sum_{t=\ell+1}^{T}(r_t - \bar{r})(r_{t-\ell} - \bar{r})}{\sum_{t=1}^{T}(r_t - \bar{r})^2}, \quad 0 \leq \ell < T - \tag{3}$$

Where, $\rho\ell$ is the serial correlation coefficient of the returns of lag ℓ, *T* is the number of observations, r_t is the return for period *t* specified in equation (1), $\bar{r}$ is the sample mean of return, and ℓ is lag of the period. If r_t is an uncorrelated sequence, its *p*-value is greater than α, the significance level. Hence, the null hypothesis of uncorrelated USE returns series would be rejected if the p-value of r_t is less than 0.05. This would indicate market inefficiency in the context of Random-walk version three.

To test jointly that several autocorrelations of r_t are zero, the Ljung-Box (1978) modification of Box and Pierce (1970) portmanteau (Q) test is applied. Ljung-Box Q involves subjecting the squared error series to standard tests of serial correlation based on autocorrelation structure using portmanteau tests as follows:

$$Q_{LB\,(m)} = T(T+2)\sum_{\ell=1}^{m} \frac{\hat{\rho}_\ell^2}{T-\ell} \tag{4}$$

Where *T* is the sample size, *m* is the number of autocorrelation used in the test. Under the condition that r_t is an *inid* sequence, the Q-statistic is asymptotically a chi-square random variable with degrees of freedom equal to the number of autocorrelation (*m*).

The null hypothesis is that the first *m* lags of ACF of ε_t^2 are zero (Tsay, 2005: 101). The decision rule therefore, is to reject the null hypothesis of uncorrelated USE returns series if the *p*-value is less than or equal to 0.05.

Unit root tests were used to determine whether USE series exhibit random walk or mean-reverting behaviour by showing the order of integration of increments. However, as Rahman and Saadi (2008) observed, unit root is a necessary pre-requisite for the RWH, it is not a sufficient condition. The presence of a unit root specifically is not sufficient to imply a random walk since the return series must also be serially uncorrelated or serially independent. The Augmented Dickey-Fuller (Dickey and Fuller, 1979) and Phillips-Perron (Phillips and Perron, 1988) are used to test for random walk in USE increments. The ADF test is thus estimated as follows:

$$\Delta Y_t = \alpha_o + \beta_t + \alpha_1 Y_{t-1} + \sum_{\ell=1}^{n} b_1 \Delta Y_{t-1} + \varepsilon_t \tag{5}$$

The null hypothesis is that Yt is a random walk, which implies that $\alpha_1 = 1$, against

the alternative that the series is mean-reverting, which implies that $\alpha_1 < 1$. Dickey and Fuller (1981) provide cumulative distribution function of the ADF statistic. If the computed absolute value of the coefficient of α_1 is less than the ADF critical tau values, reject the null hypothesis that $\alpha_1 = 1$, in which case Yt is stationary. Otherwise, accept the null hypothesis, in which case Yt is a random walk. Phillips-Perron non-parametric test is used to confirm the result of the ADF test. One of the advantages of the PP test over ADF is that it is robust to general forms of heteroscedasticity in error term (ε_t). Another advantage is that the user does not have to specify a lag length for the test regression.

ARCH-LM test is the Lagrange Multiplier test of Engle (1982). The basic idea of ARCH

model is that the shock ε_t of an asset return is serially uncorrelated but dependent (Tsay, 2005: 102). Bollerslev, Chou and Kroner (1992) observe that the *LM* test for

the null hypothesis of $\alpha_0 = \ldots \alpha_q = 0$ can be calculated as *TR2* from the regression of

$\varepsilon_{t-1}^2, \ldots, \varepsilon_{t-q}^2$. We therefore, apply the ARCH-LM, in accordance with Emenike (2016),

as a test for nonlinear dependence in residuals of r_t, and thus:

$$\varepsilon_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 - i + \ldots + \alpha_m \varepsilon_{t-m}^2 + \varepsilon_t, \quad t = m+1, \ldots T \tag{6}$$

The decision rule is to reject the null hypothesis of weak-form efficiency, in the sense of RW2 (no ARCH effect), if the *p*-value is less than the level of significance (0.05).

4. Empirical Results and Discussions

4.1. Preliminary Analysis

Figure 1 shows the time plot of log-level and return series of the USE all-share index for the 01 September 2011 to 31 December 2016 period. A look at the plot suggests that the levels of the USE series are not stationary: the series appear trending. Another noticeable feature of *Figure 1* is the downward slope at the end of September 2011, and upward spike movement thereafter. The series achieved its highest point within the first quarter of 2015, before moving downward. The downward movement is corroborated by USE (2015) which reveals that total equity listing fees decreased by 26% to Ushs.726 million from Ushs.986 million in 2014. Brokerage commission decreased by 60% to Ushs.520 million from Ushs.1.3 billion in 2014, and other operating income decreased by 16% to Ushs.938 million from Ushs.1.12 billion. On the other hand, the time plot of the return series of USE all-share index shows that the series fluctuate around their mean value, though with few major spikes. Notice that the return series show mean reversion tendency. This is easily seen in the ability of each series to return to the mean after a deviation. Mean reversion is an indication of stationarity.

Descriptive statistics for USE returns are presented in *Panel A of Table 1*. The annualized average rate of return for the USE is 7.8% for the study period. Notice

the significant difference between the minimum and maximum returns for the study period. These indicate the dispersion between returns in the USE. Dispersion is captured by the standard deviation, which measures investment uncertainty. The annualized standard deviation of USE return is 19.42%. The skewness of a normal distribution is zero. The bias towards positive or negative returns is represented by the skewness of the distribution. If returns distribution is positively skewed, it implies that there is higher probability of large positive returns than negative returns (Ivanovski, Narasanov & Ivanovska, 2015), and vice versa. Notice from *Panel A of Table 1* that skewness coefficient (-0.14) is negative and significant at 5%. This denotes that USE returns distribution is non-symmetric. Kurtosis provides summary information about the shape of a return distribution. The excess kurtosis of a normal distribution is 0. From *Panel A of Table 1*, the USE returns have heavy tails and are peaked. A major implication of heavy tails is that investors can make very high returns and lose large amount of their investments as well (Emenike, 2015). In line with this finding, for example, the UCHM posted the highest drop in price in the second quarter of 2016 to close the quarter at *Ush 94 (US $ 0.03)* from *Ush 170 (US $ 0.05)*, a drop of 45% (Capital Market Authority, 2016). This result is the Jarque-Bera test which firmly rejects normality implying that the USE daily returns series is not normally distributed.

Figure 1. Time series graph of level and return series of Uganda Securities Exchange Index for the period Sep. 1, 2011 to Dec. 31, 2016
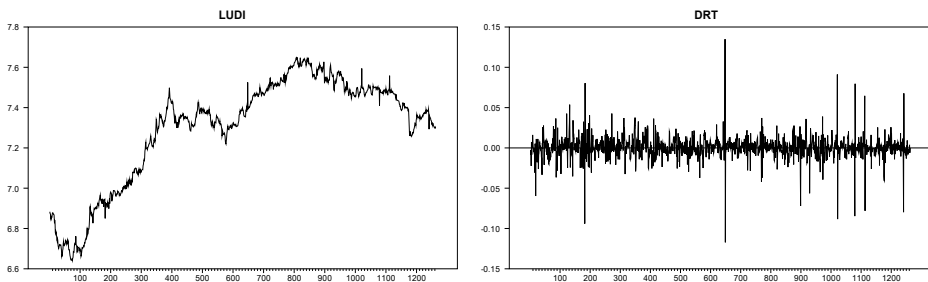
Source: Authors' calculation

Panel B of Table 1 displays the autocorrelation functions (ACF) of the USE returns series and the Ljung-Box Q-statistic adopted in evaluating significance of the ACF up to lags 40. The ACF test was conducted to determine if the USE returns series are serially correlated. Information on autocorrelation in the returns series is required to specify and estimate correct random walk model (Emenike, 2015). Estimation of correct random walk model is necessary for robust statistical inference and empirical analysis. The ACF and Ljung-Box Q-statistic indicate that the USE returns series are serially correlated at the 5% significance level, up to lags 40. Autocorrelation in the USE returns series implies that an autoregressive (AR) random walk model should be estimated so as to erase serial dependence in the residuals.

Table 1. Preliminary Statistics for Uganda Securities Exchange Returns

Panel A: Descriptive statistics for USE returns

Variable	Mean	Min. rtn.	Max. rtn.	Std. Dev.	Skewness	Kurtosis	J-B Stat.
Returns	0.0003 (0.799)	-0.1171	0.1349	0.0145	-0.1417 (0.040)	16.8828 (0.000)	14992.15 (0.000)

Panel B: Autocorrelation function and Ljung-Box Q statistics for USE returns

Lags	1	5	10	15	20	30	40
Returns	-0.1421 [25.577] (0.000)	-0.0038 [27.154] (0.000)	0.0091 [28.782] (0.001)	0.0233 [31.701] (0.007)	-0.0116 [35.099] (0.019)	0.0213 [45.754] (0.032)	0.0358 [59.558] (0.023)

Panel C: Schwarz/Bayesian information criterion (BIC) lag analysis for USE returns

Lags	0	1	2	3	4	5	12
Returns	-8.450	-8.465*	-8.459	-8.454	-8.448	-8.442	-8.405

Panel D: Unit root tests for USE daily series

	Augmented Dickey Fuller			Phillip-Perron		
		Level	returns		level	Returns
Variables	5% critical value	calculated	computed	5% critical value	calculated	Computed
ASI	-2.8642	-1.5922	-40.949**	-2.8642	-1.5702	-41.004**

Note: The Ljung-Box Q statistics for the autocorrelation functions are displayed as [.], and *P*-values are displayed as (.). Std. Dev. and J-B Stat are the standard deviation and Jarque-Bera statistics for the USE daily returns. Min and max rtn are the minimum and maximum daily returns. * and ** indicate 5% and 1% significance levels.
Source: Authors' calculation

Consequently, Schwarz/Bayesian information criterion (BIC) lag analysis was estimated to identify appropriate autoregressive lag length, and the results are displayed in *Panel C* of *Table 1*. Observe that the BIC recommends autoregressive lag one (*AR*1) for the USE returns.

As it is necessary to check for the stationarity property of a variable prior to empirical analysis, we test for the presence of unit roots in the log-level and first difference of the USE series using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The Schwarz/Bayesian information criterion (BIC) was adopted for lag analysis of the ADF. From the 5 lags estimated, the BIS lags 1 and 0 were selected for the level and return series respectively. The results of the ADF and PP unit root tests presented in *Panel D* of *Table 1*, indicate that USE returns series is integrated of order one or *I* (1). Hence, unit root results of ADF and PP show that USE return series is stationary.

4.2. Measuring Weak-Form Efficiency of USE Returns

This section presents the results of the linear and nonlinear tests for serial dependence estimated using the increments from the USE random walk model. *Panel A* of *Table 2* shows the estimates of the random walk model. We see from *Panel A* that the coefficient of drift parameter is not significant, implying that the expected price

change may not be predictable. The autoregressive term is negative and significant, supporting indication of a serial dependence identified in *Panel B* of *Table 1.* The essence of estimating the random walk model is to increment for the random walk hypothesis tests. The results are presented in the following panels.

Panel B of *Table 2* displays autocorrelation function, Ljung-Box Q (LBQ) statistic and p-value of the LBQ estimated for stock returns increments of the USE from lags 1 to 40. The *p*-value of the Ljung-Box Q coefficients for the lags 1 to 40 of the USE returns increments are all greater than the 5% significance level. Therefore, we can accept the null hypothesis of no autocorrelation in the returns series of the USE with 95% confidence. The absence of a serial dependence in the USE returns increments is an indication of stock returns unpredictability, and evidence in support of weak-form efficiency. This finding is similar to Watundu *et al.* (2015) who conclude amongst others, that USE is weak-form efficient, based on absence of first order serial correlation in the daily returns series. The finding, however, shows absence of a serial correlation at higher lags, which strengthens the evidence for RW3 weak-form efficiency.

Panel C of *Table 2* shows the results of the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) unit root tests conducted to ascertain whether USE RWM increments are random walk or stationarity. The null hypothesis of the ADF test is USE series is a random walk. If the computed absolute tau value is less than the ADF critical tau values, reject the null hypothesis of random walk. Otherwise, accept the null hypothesis. Notice from *Panel D* of *Table 2* that the computed *tau* (r') statistic (-35.46) is less than the 5% critical tau (r') value (-2.86). Since the computed r' value is lesser than the conventional critical tau values, we accept the alternative hypothesis of stationarity in USE return increments at the 5% level of significance. These results therefore, support evidence of weak-form efficiency of the USE. The result of PP unit roots test is similar to that of ADF. This method, however, does not show the version of random-walk accepted.

Panel D of *Table 2* displays results of the autoregressive conditional heteroscedasticity Lagrange multiplier (ARCH-LM) test conducted to examine the residuals from USE RWM for evidence of nonlinear dependence. Under the null hypothesis of no heteroscedasticity in return series, asymptotic significance corresponding to the p-value should be greater than or equal to the significance level, in this case 5%. Notice from *Panel D* of *Table 2* that the p-value of the ARCH-LM coefficients for the residuals, up to lags 20, is less than the significance level of 0.05. Hence, we can reject the null hypothesis of no nonlinear dependence in the USE returns, with 95% confidence, since *p*-value is less than the significance level (0.05). This indicates that the USE returns are second order serially dependent. In other words, the ARCH-LM test indicates evidence against RW2 for the USE returns.

A major implication of the results is that predictability of the USE returns, at least in the short-term, may be improved by applying nonlinear modeling strategy, but whether exploitation will be profitable after transaction costs is unknown.
USE (2015) outlined some important transformations in USE recently in order to include trading system automation to replace the manual trading system in July 2015, reduction in the settlement period from 5 working days to 3 working days in compliance with IOSCO international standards, and improved regulations[6] to conform to the automated trading environment and new settlement period. In addition to these worthy

6   USE reviewed and improved equity trading rules in 2015, and Capital Market Act was also amended in 2016 to enhance market regulation and investors' protection.

feats, there is a need to increase the number of equity listings. The sixteen listed equities are poor, and as USE (2015) observes, activity on the equity segment was dominated by activity from UMEME and STANBIC accounting for 82.51% and 8.71% of the total turnover, respectively. There is also a need to enhance the participation of national (both individual and institutional) investors. USE (2015), for example, reports that the proportion of equity transactions executed by foreign investors averaged 87% on the bourse. This implies that the local East African investors contributed only 13% of equity transactions in 2015. These measures will boost the efficiency of the USE.

Table 2. Weak-form Efficiency Analyses for NSE Sectors Returns

Panel A: Estimates of USE Random walk model (RWM)

Parameters	coefficient	std. error	t-statistics	p-value
μ	0.0003		0.9391	0.3478
ϕR_{t-1}	-0.1421		-5.0971	0.0000

Durbin-Watson 1.9995; $F(1,1259)$ 25.9805, significance level of F 0.000

Panel B: Autocorrelation function and Ljung-Box Q statistics for USE RWM residuals

Lags	1	5	10	15	20	30	40
Residuals	0.0002	-0.0004	0.0129	0.0153	-0.0190	0.0174	0.0414
	[0.0005]	[0.557]	[2.303]	[5.071]	[9.143]	[19.742]	[37.637]
	(0.994)	(0.989)	(0.993)	(0.991)	(0.981)	(0.923)	(0.577)

Panel C: Unit root tests estimates for USE RWM residuals

	Augmented Dickey Fuller		Phillip-Perron	
	5% critical value	Computed	5% critical value	Computed
Residuals	-2.8643	-35.4623**	-2.8642	-35.4908**

Panel D: ARCH-LM test for test for nonlinear dependence in RWM residuals

Lags	1	3	6	9	12	15	20
Residuals	221.740	87.908	43.902	29.270	21.865	17.527	13.624
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note: The *p*-values are displayed in (.), and the Ljung-Box Q statistic for the autocorrelation functions are displayed in [.]. ** indicates significance at the 1% level.
Source: Authors' calculation

5. Conclusions

This paper evaluates the nature of random walk weak-from efficiency of the Ugandan Securities Exchange for the period ranging from 01 September 2011 to 31 December 2016, using the autocorrelation test, Ljung-Box Q test, unit roots tests, and ARCH-LM test. The preliminary analyses show that the USE return is zero, indicating that positive and negative returns cancel each other. It also shows negative skewness and leptokurtosis in the return series. Results of the linear models estimated using ACF and Ljung-Box Q statistics suggest evidence of random walk (3) weak form efficiency for USE. This is evident in the absence of a serial correlation in the returns

increments. The results of non-linear model analysis conducted using the ARCH-LM provide evidence against random walk (2) in USE returns. The key implication is that the prediction of USE returns requires a superior fundamental analysis of their intrinsic values. These findings add to the accumulating knowledge on the stock market efficiency of USE, and underscore the need for financial market regulatory authorities to formulate policies that will enhance market efficiency.

Acknowledgement

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Appendix I
Listed Equities in the USE

The Main Investment Market Segment of the USE currently has 16 listed equities comprising of 8 Locally Listed Equities;

BATU	UG0000000022	British American Tobacco Uganda
BOBU	UG0000000055	Bank of Baroda Uganda
DFCU	UG0000000147	Development Finance Company of Uganda Ltd
NVL	UG0000000162	New Vision Printing and Publishing Company Ltd
SBU	UG0000000386	Stanbic Bank Uganda
NIC	UG0000000758	National Insurance Corporation
UCL	UG0000000014	Uganda Clays Limited
UMEME	UG0000001145	Umeme Limited

It also has 8 Equity Securities which are cross listed from the Nairobi Securities Exchange (Kenya) as below:

EBL	KE0000000554	Equity Bank Limited
KCB	KE0000000315	Kenya Commercial Bank Group
EABL	KE0009081092	East African Breweries Limited
JHL	KE0000000273	Jubilee Holdings Limited
KA	KE0009081084	Kenya Airways
NMG	KE0000000380	Nation Media Group
CENT	KE0000000265	Centum Investment Company Ltd
UCHM	KE0000000489	Uchumi Supermarkets Limited

Appendix II
Autocorrelation Function for USE Returns

Autocorrelation Function of DRT
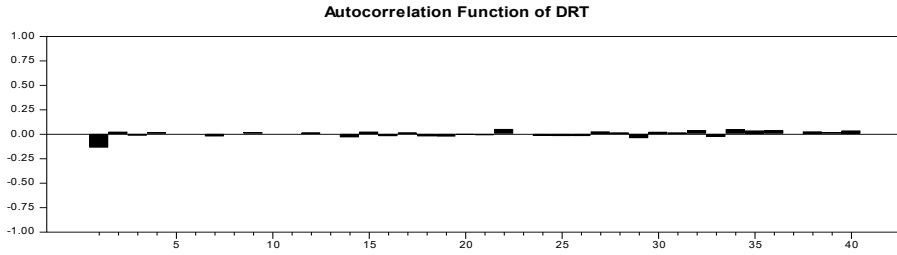
Appendix III
Autocorrelation Function for Regression Residuals from USE Return Series

Autocorrelation Function of RDRT
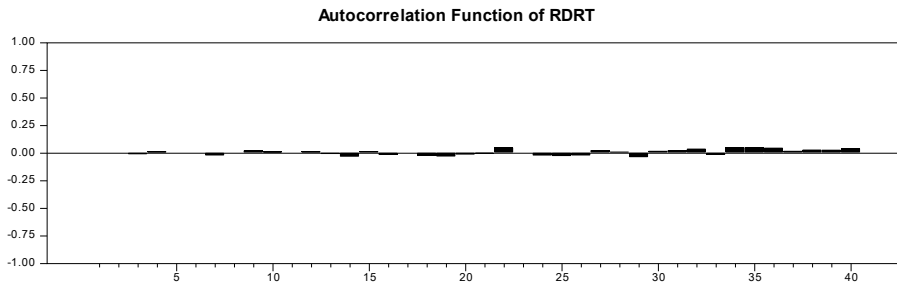
KINDLEBERGER AND MACROMANAGEMENT

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Abstract

The idea of the relation between the economic development level and the balance of payments position is not a new one. Yet, this idea was formalized for the first time in the early 1960s by Charles Kindleberger in the form of the balance of payments evolution scheme. Although this is a rather "old" concept, all the aspects of this theory and all the possibilities for its usage have not been exhausted yet. For example, this theory explicitly includes an interesting (and provocative) idea that the underlying point of development, the point that separates developed economies from underdeveloped economies is actually the moment when a country reaches the full coverage of imports by exports. More implicitly, in the manner of a genuine liberal, who Kindleberger certainly was, this theory suggests the implementation of passive (pro-liberal) economic policies. This, in combination with our research on possible ways of measuring the level of economic development, has led us to the idea that, in circumstances of relatively liberal[3] trade, the level of development and level of competitiveness could be measured by the export/import indicator. In the work we will show that this idea is not generally accepted, but still worth researching. Our intention with this work was to show that countries in South-East Europe, although facing serious economic difficulties, are developing and improving their competitiveness position in time, and to try to predict, for each country, the time when that country will join the club of lesser-developed, but yet developed countries. This would have reflections in the assessment of the adequacy of the economic polices implemented in those countries during the last twenty years, i.e. the quality of macromanagement in these countries.

Keywords: *development, competitiveness, balance of payments, passive economic policies*

JEL Classification: E64, O23, O24

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3   Free trade is an abstract term. There are no examples in history that countries have practiced a fully free trade, even though according to Chang (2016: 80), Great Britain in the second part of XIX century aspired to have its practice close to this ideal. With much less success, from the beginning of the '80s to the middle of the second decade of the XXI century, the United States of America has been the global force which promoted the free trade. However, the practice of the USA (Voluntary export limitations, etc.) was much further from this ideal than the practice of Great Britain at the end of the XIX century. However, when we in this paper use the term free trade, it should be taken into consideration that the term does not refer to total global trade, but solely to the trade between a limited number of countries in East Europe (10 of them) with the EU, and that we do not think of this as the absolutely free trade (ideally), but as a relatively free trade (compared to the trade of these countries with other countries in the world, and compared to earlier historical experiences–especially compared to the period before 1990).

Introduction

Charles Kindleberger was one of the most influential economists in mid XX century. He was born in New York in 1910, he graduated from the studies of economics at the University of Pennsylvania in 1932 and as early as in 1937 (at the age of 27) he defended his Ph.D. thesis at the Columbia University. From 1948, he was elected professor of international economics at the MIT University where he stayed until retirement. He was engaged in economic history and his name was connected to hegemonistic theory of stability claiming that the world always needs one super power to stabilise international relations. Actually, the strongest influence of Kindleberger was felt at the end of the Second World War, when he worked in the US Ministry of Foreign Affairs as the manager in charge of economic issues. The so-called Marshall Plan for European recovery was mainly Kindleberger's work. He was strongly opposed to the monetarist view of Milton Friedman, particularly in respect of the effects of the FED policy on the deepening of Great Depression in the 1930s. His book Manias, Panics and Crashes on speculative bubbles from 1978 was reprinted at the beginning of 2000s, after the dot-com bubble.

However, the reason for remembering this great man includes nothing of what has been mentioned above. The reason why Kindleberger found its place in all the books of international economics and stayed there by this time is his theory called *the balance of payments evolution scheme* or *the theory on the debt cycle*. Kindleberger, by analysing the history of the values of the US balance of payments sub-accounts and connecting them to the stages of the country's development arrived at the conclusion that all the countries go through four4 stages of development as it follows:

Graph 1. Balance of payments evolution scheme

Stage of the country's development	Current account
I – Young debtor	deficit
II – Mature debtor	deficit
III – Young creditor	balance
IV – Mature creditor	creditor

Source: adapted from Samuelson-Nordhaus (2009), p. 603.

It is evident that each stage of development results in a certain situation in the balance of payments current account. So, underdeveloped countries, according to his view, naturally record high deficits of current accounts, attracting at the same time foreign capital in order to fill in the accumulation gap ("young debtor"). This conclusion is in accordance with the principles of neoclassic theory and findings of Baldwin and Wyplosz (2009: 555), Eicher, Mutti and Turnovsky (2009: 225), Salvatore (2009: 513), Pugel (2009: 513), and Kovacevic (2016: 505) on the causes and effects of capital trends from developed countries (rich in capital) to the underdeveloped ones (poor in capital, this being the reason for high rates of return on capital). As the country is developing ("mature debtor"), the current account deficit is decreasing, as well as

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4   In his later papers, he expanded the classification into six stages of development, including the category adult debtor, i.e. creditor, placed between "young" and "mature".

the inflow of foreign capital (at least relatively), until the moment when the country is developed enough to become a creditor itself recording a positive trade balance in relation to less developed countries (the stages of „young" and „mature" creditor).

Yet, this theory, besides the undisputable attractive features, has plenty of deficiencies. The basic one is that it has been formed into a model on the basis of the historical experience of only one country (USA). To be even more specific, there is no guarantee that all the countries will go through all the mentioned stages of development at equal pace, or even go through them at all. The book *Why Nations Fail: the origins of power, prosperity and poverty* (Acemoglu-Robinson, 2012) suggests that some countries, due to the extractiveness of their political and economic institutions (as compared to the inclusiveness of those in the developed countries) have stayed for centuries in relative underdevelopment. This is contrary to the US experience which, according to the findings of Paul Samuelson and William Nordhaus (Samuelson-Nordhaus: 2009: 603) was in the stage of „young debtor" for around 90 years (roughly 1775-1865), in the stage of "mature debtor" for around 40 years (1873-1914), in the creditor stage since 1914. The problem is that the USA since the end of the 1980s, has entered the stage of „mature debtor" (Samuelson-Nordhaus, 2009: 603) again, and has stayed there, with slight variations, to date (Salvatore, 2016).

Some countries, such as South Korea, went through all the mentioned stages in the period of only several decades, which is much faster than suggested by this theory (Chang, 2016: 17).

However, despite all the empirical counterevidence, there are few of those who dare to declare the theory on the balance of payments evolutions scheme "dead". Actually, most economists accept it as a certain log-term rule (such as PPP theory or HOS theory), which in most cases is empirically confirmed in long term.

We now arrive at the essential question. If countries "naturally" move from underdevelopment to development and from the current account deficit to surplus, does it make sense to implement active economic policies or is it sufficient "not to hinder development"? We arrive at the issue of macromanagement as a skill of managing the economy of a country, with the objective of improving its economic parameters. Kindleberger's theory implicitly suggests the acceptance of passive economic policies focused on the creation of market economy and free international trade, while the passing of time should do the rest.

This is the position which we also accept, although aware of numerous exceptions, and some of them we have already mentioned.

However, this discussion is moved to another field (compared to the 1950s when Kindleberger presented his theory), due to a dramatic development of the concepts of "development" and "competition". To be developed and/or competitive today denotes quite complex multidimensional concepts.

Therefore, the question arises whether it is justified to use the coverage of imports by exports as the basic indicator of the development level. Our answer is that generally

it is not. However, if you accept, during the consideration, also liberalized economic relations with foreign countries (free trade but also the possibility of borrowing in foreign countries, and the possibility of free investment of capital in the country) as an additional requirement, then such measurement of the development level gains additional objectivity. Also, from the perspective of developing countries recording permanent trade deficits for decades, such measurement of the development level makes sense equally as the use of revenue per capita as the most frequently used development level indicator.

Therefore, the purpose of this work is by placing an emphasis on this less frequently used development level indicator (the coverage of imports by exports) to reply to the question whether the countries formed after the dissolution of the SFRY are developing in accordance with the assumptions of Kindleberger's theory (development and decrease of trade deficit) or not, which has implications on the assessment of the adequacy of the implemented economic policies, which have been mainly, but not fully, based on the principles of "Washington consensus" and the transformation of economic and legal systems according to the requirements of EU integrations.

Our hypothesis is: *The countries of South East Europe have made a big step towards economic development over the last twenty years.*

Our hypothesis, as simple as it can seem, is actually quite unpopular, and some would say it does not reflect reality. This is the additional reason to question it.

1. Literature overview

Although we could expect a number of papers on the subject of connection of the level of development of a country with its balance of payments situation, our research has not confirmed such expectations. Actually, our research of literature on this subject has shown that the highest number of such "basic" economic research is in the books and well known school books, while there are only few papers on this subject. So, the first author who was occupied with this issue was Boggs and his book from 1922 *The International Trade Balance in Theory and Practice*. We should mention that Boggs did not present the theory of the balance of payments evolution but he was the first one who connected the issue of capital flows with the move of the country from the group of developing countries to the group of developed countries. Another author who was occupied with this issue was Wagemann in the book published in Berlin in 1931 entitled Struktur *und Rhythmus der Weltwirtschaft*.

However, the appearance of the balance of payments evolution scheme waited for Kindleberger. We have not managed to identify the first work where Kindleberger mentioned this theory. However, it is quite certain that Kindleberger presented a developed theory in the school book International Economics from 1968. Kindleberger clearly identified and made a distinction among the six stages of development of the country, connecting them to the foreign debt balance, i.e. capital flows. These observations were additionally developed by Kindleberger in 1981 in the book entitled *Debt Situation of the Developing Countries in Historical Perspective 1800-1945*.

We should also mention Samuelson and Nordhaus and their school book *Economics*. The first edition of this school book appeared in 1948, and it quite certainly did not include the balance of payments evolution scheme. Yet, the eighteenth edition did include this scheme without mentioning the sources. So, Samuelson and Nordhaus (2005:603) spoke of the four development stages: the newly appeared state – a developing debtor, a developed country -debtor, a new creditor country and a developed creditor country.

Among the more recent editions referring to the issue of the balance of payments evolution, we should also mentioned the book of the group of authors Gundlach, E., Scheide, J., and Sin, S. from 1990 entitled: *Die Ent wicklung nationaler Auslandsvermogenspositionen*, and a book by a well-known contemporary economist Williama R. Cline from 2005 entitled *The United States as Debtor Nations*.

Among the recent editions, the balance of payments evolution is also treated in the book Global *Imbalances, Exchange Rates and Oil Exporting Countries*, by author Christian Oberpriller from 2008.

Unfortunately, besides occasional references to the concept of the balance of payments evolution in books and school books, there are not many works in the databases of the institutions which you would think would be interested in this issue, such as the IMF, the BIS, and National Bureau for Economic Research of the USA.

Specifically, in the IMF database, which in September 2017 included more than 16,000 working papers, there were only 16 works including balance of payments in their titles, none of them occupied directly with the relation of development and balance of payments position, but focused mainly on "technical issues" such as the methodology of recoding various kinds of transactions in the balance of payments or current problems of some countries.

It is not possible to find papers on the research of the long-term relation between the development level and the balance of payments position on the website of the Bank for International Settlements, either. However, it is possible to find several papers regarding balance of payments and the needed adjustments with the group of developed countries and developing countries in the periods of several decades. So, for example, the work *Exchange Rate and Balance of Payment Adjustment – General Principles and Some Recent Experiences by* William A. Allen, examines the situation and methods of adjustments of balance of payments in the USA, Japan, West Germany, the United Kingdom, Italy and Canada, starting from the mid-1960s until 1979. On the other hand, the work *The Evolution of the External Debt and Balance of Payments of Eastern Europe and the USSR since 1970*, by Richard Allen, considers the balance of payment problems of the Eastern Bloc countries.

On the NBER website, we have found 19 papers regarding balance of payments, but only two papers *Japanese Structural Adjustment and the Balance of Payments*, by Jeffrey Sachs and Peter Boone, and paper *U.S. Foreign Trade and the Balance of Payments, 1800-1913*, by Robert E. Lipsey, at least partly commented upon the issues of change in trade patterns, development level and the related changes of capital flows. In the first mentioned work, Sachs and Boone argue for the decrease of trade surplus of Japan through directing domestic savings in spending. This is contrary to the assumption of Kindleberger that the economic development leads to an

increasing trade surplus and increasing deficit of capital flows. The period treated by Lipsey, on the other hand, corresponded with the period when the USA was a young and mature debtor, and this paper explains why agricultural products remained the country's predominating exporting product long time after the USA was industrialized.

Besides providing a survey of literature directly concerned with the balance of payments evolution scheme, we would like to comment briefly on the literature measuring the development level. There is quite a lot of such literature and we would not be able to state all the sources, even if we devoted our paper only to this issue. However, the purpose of stating such literature is to point out the relation between the balance of payment evolution scheme (more precisely the classification of countries according to the level of development in that scheme) and the country classification methodology according to the level of development used by the UN, the IMF and the IBRD, so we will refer only to one paper which treated this issue in a systemic way. This is the paper by Lynge Nielson *Classifications of Countries Based on Their Level of Development: How it is Done and How it Could be Done.* The paper was published in 2011 as the IMF working paper (WP/11/31).

In this paper, a background of the development of classification of countries according to their development level in the methodologies of the UN, IMF and IBRD is presented. It is evident in the paper that the primary indicator used by these institutions has always been the level of revenue per capita, where only the United Nations made the (expected) deviation from this economic category. So, the methodology of classification of the country development level applied by the United Nations arose from the *Human Development Report* (published for the first time in 1990) for the needs of which the *Human Development Index* was created. It is a composite index including three groups of indicators (gross national income presented as purchase power by means of PPP and denominated in $ as an income measure, the life expectancy and the average duration of education). According to such classification, all the countries have been divided into the following groups: 1. countries of low level, 2. medium level and 3. high level of human capital development. However, it is important for us that in the first edition of this report, the group of the countries with high level of development of human capital is also called industrial countries, while the other two groups are identified with the phrase "developing countries". This partly corresponds to Kindleberger's balance of payments evolution scheme, as Kindleberger identified the exit from the debtor group and entry into the creditor group with the country's industrialization.

The IBRD classification of the level of the country's development is connected to the *World Development Report* (published for the first time in 1978) for the needs of which the *World Development Indicators* was developed. This report firstly divided the countries into three groups: 1. developing countries, 2. industrialised countries and 3. capital-surplus oil-exporting countries. The basic indicator of the development level in this report was (and stayed) the gross national income per capita calculated as in the case of UN (with the use of PPP and converted into $).

The IMF classification of the country's development level is connected to the development of *International Financial Statistics* kept by the IMF since 1948. On the basis of such data, in 1964, the IMF classified the countries into the following categories: 1. industrial countries 2. other high-income countries and 3. less-developed countries. This classification was changed many times in later periods, particularly after the IMF

started publishing the *World Economic Outlook* in 1980. At that time, the countries were divided into two groups only: 1. industrial countries and 2. developing countries. Since 1997, the IMF renamed industrial countries into the advanced country group thus accepting the opinion on irreversibility of the deindustrialisation process. Besides that, in the period 1993-2004, the IMF introduced another category in use, those being the transition countries.

It is important to mention that in all these classifications, a distinction is made between industrialised countries and those being industrialised, which corresponds strongly with the balance of payments evolution scheme.

2. Empirical research

Our empirical research has been carried out on a sample of ten countries. Those ten countries include six countries formed after the dissolution of the SFRY (Slovenia, Croatia, BH, Serbia, Montenegro and Macedonia), and the four countries of the so-called Visegrad Group (Poland, the Czech Republic, Slovakia and Hungary).

The Visegrad Group countries in the last ten years have appeared as a homogeneous group of countries which used to belong to the "the Eastern Bloc" sharing the same values today and having become members of the European Union since the same moment in time (the 2007 enlargement). Those countries will be used as benchmark of whether the policies5 implemented by the countries formed after the dissolution of the SFRY (but with a certain time lag compared to the Visegrad Group countries), bring good results in respect of development, in the context of Kindleberger's view that the important development indicator is the transfer of the country's economy from a trade deficit situation into a trade surplus situation.

In order to obtain as objective conclusions as possible, the period of our observation is quite long, lasting for twenty years (1997-2016). Yet, we have in mind and we accept that Kindleberger's period of observation of the development process is much longer (lasting up to two centuries). However, Kindleberger's period of observation includes the development of the country from a pre-industrial (agrarian) society to a developed industrial society6, while a facilitating circumstance in our research was the fact that all the observed countries had already been through the industrialisation process so our question actually is whether the policies implemented over the recent twenty years helped them to move from the stage of mature debtor to the state of young creditor or at least to come close to it.

Beside answering the previous question, it is our intention to extrapolate trends for the countries which have not reached the lower point of development yet (the full coverage of imports by exports in the conditions of liberalized economic relations) in order to determine the moment in time when that will happen. We have used the World Bank database as a source of data7.

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5   Liberalisation of trade systems and their integration in the EU is referred to.
6   In the moment when Kindleberger presented his thesis, deindustrialisation in the USA was at the very beginning and it was not included by his development stages.
7   https://data.worldbank.org/topic/trade

2.1. Coverage of imports by exports in the period 1997-2017

As we have pointed out, the first part of our empirical analysis is based on the collection, processing and analysis of data on the trend of the index of coverage of imports by exports in the Visegrad Group countries. These data are provided in Table 1:

Table 1. Coverage of imports by exports in the Visegrad Group countries 1997-2016

	Poland	Czech Republic	Slovakia	Hungary
1997	-3.8	-4.2	-9.4	1
1998	-4.7	-0.3	-10.6	-1,5
1999	-5.8	-0.4	-4.4	-2.7
2000	-6.3	-1.9	-2.6	-3.6
2001	-3.6	-1.3	-8	-1.2
2002	-3.4	-1.3	-7.2	-2
2003	-2.7	-1.2	-1.9	-3.9
2004	-2.7	0.8	-2.7	-3.9
2005	-1.1	2.4	-4.6	-2.3
2006	-2.1	2.7	-4	-1.1
2007	-3.5	2.5	-1.1	0.7
2008	-5	2.2	-2.8	0.4
2009	-0.9	3.9	-1.5	4.1
2010	-2	3.1	-1.5	5.3
2011	-2	3.8	-0.9	6.1
2012	-0.4	4.8	3.7	6.7
2013	1.9	5.8	4.2	7
2014	1.4	6.4	3.6	6.9
2015	3.1	6.1	2.4	8.9
2016	3.9	7.4	3.7	10.3

Source: World Bank Data, available at: https://data.worldbank.org/topic/trade, date of access 11 October 2017.

It is evident in the previous table that all the Visegard Group countries over the observed period moved from the stage of mature debtor into the state of young creditor although the dynamics was different. So, for example, Hungary recorded a trade surplus in the first year of observation (1997) and in the following ten years, it recorded a trade deficit (until 2006). From 2007 until the end of the observed period, there was a clear upward trend of the trade surplus of Hungary which actually became quite impressive (10.3% of Hungary's GDP). On the other hand, the Czech Republic is a country with the shortest period of trade deficit. It has started to record a trade surplus since 2004 and at the end of 2016, it reached the quite high level of 7.4% of GDP. On the other hand, the largest of the observed countries (Poland) recorded a trade deficit for the

longest time (for entire sixteen years i.e. from 1997 to 2013). Yet, Poland established its trade surplus over the last four years, which although slightly lower in relative sense, was still impressive taking into account the country size8.

Observing generally the experiences of the Visegrad Group countries, we can conclude that the "recipes" they used are clearly efficient and leading to development, if the assumption is accepted that higher coverage of imports by exports in conditions of a rather free trade is an indicator of development.

It is now time to consider the experiences of the countries formed after the dissolution of the SFRY in the same observed period (Table 2).

Table 2. Coverage of imports by exports in the countries formed
after the dissolution of SFRY 1997-2016

	Slovenia	Croatia	Serbia	Macedonia	BH	Montenegro
1997	-1.1	-12.9	-14.2	-13.5	-45	-
1998	-1.7	-6.8	-9.2	-14.9	-71.1	-
1999	-4.3	-6.1	-6.7	-10	-66.5	-
2000	-3.7	-3	-4.5	-14.3	-46.8	-14.3
2001	-1	-3.5	-15.3	-13.1	-47.5	-23.6
2002	1	-7,9	-18.1	-18.9	-46.6	-24.5
2003	-0.3	-7.4	-17.6	-15.8	-52.9	-16.4
2004	-1.4	-6	-26.4	-19.5	-45.3	-16.1
2005	-0.6	-6.1	-20	-16.2	-40	-17.5
2006	0	-6.7	-20.3	-17	-28	-29.7
2007	-1.3	-7.3	-24.3	-17.9	-29.4	-42.3
2008	-1.9	-8	-25	-25,1	-32,5	-54,5
2009	1.9	-3.7	-15.9	-21.6	-23.7	-33.3
2010	1.4	-0.4	-15	-18.3	-21.6	-25.7
2011	1.8	-0.5	-15.4	-18.9	-23.8	-22
2012	4.2	0.5	-16.7	-21.5	-23.5	-24.2
2013	5.6	0.5	-10.7	-18.1	-20.4	-20.1
2014	7.5	2	-10.8	-17.2	-22.7	-19.8
2015	9.1	2.8	-9.8	-16.2	-19	-18.6
2016	9.6	3.2	-7.3	-14.6	-	-23.4

Source: World Bank Data, available at: https://data.worldbank.org/topic/trade, date of access 11 October 2017.

It is shown in the previous table that out of the six observed countries, two (Slovenia and Croatia) have actually gone through the transformation from countries recording

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8   It is a generally accepted and empirically confirmed position that larger economies are naturally less open compared to small ones.

trade deficits into countries recording a surplus. The coincidence, if something like that can be mentioned in economics at all, is that these are the only two countries formed after the dissolution of the SFRY which became the EU members in the meantime. Both countries started recording a trade surplus only after joining the EU (Slovenia since 2009, Croatia since 2012). The other four countries (Macedonia, BH, Serbia and Montenegro) recorded only trade deficits throughout the entire observed period, although the deficit trend dynamics varied a lot among the countries.

Bosnia and Herzegovina recorded a permanent decrease tendency in its trade deficit (Graph 1), which at the beginning of the observed period was at the highest level of all the ten observed countries (1998, the incredible level of 71.1% of GDP in BH). Yet, such decrease was considerably slowed down over the last five years (2011-2016).

Graph 2. Trade surplus/deficit of BH as % of GDP
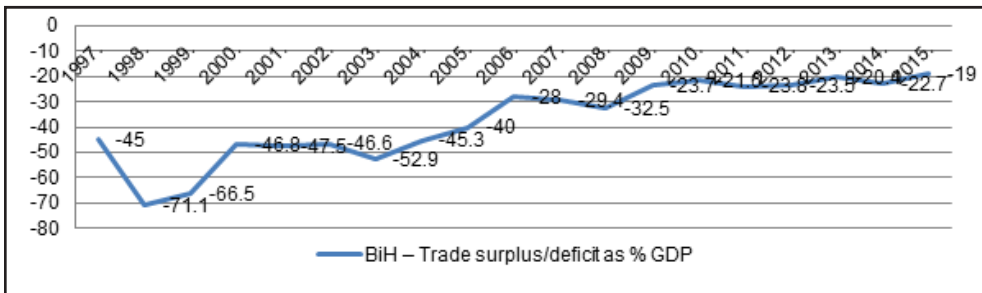
Source: Table 2

On the other hand, over the previous twenty years, Macedonia went through two periods which lasted almost equally. So, in the first observed period (1997-2008), the trade deficit of Macedonia permanently increased, while in the second period (2009-2016), the decreasing trend of the deficit was evident (Graph 2).

Graph 3. Trade surplus/ deficit of Macedonia as % of GDP
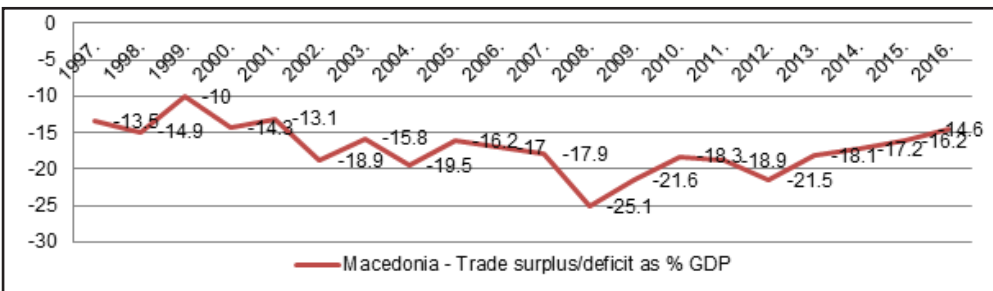
Source**:** Table 2

For the Republic of Serbia, we can say that it went through three different periods over the observed period. The first one, a very short one (1997-2000), was a period of the

decrease of trade deficit9. The second period (2001-2004) was a period of dramatic growth of trade deficit (from 6.7% to 26.4% of GDP), while the third period, which is not over yet, is a period of gradual but permanent decrease of trade deficit, which is significantly lower today than in any other country formed after the dissolution of the SFRY, which has not become a member of the EU.
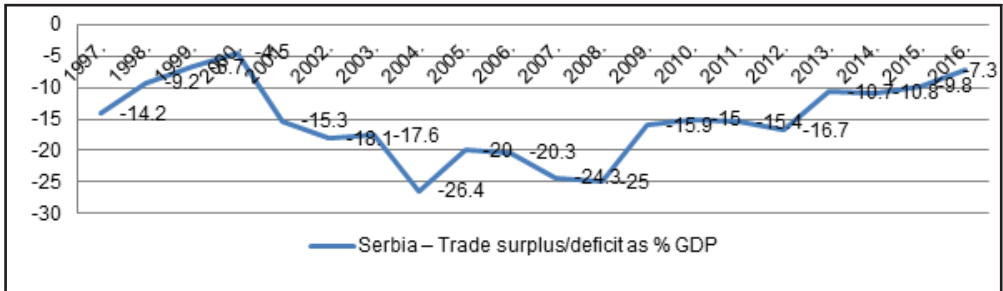
Graph 4. Trade surplus/deficit of Serbia as % of GDP

Source: Table 2

Montenegro is the most controversial case among the observed countries. The period of only seventeen years10 can be divided into even four sub-periods. So, the first period (2000-2005) is characterized by strong oscillations of trade deficit without a clear trend. The second period (2005-2008) was characterized by the enormous increase of trade deficit11, which in 2008 reached the incredible level of 54.5% of GDP of Montenegro. This was followed by a period of a fast decrease in the trade deficit (2008-2011), when the trade deficit was reduced by half in a relative sense, which was followed by the period of deficit stabilisation at the reached (and rather high) level, without a clear tendency of further decrease. Briefly, in the case of Montenegro, it is clear that the assumption that capital flows represent the other side (reverse side) of trade does not have to be correct and the opposite is possible as well (that capital flows are dominating in forming trade relations).

Graph 5. Trade surplus/deficit of Montenegro as % of GDP
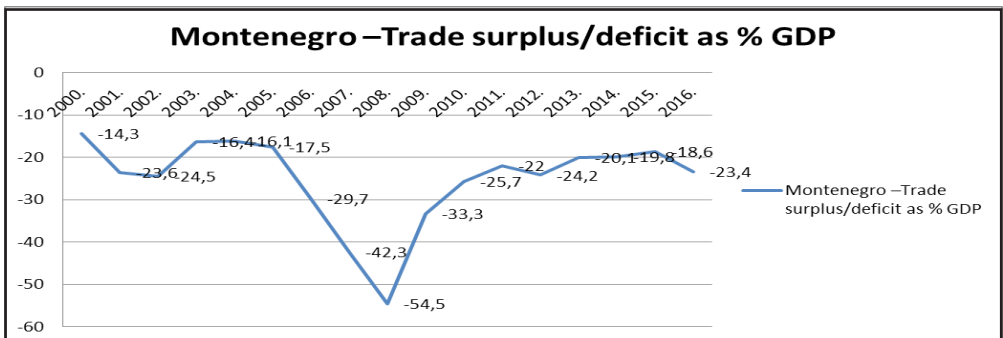
Source**:** Table 2

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9   Although liberalisation of economic relations of Serbia with foreign countries and market economy in general was questionable in that period.
10   There are no data before 2000 in the World Bank database.
11   Probably as a counter-balance to the enormous capital inflow from foreign countries in that period.

Observing the experiences of all the ten countries we can conclude that the EU integration represents the main engine of development, and that policies in line with that process are certain to give good long-term results.
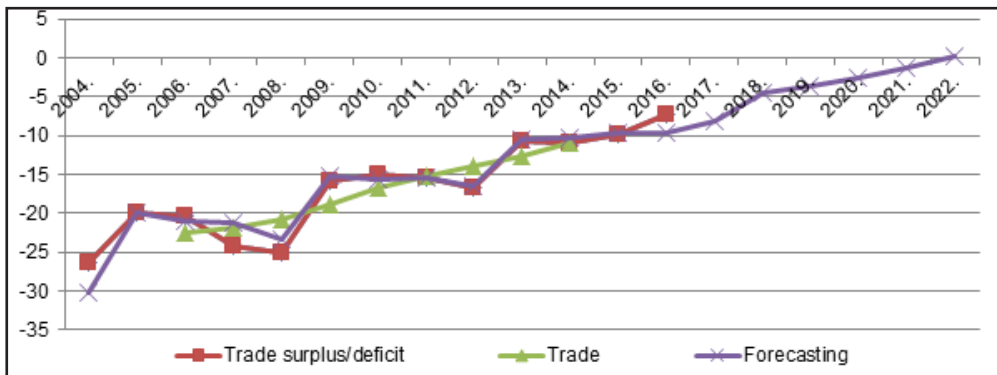
2.2. Trend extrapolation

We have carried out the extrapolation of the trend by using Microsoft Excel 2010. When calculating, we used the classic multiplication model for time series ($Yt = Tt \times St \times It$) with the application of the sum of the least squares method, and with the use of a simple linear regression. For each country, on the basis of the visual observation of trends, we firstly determined the point (the year) when the trend which lasts now has started, and after calculating the trends, we extrapolated them as long as necessary to reach the full coverage of imports by exports. For Montenegro, we have not carried out the trend extrapolation, as it is not possible to observe any trend from the graph, i.e. the trend curve is a straight line. For Macedonia, we have tried to calculate the trend, but we have not managed to do that, as the short time series (2008-2016), does not make it possible to calculate the seasonal trend component, if one cycle lasts for four years. Therefore, we finally extrapolated the trends of trade deficit for two countries only: BH and Serbia.

2.2.1 Serbia
The data for 2016 show that out of the four observed countries formed after the dissolution of the SFRY, which have not reached the full coverage of imports by exports, Serbia is closest to the situation of achieving it. Yet, the economic situation in Serbia is surprising over the recent years, at least if we assess it on the basis of this criterion, as it records a more positive development than envisaged by the trend. So, our trend calculation (Graph 4) suggests that, for example, in 2016, the trade deficit of Serbia should be 9.7% of GDP, while actually it is "only" 7.3%.

Graph 6. Trend and trend anticipation of the index of coverage of imports by exports of Serbia in the period 2004-2022
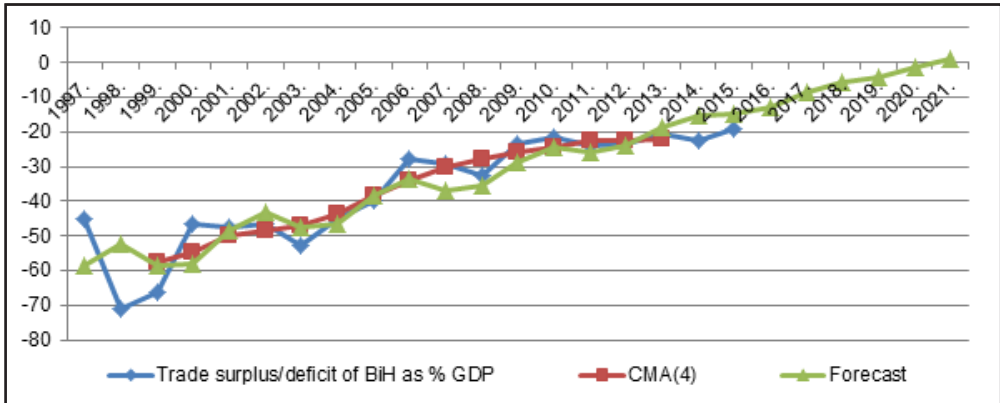

Source: our calculation

By extrapolating the trend, we have arrived at the forecast that Serbia should reach its

full coverage of imports by exports in 2022.

2.2.2 Bosnia and Herzegovina

By observing the trend of the coverage of imports by exports (Graph 1), it is evident that BH throughout the entire twenty-year long period12 has improved this indicator, with significant annual fluctuations. It suggests the existence of a certain trend, which we have calculated and which is presented in Graph 7.

Graph 7. Trend and trend forecast of the index of coverage of imports by exports of BH in the period 1997-2021

Source: our calculation

As shown in the previous graph, the trend of BH has a much larger positive inclination than in the case of Serbia, which results from a significantly higher improvement of the observed indicator (the trade deficit which in 1998 amounted to 71.1% of GDP decreased to 19% in 2016, which is an improvement by around 3.75 times). This results in the forecast that BH could reach its full coverage of imports by exports as early as in 2021, although its trade deficit is two and a half times higher (relatively) than the trade deficit of Serbia. The fact that over the recent several years BH recorded negative deviations of the actual indicators from the forecasts on the basis of the trend shows that such forecast is unrealistic (Graph 7).

Conclusion

Our research has undoubtedly confirmed the set assumption that all the ten countries observed over the previous twenty years made a large step in the direction of economic development, i.e. the creation of competitive economies which are self-sustainable in conditions of liberalised economic relations with foreign countries. However, our research has also shown that the success is unequal. So, all the countries from our benchmark group (Visegrad Group) achieved remarkable economic results and for years, or even decades, they recorded a trade surplus (coverage of imports by exports exceeding 1), while the situation in the countries formed after the dissolution of the SFRY is quite diverse. Specifically, Slovenia and Croatia went down the path from

12   In the World Bank database, there is no data for BH for 2016, so our final observation period is 1997-2015.

"mature debtor" countries to "young creditor" countries, while Serbia, BH, Macedonia and Montenegro are still in the group of underdeveloped countries as they have not managed to reach the full coverage of imports by exports even after twenty years of economic transformation. As all the six countries (Poland, the Czech Republic, Slovakia, Hungary, Slovenia and Croatia), which according to the used criterion moved to the group of developed countries, at the same time became EU members, the thesis has been empirically proved that the reforms required for the membership in the EU are useful for the country development although they are certainly connected with some social and economic costs and risks. Even in the remaining four countries (Serbia, BH, Macedonia, Montenegro) which have not reached what we defined as the minimum point of an acceptable level of development (the full coverage of imports by exports in the conditions of liberalised economic relations with foreign countries), there is a distinct pattern that the faster the progress in the EU integrations process, the better the economic performances. So, Serbia, which has made the largest step on the EU integration path in recent years, is also the country currently closest to the point of reaching the full coverage of imports by exports. Positive trends are also recorded with BH and Macedonia, but in these two countries, the several-year long stagnation in the EU integration process was reflected in the slow-down of positive trends, which is particularly the case in BH. As the European Union itself "has implemented" a liberal economic paradigm for decades and our research has shown that the success of the observed countries has depended on the degree of following such policies, we believe that the basic implicit recommendation of Kindleberger's balance of payment evolution scheme (on the need of conducting passive liberal economic policies which will not disturb development) has been proven.

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THE ROLE OF INTELLECTUAL CAPITAL AND ITS ACCOUNTING RECOGNITION AND MEASUREMENT

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Abstract

In the last two decades, the economy has moved from industrial to knowledge-based, with the result that basic economic resources no longer consist of natural resources, capital and labor, but knowledge. In a knowledge based economy, what creates a competitive advantage and value is the resources of knowledge such as human capital, processes, external brands, and networks. The source of companies' economic value no longer depends only on the production of material goods, but on the creation and management of intellectual capital. As a result, the concept of intellectual capital, which quantifies knowledge, skills, relationships, processes, innovations and other components of intangible assets, has become the most important business factor. The main objective is to examine the need for modifying the accounting theory to provide a standardized and comparable approach when using accounting and intellectual capital reports. Measurement and recognition of intellectual capital in financial statements are not limited by the requirements for legal explanations, while discretionary and contextual considerations are advisable. Despite the transition from the industrial to the knowledge economy, financial reporting is not sufficiently tailored to keep pace with the change in value-creation processes and the most significant changes that will yet take a turn in the financial context and reporting on the intellectual capital of an organization.

Keywords: *Corporate annual reports, intellectual capital, management, measurement, recognition*

JEL classification: *M41*

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Introduction

Companies that are interested in building and maintaining a continuous competitive advantage should focus on their intellectual capital, as well as their knowledge activities. Structural changes in the economy have made companies correctly evaluate their strengths and abilities. Qualified human resources, research and development initiatives, innovation and productivity are the main areas for obtaining the necessary competitiveness in major industries. The concept of intellectual capital is useful for business partners and other stakeholders who believe that there is a connection between intellectual capital management initiatives and value-creation results.

The subject of this research will be the role of intellectual capital in the operations of companies, the strategic aspect of intellectual capital management, the need for reporting on companies' intellectual capital, and the accounting treatment of intellectual capital in connection with its recognition and measurement.

The role of intellectual capital in companies' operation

In the last two decades, the business environment has seen a dramatic increase in the number of companies that own intangible assets. The economy has moved from an industrial to knowledge-based economy, with the result that basic economic resources no longer consist of natural resources, capital and labor, but knowledge. In a knowledge based economy, what creates a competitive advantage and value is the resources of knowledge such as human capital, processes, external brands, etc. Accordingly, traditional factors of production have lost their significance in creating value, so the organization's success depends more on the ability of these organizations to exploit and manage their intangible assets than material assets (Seetharaman, Sooria & Saravanan, 2002). Despite the transition from the industrial to the knowledge economy, financial reporting is not sufficiently tailored to keep pace with the change in value-creation processes, and the most significant changes that will yet take a turn in the financial context are in the reporting on the intellectual capital of an organization (Holland J, 2006).

Figure 1. Classification of intellectual capital
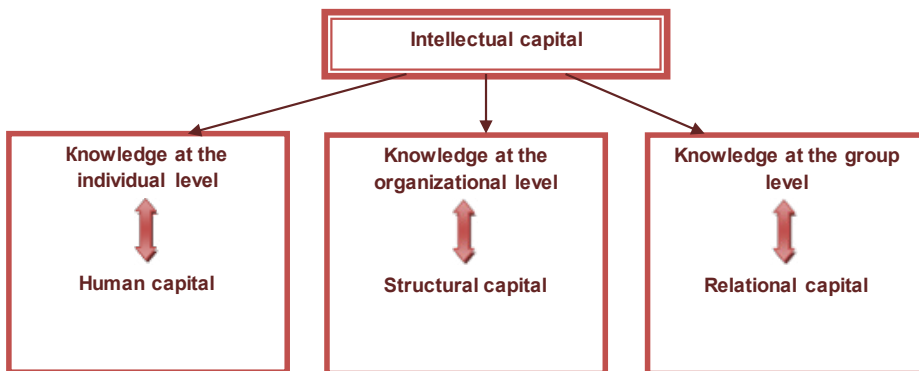
Source: Concept of intellectual capital. (Ordóñez de Pablos, 2004: 636)

There is no common definition of intellectual capital and the term is often used extensively and has the meaning just as the term "intangible assets". At the same time, there is a widespread tendency to use the terms "intellectual capital" and "intangible assets" alternately. The term intangible assets refers to those assets that according to the International Financial Reporting Standards (IFRS) are allowed to be recognized in the company's balance sheet. In a broader sense, intellectual capital can be the ultimate result of the process of transformation of knowledge or knowledge transformed into intellectual capital. In addition, intellectual capital can be referred to as one of the most important and valuable strategic resources in the modern business environment (Coakes & Bradburn, 2005). Any monetary investment made by the company in anticipation of future profits that are not immediately embodied in a material form is intangible assets, and in most cases intellectual capital. The existence of intellectual capital is more suggestive than demonstrative and plausible. Speaking in broader terms, intellectual capital is any factor that contributes to the process of generating company's value which is more or less directly under the control of the company itself. Hunter's view (Hunter, Webster & Wyatt, 2005) is that intellectual capital consists of a sub-group of intangible assets where "intangible assets" and "intellectual capital" will be used interchangeably, with the intellectual capital being part of the intangible assets of the company. Mouritsen (Mouritsen, Larsen & Bukh, 2001) suggests that intellectual capital is a set of intangible assets that comprise human and structural capital. These various descriptions of intellectual capital are consolidated in the definition of intellectual capital (Roslender, 2000). Abeysekera (Abeysekera, 2003) defines intellectual capital as "possession of knowledge, applied experience, organizational technologies, customer relationships and professional capabilities that provide competitive advantage to the market." Abeysekera identifies three classes of intellectual capital, namely human capital, structural capital, and relational capital. He further suggests that the definition of intellectual capital refers to intangible assets that are not recognized in the financial statements. However, part of the structural capital accounting for intellectual property is recognized in the financial statements because it meets the IASB identification criteria. Based on IFRS 3 (Brannstrom & Giuliani, 2009), intellectual capital is described as intangible assets identified plus goodwill purchased. Studies show that intellectual capital is found at all levels of the company and the three intellectual capital classes are supporting each other. Thomas (Thomas, 1997) argues that human capital refers to the capacities of individuals to provide solutions to their clients, while structural capital transforms the know-how owned by the group. Relational capital allows customer relationships to be enhanced. This view is supported by other researchers (Swart, 2006). Figure 1 below illustrates various subcomponents or classes of intellectual capital.

Figure 1 illustrates the types and indicators of knowledge across the three classes of intellectual capital. In addition to financial performance information, investors and managers can consider other factors and indicators when collecting information and exploring about their investment options. Concepts such as elasticity, quality of management and potential risk are material in the decision-making process of a group of stakeholders, as well as users of financial information (OECD, 2006). Accordingly, the list under each sub-component of intellectual capital presented below is not sufficient.

Figure 2. Sub-components of intellectual capital

Human capital:	Relational capital
• Know-how	• Brands
• Education	• Customers
• Professional training	• Customer loyalty
• Knowledge about work	• Company name
• Professional assessments	• Delayed orders
• Psychometric assessments	• Distribution channels
• Job competencies	• Business cooperation
• Entrepreneurial enthusiasm and innovation	• Licensing agreements
• Proactive and reactive abilities	• Favorable contracts
• Variability	• Franchise agreements

STRUCTURAL CAPITAL

Intellectual property	Infrastructure facilities
• Patents	• Philosophy of management
• Copyrights	• Corporate culture
• Design rights	• Process management
• Trade secrets	• Information systems
• Trademarks	• Financial relations
• Service marks	

Source: CIMA (2005: 6) adapted

Strategic aspect of intellectual capital management

Intellectual capital management connects scientific and technological research and development, innovation and intellectual property rights to a comprehensive management concept. However, not only technology-oriented companies will benefit from the management of intellectual capital. The capitalized value of many global companies such as Coca Cola show value many times over their fixed assets and the only way to explain the difference are intangible assets such as the brand and business processes owned by the company. China is beginning to understand that it has lost many of its historic brands and encourages the development of self-branded

brand names. There are also many Asian cases, such as Hong Kong's "Esprit" and "Red Bull" in Thailand, which have made an exceptionally clever use of intellectual capital management to take a major step from being local brands to becoming globally recognized brands. The management of intellectual capital, in particular the creation of intellectual property (including registered trademarks of which brands are built), is the foundation upon which the world's knowledge economies are built and a basic business management tool that enterprises need to exploit as they move along the path of innovation and creativity.

The process of managing intellectual capital mainly includes:
- Analysis of the existing knowledge of the enterprise in order to better meet its business plans (enterprise's structural capital),
- Creating a climate in which intellectuals have the best working conditions,
- Identifying possible sources of income that can be drawn from the existing structural capital and developing marketing plans for them,
- Optimizing the creation of value through new and existing initiatives,
- Assessing the risks involved in protecting the enterprise's intellectual property and use an effective intellectual property strategy to minimize the business risk.

Many companies have realized that market multipliers related to their intangibles (patents, trademarks, trade secrets, branding, etc.) are often much larger than the multipliers associated with cash inflows generated by their tangible assets. The challenge these companies face is to implement business practices and systems to manage and utilize these intellectual assets, since traditional accounting approaches, physical assets monitoring, and inventory are designed to manage tangible assets. Most companies have unequally developed processes, organizations or systems for effectively managing and supporting intellectual assets and have missed opportunities to realize the greatest possible value from them.

The need for reporting on the intellectual capital of companies

The increasing importance of intellectual capital and the growing number of companies that rely on these assets in order to create value require the information of the market, investors and other stakeholders on the existence of intellectual capital (OECD, 2006). As intangible assets such as knowledge and innovation become an increasingly important part of the corporate value, the problem escalates as to how to report and disclose the value of these assets in any report of the organization and also how to explain the profits arising from these funds. Companies that use knowledge-based and value-creation tools to generate value generally show a high return on assets. The story of this phenomenon is that some of these assets do not qualify for disclosure in the balance sheet, while they still contribute to gaining profits shown in the income statement. Compared to the industry average, a high-return company is assuming that there is a surplus of intellectual capital higher than the average in the industry. Accordingly, with the change in the factors of production or assets that create value from less physical to more intangible, there is a need for a change in the accounting framework and the disclosure of information in annual reports.

The emphasis in the annual financial statements is still on the accounting values of the entity's assets, and less on the market value of the entire organization. The organization's market value is based on the full value of the company, not on the individual assets that the company owns. In most cases, the carrying amount of assets differs from their market value as a result of the fact that market value includes assets not included in the book value and other market related factors. However, the difference between the two values should not be seen as equal to the value of any intellectual capital, although it explains the existence and importance of intellectual capital in the organization. In view of the fact that the difference between these two values remains unhealthy, the current financial reporting framework fails to address this situation. This difference is recognized and disclosed only as goodwill when a company is taken over by another company in a business combination. The standards also define the goodwill acquired in business combinations as "a tool that represents the future economic benefits derived from other assets obtained in a business combination that are not identified individually and are not recognized separately".

In addition, the difference between the entity's market value and the present value of its identified net assets may record a number of factors that affect the entity's value. A company that has generated goodwill in the form of internally generated intangible assets is not allowed to recognize this fact in its financial statements, as these assets do not meet the criteria for recognition of an asset. Hence, it becomes necessary to find a way to report this value both to the users of information and investors.

In trying to resolve the difference between the book value and the market value of a business, it is important to identify those mechanisms with which value is created and transformed. Therefore, it is very important to identify what creates the value, how this value is created, and how to bring this information to investors and other users of information. In modern economy, the value creation process is presented as an effect of the links between physical assets and intellectual capital, as well as the way in which these two resources are compiled and intertwined. As a result of the fact that companies now tend to have more intellectual capital compared to physical assets, the value-creation process contributes more to the market value of the business. Mouritsen (Mouritsen, Larsen & Bukh. 2001) describes this approach in assessing business as an approach to intellectual capital. The value in terms of financial accounting is determined by transactions between two parties or the fact that the element can be identified. Accordingly, the process of value creation and the existence of intellectual capital in the company is not disclosed in its financial statements. This lack of confidence in these funds has led to an accounting debate and studies by researchers on the subject.

The strict recognition terms and criteria set out in the current financial accounting framework and the IAS (IASB 2010, IAS 38) make most of these issues unresponsive. It is understandable that the criteria for recognition of assets want to fulfill some goals to protect the public interest and to ensure that due attention, objectivity, consistency, verifiability and comparability are retained. In addition, the objectives of the Financial Accounting Framework are aimed at reducing the subjectivity and manipulation of financial information by the management, as well as promotion an

objective presentation of all financial transactions (IASB 2010). However, there is a growing need to report on those assets that do not meet the accounting standards and criteria for recognizing investors or capital providers and other stakeholders for their existence and value in the business concerned.

Accounting treatment of intellectual capital in connection with its recognition and measurement

The purpose of financial reporting is to provide information to users to make economic decisions about the financial position and performance of the firm as specified by the Board of Standards for Financial Accounting and the International Accounting Standards Board in the framework for the preparation and presentation of financial statements. While it is generally accepted that investments in intangible assets are important sources of future performance, the restrictive accounting rules for the recognition of assets mean that most intangible assets cannot be included in the balance sheet, especially if they are internally developed. Instead, all costs incurred in developing intangible assets must normally be directly included as costs in the profit and loss account. With companies that invest in intangible assets, this direct payment of costs means that the current profit and financial position of the company is reduced, while future profits are often overstated.

Therefore, it is essential that the company identifies and develops its own strategic resources as an intellectual capital in order to be able to develop a strategy that will coincide with the competitive advantage of the company. Apart from the growing importance of reporting on intellectual capital, the current financial accounting framework has remained focused on tangible assets and certain intangible assets, but excludes the most important material assets. In addition, a greater emphasis on growth and competitiveness is a challenge in terms of both financial reporting requirements and corporate reporting (OECD, 2006). The only intangible assets that are recognized in financial statements are those permitted in respect of the International Accounting Standards Board (IASB). The International Accounting Standards Board (IASB) (IASB 2010) requires that an intangible asset to be recognized in the company's annual financial statements should be recognizable and measurable. The reason for not recognizing some of intellectual property capital as human capital, competitive advantage and internally generated goodwill is because these assets do not meet the criteria for recognition and measurement in terms of classifying them as an intangible asset (IASB 2010). The International Accounting Standards Board (IASB) sets out very stringent requirements if an item needs to be recognized as an asset in the financial statements. These requirements are necessary in order to ensure that it is possible to compare the financial information of different companies and to prevent manipulation of this information by the management.

The criteria for recognizing and measuring an asset in the company's annual financial statements are determined either by a specific transaction or by a series of identifiable and verifiable transactions (OECD, 2006). An example of such transactions involves the purchase, exchange, production process or contractual arrangement. Holmen

(Holmen J, 2005) considers that the occurrence of any particular transaction or series of transactions allows the recognition of the asset to be verifiable. Part of the verifiability of the asset means that the asset is measurable. However, most items of intellectual capital are difficult to measure with certainty and it is not always easy to check. These limitations on the nature of intellectual capital pose a challenge to financial reporting. To be confident in information, one must faithfully represent transactions or other events, or endeavor to represent them, or could reasonably be expected to represent them. This situation makes it difficult to recognize the internally generated brands, list of clients, publishing titles and other similar items that are not easily measurable and reliable. However, the costs incurred in generating these assets are recognized immediately because it is not possible to distinguish between these costs from the cost of business development as a whole.

The Board (IASB 2010) further argues that the reason for not recognizing these assets is the fact that there is a degree of risk that the information about these funds will be a less faithful representation of what the information really represents. This is due to inherent difficulties either in identifying transactions or other events that need to be measured, or in planning and applying the presentation techniques and techniques capable of communicating a message that is consistent with those transactions or events. However, the framework permits using reasonable estimates to determine the amount to be disclosed. In this case, measurement and presentation can be made using reasonable estimates without undermining the value of the information.

Failure to recognize assets such as intellectual capital in financial statements may result in a large difference between the value of the company as perceived by investors and the accounting value of the company as shown in its financial statements. Unfortunately, this disparity can create the impression that financial reporting does not provide an adequate picture of company operating assets. Additionally, investors are not able to rely solely on financial statements in order to make investment decisions. Market value is the one that encourages the investor to make a decision as to whether to invest or not in a proprietary company.

The rising tendency to link the management valuation with the stock price means that the accounting profession is under pressure to report on the true value of the business in financial statements (Roslender R & Fincham R. 2004). Despite the fact that the value of intellectual capital of a company does not have to be equal to the difference between the market value and book value of the company, the value of these intangible assets is included in the market value of the business and, therefore, their value contributes to the gap between the market value of the business and its book value (Steward TA 2001). With the rise of a knowledge-based economy, intellectual capital has the potential to explain the differences that exist between these two values (Sujan & Abeysekera, 2007). Several researchers have developed models that can be used to measure the value of intellectual capital. One of the models was developed on the basis of the System of Parallel Observation of Progress (Liang C & Yao M. 2005). This model divides the market value of financial capital and intellectual capital in order to enable the identification and measurement of intellectual capital components.

A key argument against the recognition of intangible assets in the balance sheet is the inconsistency of future economic inflows from such assets. As a consequence, current accounting systems are more likely to overburden the costs of investing in intangible assets and postpone the recognition of their benefits (Lev and Zarowin, 1999). In the late 1980s, academics and practitioners began to express their concerns about this practice and to argue that if accounting rules did not adapt to the growing need to provide relevant information on investment in intellectual capital, accounting would lose its relevance (Johnson and Kaplan, 1987). Both attitudes of professional organizations and academic research have emphasized the need to adjust existing accounting practices in order to maintain the provision of users with genuine and objective information on the financial position of a firm and its performance.

Conclusion

Existing knowledge in an organization crucial to its success is the so-called intellectual capital, which plays a key role in creating innovative products or services in the coming financial years which can be sold as a net profit. The targeted promotion of individuals with excellent skills, solid relations with consumers and market-oriented development for getting as good products as possible are among the most important factors of success in today's economy, which is largely based on inventiveness and knowledge. In addition to some new managerial tools, many SMEs rely on employees' inventiveness and quality management as one continuous approach in order to identify, select and target the availability of internal and external knowledge and to integrate it as an additional value in success.

Intangible assets are sources of value and a competitive advantage, but it is clear that what is normally considered as intellectual capital and the impetus for the intangible asset will not actually pass the recognition test. Accounting regulatory bodies have not yet developed an adequate reporting system that will provide investors and other users with information to make their investment or credit decisions. This lack of information has harmful consequences for both firms and investors, since it can direct them to a higher cost of capital and interest rates, a higher degree of income uncertainty, greater errors in revenue forecasts, and greater information asymmetry between managers and shareholders, leaving a great degree of freedom for insider gains and management-earnings. However, firms seem to be starting to react, and driven by research at the international level, they are beginning to provide information on their intangible resources on a voluntary basis in order to comply with new needs and requirements for better information.

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THE IMPACT OF JOB AND COMMUNICATION SATISFACTION ON THE FINANCIAL PERFORMANCE OF A MID-SIZED COMPANY

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Abstract

The paper presents a research on employees' job and communication satisfaction, as well as on financial performances on the example of a mid-sized Serbian company. The company operates in the field of food industry. The research was carried out by means of standardized questionnaires and the examinees werre employed in the observed company. In addition, the impact of job and communication satisfaction dimensions on the items of financial performance was studied as well. The research results showed that the examined employees were generally satisfied with their job and communication, while the financial performances of their company were considered as average. Further, both the dimensions of job satisfaction and communication satisfaction have a significant impact on financial performance items. Their salary, possibilities for promotion, a good organization of meetings, efficient and clear guidelines and meetings, and access to information about the organization as a whole can raise the level of financial performance. On the other hand, the dimensions of job and communication satisfaction do not have a bigger impact on some extreme components of financial performance such as sale growth, competitiveness and growth of the fixed assets in a company.

Keywors: *job satisfaction, communication satisfaction, financial performance, Serbia.*

JEL classification: *D23, J28.*

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Introduction

Employee satisfaction is a very important factor for achieving the desired business results of each company. Therefore, it is of utmost importance to monitor the satisfaction of employees in companies, as well as to increase employee satisfaction to a higher level. Top managers must always take care of this. Employee satisfaction is reflected, above all, through job satisfaction and satisfaction with the communication of employees.

The subject of research in this paper is the relationship between the dimensions of job satisfaction and financial performance items, as well as the relationship between the dimensions of communication satisfaction and financial performance items. All these relations are examined on the example of the company "Art Ival" d.o.o., Zemun (Serbia), which is also the subject of this research. The company is successful, but there is a desire to determine the condition of certain aspects of employee satisfaction and business results, as well as to define the directions of action for their improvement.

The examination of these relations is very important for determining, first and foremost, the state of the items and dimensions observed, and then the relationship between them. This will enable the definition of possible top management practices, in order to improve the aspects of job satisfaction and satisfaction with communication, and finally, improve the financial performance of the observed company.

Numerous studies deal with the problems that are being investigated in this paper. For example, a significant number of references confirm the link between job satisfaction and communication satisfaction (Kang, 2010; Pincus, Knipp and Rayfield, 1990). Similarly, open communication in organizations leads to increased satisfaction with employee engagement (Burke and Wilcox, 1969). According to Andersen (2001), Nelson and Coxhead (1997), satisfaction with communication and internal communication plays an important role in the strategic activities of the company. What is especially important for this work is that improving the satisfaction with communication and internal communication provides better financial results of the organization (Ehling, White and Grunig 1992; Yates, 2006). Likewise, according to Ivancevic and Matteson (2002), in many organizations, top managers understand the importance of a potential link between job satisfaction and desired organizational outcomes.

Theory and hypotheses

Job satisfaction

According to (Robbins and Judge, 2009), job satisfaction can be defined as a positive attitude about one's own business, which stems from the assessment of the

characteristics of the job. Employees who are satisfied with their work have positive feelings towards their work, and the opposite: employees who are dissatisfied with their work have negative feelings towards their business. In general, when it comes to employee attitudes toward work, in fact, it is often thought of job satisfaction. So, job satisfaction is one of the most important employee attitudes toward your business.

According to (Janićević, 2008), satisfaction with the job is a complex position that includes: certain assumptions and beliefs about the business (cognitive component), feelings towards work (affective component) and job evaluation (evaluation component). Job satisfaction is one of the most investigated areas of organizational behavior.

What is it that leads to satisfaction or dissatisfaction with the work? Job satisfaction is affected by various aspects of job satisfaction: salary level, type of work (nature of work), career opportunities, colleagues, superiors, etc. According to (Robbins and Judge, 2009), the most significant impact on overall job satisfaction has the aspect of being employed in the work itself. Most people prefer interesting and creative jobs, which offer the possibility of training, diversity and independence at work over tasks that are routine, repetitive and predictable. Money can often be a motivator, especially in poor countries or for poor people. In addition, an important motivator is the opportunity for promotion. Therefore, satisfaction with the job is not affected only by the size of the prize, but also by the type of reward that the employee prefers. It should be noted that employee satisfaction is also affected by job satisfaction. So, some people are never completely satisfied, while other people are always satisfied.

Communication satisfaction

Communication plays an extremely important role in each organization. It is impossible to imagine an organization without communication. Ivancevich and Matteson (2002) describe communication as an adhesive that connects the organization. Communication helps members of the organization to realize both individual and organizational goals, apply and respond to organizational changes, coordinate organizational activities and stimulate all relevant stakeholders in the organization. Breaking communication in the organization would cause enormous problems.

Managers are especially referred to communication, because virtually every activity of the manager is based on communication. The same authors further conclude that the effectiveness of organizational communication affects the overall effectiveness of the organization. Difficult, interrupted and unqualified communication can significantly jeopardize the organization's business. Managers must be aware of the importance of communication and its impact on business. They need to find ways to achieve clear, continuous and quality communication in their organization.

Robbins and Judge (2009) state that communication among people can be oral, written and non-verbal. Oral communication is fast and efficient. Written communication is advantageous in business because it leaves a mark and can be checked who it is from, who wrote it and who ordered it. Non-verbal communication is always present, both in terms when something is spoken and not spoken. Often, it is unconscious and presents the most sincere real feelings of the one who sends the message.

According to Robbins and Judge (2009), obstacles to effective communication are: filtering (hiding individual information), selective perception, overloading information, emotions, language, and fear of communication. The same authors cite contemporary communication problems: communication barriers between men and women, silence as communication, "politically correct" communication and intercultural communication.

The research is exploratory in the part where the state of job satisfaction, satisfaction with communication and financial performance is examined, because it is difficult to assume the nature and quality of this situation in the observed company. Furthermore, the research is confirmatory in the part where the observed impacts are examined: between the dimensions of job satisfaction and satisfaction with communication, between the dimensions of job satisfaction and financial performance, between the dimensions of satisfaction with communication and financial performance in the observed company. In this case, it is easy to assume that there are positive and statistically significant influences.

Based on the previous paragraph, three research questions and two hypotheses are set out in the paper:
IP1: What is the state (average grade) of the dimension of job satisfaction in the observed company?
IP2: What is the state (average grade) of the dimension of communication satisfaction in the observed company?
IP3: What is the state (average grade) of the financial performance items in the observed company?
H1: There are statistically significant correlations between the dimensions of job satisfaction and financial performance items in the observed company.
H2: There are statistically significant correlations between the dimensions of communication satisfaction and financial performance items in the observed company.

Methodology

Research instruments

For the measurement of job satisfaction, the Employee Satisfaction Testing Questionnaire was used, developed by Spector (1985). This questionnaire has 36 items divided into nine dimensions. Each item receives an assessment of the respondents ranging from 1 to 6 (Likert scale in six points). Dimensions are as follows (Spector, 1985): Salary, Promotion, Supervision, Fringe Benefits, Contingent Rewards, Operating procedures, Coworkers, Nature of work, Communication.
The Communication Satisfaction Questionnaire (CSQ), developed by Downs and Hazen (1977), was used to measure communication satisfaction. This questionnaire has 40 items divided into eight dimensions. However, in this paper, 35 items and seven dimensions were used. It is misleading because the entities that make up this dimension are intended for supervisors, i.e. employees with at least several subordinates, and some of them have no subordinates. Each item receives an

assessment of the respondents ranging from 1 to 7 (Likert scale in seven points). Dimensions are the following (Downs and Hazen, 1977): Organizational perspective, Communication with supervisors, Communication climate, Personal feedback, Horizontal and informal communication, Media quality, Organizational integration, Communication with subordinates.

Financial performances were selected by reference to references (Terek et al., 2015; Nikolić et al., 2011). Thus, the seven schedules used in this paper are defined: Enterprise productivity, Profitability of enterprises, Market share of companies, Growth of company sales, Competitiveness of enterprises, Growth of fixed assets in the company, Salaries of employees in the company. Each item receives an assessment of the respondents in the range of 1 to 5 (Likert scale in five points). Apart from observing all the details, a financial performance dimension has been formed, which is also used in the analysis in this paper.

Sample research

The research was carried out at the company "Art Ival" d.o.o., Zemun. The employees of this company filled in the questionnaires. A total of N = 33 questionnaires was collected from the same number of respondents. Given that the company has 40 employees, the sample covered a significant percentage of employees (82.5%). Out of 33 respondents, there were 12 men and 21 women in the sample; 16 younger respondents and 17 older respondents; 13 employees who completed high school and 20 employees who completed college or university.

Research results

Descriptive statistics

Table 1 gives the results of descriptive statistics. This table shows the names of the items and dimensions observed, the short names for these items and dimensions, the mean values of items and dimensions, and Cronbach's alpha for each dimension. The values of Cronbach's alpha range from α = 0.711 to α = 0.950.

Table 1. Descriptive statistics

Names of items and dimensions	Short name	N	Min	Max	Mean	Std. Dev.	α
Pay	JS1	33	1.75	5.50	**3.5985**	1.07154	.909
Promotion	JS2	33	1.50	6.00	**4.0076**	1.23504	.930
Supervision	JS3	33	2.00	6.00	**4.6288**	1.11825	.909
Fringe benefits	JS4	33	1.50	6.00	**3.9545**	1.31466	.937
Contingent rewards	JS5	33	2.00	6.00	**4.0758**	1.28769	.950
Operating procedures	JS6	33	2.00	5.25	**3.5985**	.75244	.256
Coworkers	JS7	33	2.25	5.75	**4.1970**	.82148	.846
Nature of work	JS8	33	2.50	6.00	**4.5000**	1.08253	.929
Communication	JS9	33	2.00	6.00	**4.4091**	1.10010	.891
Organizational perspective	CS1	33	2.20	6.80	**4.7758**	1.20391	.877
Communication with supervisors	CS2	33	3.49	6.91	**5.3892**	.94790	.945
Communication climate	CS3	33	3.00	6.80	**4.7879**	1.02095	.876
Personal feedback	CS4	33	3.20	7.00	**4.8788**	1.00242	.857
Horizontal and informal commun.	CS5	33	3.76	6.76	**5.1661**	.66273	.711
Media quality	CS6	33	3.86	6.75	**5.2029**	.75462	.750
Organizational integration	CS7	33	2.88	6.80	**5.0764**	.99536	.762
Financial performance	FP	33	1.29	4.86	**2.9784**	.86685	.949
Productivity	FP1	33	1	5	**3.21**	1.023	
Profitability	FP2	33	1	5	**3.00**	1.118	
Market share	FP3	33	2	5	**3.09**	.914	
Sales growth	FP4	33	1	5	**2.76**	1.275	
Competitive status	FP5	33	2	5	**3.21**	.781	
Asset growth	FP6	33	1	5	**2.73**	.944	
Salaries	FP7	33	1	4	**2.85**	.795	
Valid N (listwise)		33					

Source: authors' own estimations

Correlation analysis

Table 2 shows the correlation analysis between the dimensions of job satisfaction and financial performance items. Table 3 shows the correlation analysis between the dimensions of communication satisfaction and financial performance items. In this respect, statistically significant correlations are marked as follows: * $p < 0.05$; ** $p < 0.01$.

Table 2. Correlation analysis between the dimensions of job satisfaction and financial performance items

	FP	FP1	FP2	FP3	FP4	FP5	FP6	FP7
JS1	.792**	.757**	.789**	.677**	.710**	.613**	.537**	.761**
JS2	.758**	.747**	.781**	.747**	.611**	.649**	.491**	.653**
JS3	.527**	.515**	.569**	.646**	.384*	.426*	.227	.488**
JS4	.698**	.693**	.707**	.719**	.571**	.596**	.424*	.606**
JS5	.655**	.610**	.657**	.645**	.549**	.562**	.397*	.622**
JS6	.364*	.378*	.390*	.237	.213	.346*	.325	.326
JS7	.690**	.701**	.689**	.683**	.532**	.511**	.494**	.669**
JS8	.542**	.494**	.555**	.545**	.447**	.460**	.275	.581**
JS9	.750**	.739**	.775**	.638**	.657**	.547**	.479**	.761**

Note: *p<0.05; **p<0.01
Source: authors' own estimations

Table 3. Correlation analysis between the dimensions of communication satisfaction and financial performance items

	FP	FP1	FP2	FP3	FP4	FP5	FP6	FP7
CS1	.769**	.740**	.748**	.684**	.680**	.633**	.516**	.760**
CS2	.579**	.557**	.579**	.561**	.474**	.481**	.346*	.564**
CS3	.761**	.726**	.783**	.624**	.708**	.560**	.489**	.775**
CS4	.659**	.592**	.675**	.551**	.641**	.435*	.393*	.737**
CS5	.283	.260	.270	.335	.093	.282	.248	.277
CS6	.793**	.750**	.788**	.716**	.729**	.544**	.558**	.801**
CS7	.751**	.721**	.755**	.687**	.637**	.614**	.494**	.724**

Note: *$p<0.05$; **$p<0.01$

Source: authors' own estimations

Discussion of results

Discussion of the descriptive statistics results

Based on the results in Table 1, it can be seen that average grades of satisfaction with work are more than average (3.5 for this questionnaire). This indicates that the employees of "Art Ival" company d.o.o. are generally satisfied with the job, which is also the answer to the IP1 research question. The highest average grade has the dimension JS3 - Supervision, and then the dimension JS8 - Nature of work. Employees are obviously very pleased with how managers handle them, as well as the nature of their work. This is very important for the observed company. It is easy to assume that for this reason, other dimensions of satisfaction with work will have high values: if you are satisfied with the job you do, as well as the behavior of your superiors, then this is a great basis for total job satisfaction. On the other hand, employees are the least satisfied with the dimensions of JS1 - Salary and JS6 - Operating procedures. In the current, transitional conditions in Serbia, many people are not satisfied with the salary, so this result is understandable and generally expected. The JS6 Dimension - Operating procedures have an administrative character and there are almost always opportunities for improvement in this segment. As a result, the likelihood of certain discontent with operational procedures has increased.

The satisfaction levels of communication at the enterprise level are also more than average (4.00 for this questionnaire), so it can be said that the employees of the company "Art Ival" d.o.o. are generally satisfied with communication. This is also the answer to the IP2 research question. The highest average grade is CS2 - Communication with the superior, which is in line with the previous result for satisfaction monitoring. In addition, the CS6 - Quality of the media has a high grade. Employees are satisfied with the organization and efficiency of meetings. In contrast, the dimensions CS1 - Organizational Perspective and CS3 - Communication Climate have the weakest grades. Notifications of changes, then information on the financial position of the organization and information on the general policy and goals of the organization are not fully known to employees. Likewise, there is room for improving communication in the organization, so that it motivates and stimulates employees to achieve organizational goals and identify themselves with the organization.

Financial performance metrics have values around the average (3.00 for this questionnaire). This is best illustrated by the average estimate of the financial performance dimension (obtained on the basis of seven financial performance averages), which is 2.9784, which is very close to average. Therefore, the answer to IP3 is that employees see their company as average in terms of financial performance. Top rated items are FP1 - Productivity and FP5 - Competitiveness of the company. The weakest assessed assets are FP6 - Growth of fixed assets in the company and FP4 - Growth in company sales. From this you can see in which segments top managers should act.

Discussion of the correlation analysis results

From Table 2, it can be seen that almost all correlations between performance satisfaction and performance are statistically significant, strong, and positive. The exception is the dimension of the JS6 - Operating procedure, which has significantly less correlations with the financial performance ratios. Based on this, it is clear that the dimensions of job satisfaction have a significant impact on the performance of financial performance. This hypothesis was confirmed by H1.

Of the dimensions of job satisfaction, the strongest impact on the performance of financial performance has the dimensions of JS1 - Salary and JS2 - Advancement. Salary and career prospects can be a strong motivator for employees, and this result can be explained by staff motivation, which then results in better financial performance. The weakest correlations are achieved by the dimensions of JS6 - Operating procedures and JS3 - Supervision. Operating procedures do not have such a significant impact on financial performance: work is done regardless of the operational procedures, the difference exists in satisfaction or dissatisfaction with these procedures, depending on how they are set up. Supervision has a significant impact on financial performance, but somewhat weaker than other dimensions of job satisfaction, except for operational procedures. Similar to operational procedures, employees must do their job regardless of their satisfaction with supervision, so financial performance is not affected by changes. In addition, it may be that sometimes excessive satisfaction with supervision leads to some relaxation with subordinate employees, which reflects a decrease in financial performance.

From the financial performance points, the most affected by the business satisfaction dimension are the FP2 - Enterprise profitability, then the FP1 Enterprise productivity. Contrary to this, the smallest impact of business satisfaction dimensions is FP6 - Growth of fixed assets in the company, FP4 - Growth of company sales and FP5 - Competitiveness of the company. Satisfaction with work significantly influences the work that is directly related to the satisfaction of employees. This particularly refers to productivity that is directly influenced by the engagement of employees. On the other hand, job satisfaction does not have such an impact on some external components, such as sales growth and competitiveness of the company. The smallest impact occurs in the growth of fixed assets in the company, which depends on the top management and the situation in the company, and not so much on employee satisfaction.

From Table 3, it can be seen that almost all correlations between the dimensions of satisfaction with communication and financial performance items are statistically significant, strong and positive. The exception is the CS5 dimension - Horizontal and informal communication, which has no statistically significant correlation with the financial performance ratios. Based on this, and with the exception of the CS5 dimension - Horizontal and informal communication, it can be said that the dimensions of communication satisfaction have a significant impact on the performance of financial performances. In this way, the hypothesis H2 is confirmed.

From the dimensions of communication satisfaction, the strongest impact on the performance of financial performance have the dimensions CS6 - Media quality and CS1 - Organizational perspective. Good organization of meetings, efficient and clear instructions and meetings can raise the level of financial performance. Also, the same effect is achieved with the availability of information about the organization as a whole, as well as information about changes, the financial position of the organization and the goals of the organization. The weakest correlations are achieved by the dimensions CS5 - Horizontal and informal communication and CS2 - Communication with superiors. Horizontal and informal communication is not a reliable indicator of the company's business results. If employees communicate openly and friendly, this does not necessarily mean that the company's business results will be either good or bad. The communication with superiors dimension is similar to the dimension JS3 - Supervision in the dimension of job satisfaction, so the explanation is similar. Communication with the superior has a significant impact on financial performance, but somewhat weaker than other dimensions of communication satisfaction, except for horizontal and informal communication.

From the financial performance points, the most affected by the dimensions of satisfaction with communication are the items of FP7 - Salaries of employees in the company, then FP2 - Profitability of the company. At the same time, under the smallest impact of communication satisfaction dimensions, there are FP6 - Growth of fixed assets in the company, FP5 - Company competitiveness and FP4 - Growth in company sales. Similar to the dimensions of job satisfaction, the dimensions of satisfaction with communication do not have such an impact on some external components, such as sales growth and competitiveness of enterprises, as well as the growth of fixed assets in the company, which is under the authority of top management. Regarding the dimensions of job satisfaction, the main difference is that the FP7 - Salary of employees in the company is under the greatest influence of the dimensions of satisfaction with communication. It is difficult to say that good commuication in an enterprise has an impact on employees' salaries to such an extent. In fact, the situation here is reversed: good payouts seem to encourage good communication in the company.

Conclusion

Employees in the company "Art Ival" d.o.o. are generally satisfied with their job. They are particularly pleased to see how managers deal with them, as well as the nature

of their work. Employees are the least satisfied with their salaries and operational procedures. Employees in the company "Art Ival" d.o.o. are generally satisfied with the company's communication. They are particularly satisfied with the communication with their superior, then with the organization and efficiency of meetings. Employees are less satisfied with access to information on changes, the financial position of the organization, general policy and the goals of the organization. Employees perceive the financial performance of their company as average. The best perceived items are the the company's productivity and competitiveness, while the weakest are growth in the company's fixed assets and growth in sales of enterprises.

The dimensions of job satisfaction, as well as the dimensions of communication satisfaction, have a significant impact on the performance of financial performance. The level of salary, opportunities for promotion, good organization of meetings, efficient and clear instructions and meetings, availability of information about the organization as a whole, can raise the level of financial performance. The dimensions of job satisfaction and the dimensions of communication satisfaction do not have such an impact on some external components of financial performance, such as sales growth, competitiveness of enterprises and growth of fixed assets in the enterprise.

Top management of the company "Art Ival" d.o.o. might be pleased with the results obtained, especially in terms of the existing job satisfaction and communication, and superiors' behavior. Also, there are no worsening failures that would jeopardize the company's business and employee satisfaction. The general recommendation for managers in the observed company is to be aware of the importance of having a job satisfaction and satisfaction with employee communication.

This kind of research can help improve business results and raise employee satisfaction. Therefore, such research should be carried out periodically at the "Art Ival" company d.o.o. The limitation of this research is the fact that it was carried out in one company, so the results are valid only for the observed company. However, other companies can conduct same or similar researches, so that the top management can obtain the data and guidelines for further operation.

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ON THE QUESTION OF ECONOMIC GROWTH NECESSITY: EVALUATION OF EFFICIENT RATES AND MAINTENANCE OF STABLE DYNAMICS

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Abstract

This article analyzes the causes of economic growth. The authors revise social influences on the maintenance of economic expansion rates as a cause and effect together with maintaining the balance between aggregate demand and supply. They also give the main factors which give an impulse to a breach, as well as to a recovery of dynamic balance, including overseas trade factors. The main objective of the paper is to explore the possibilities of changing the approach to a consideration of a problem and define what a pressing need for economic growth is. The authors find out that profit should be considered as the "negative" factor of economic growth, i.e. the growth serves as feedback on the response of the total profit increasing, or as a method of negotiation of its destabilizing influence. Another main idea of the paper is that continuous development of labor productivity (achievable through scientific and technical progress, business activity) together with a balanced policy on money supply is an inviolable factor for a sustainable economic growth. In conclusion, the authors suggest that the expansion of products export facilitates the stabilization of a country's economic situation and decreases the dependency on domestic demand, which is not always sufficient to cover the supply in a long-run equilibrium. At the same time, the possibilities for export expansion are limited, and one of the most significant constraints is determined by competitive and differently directed interests of countries entered in international trade flows as participations of a "zero-sum play".

Keywords: *economic growth, consumption, savings, investment, external trade balance, aggregate profit, financial reserves.*

JEL Classification: *A11; B17; B40*

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Introduction

A variety of conditions that underpin sustainable economic growth are the subject matter of many discussions between representatives of many economic schools. However, the existing diversity of approaches can be restricted to two principal directions (Agapova, Seregina, 2001), (Lavrov, 2006). The Keynesian demand theory's assumption, complemented by factors determining the dynamics of supply, can be taken as a basis for the first trend (Keynes, 2012). The second trend is based on neoclassical models, including the particularly noteworthy economic growth model of R. Solow.

At the same time, it should be noted that according to the authors' opinion, none of the theories forming the above mentioned directions pays sufficient attention to the issue of "the economic growth necessity". Taking the things which "need no extra proof" out of the brackets, the theories emphasize the factors promoting some positive economic dynamics, as well as the obstacles faced in the efforts to achieve an acceptable growth rate.

Methodology

The authors propose to change the approach to the consideration of the problem and wonder: what is a pressing need for economic growth? It is generally accepted that economic growth is a means to meet the growing population consumption (Lavrov, 2006). Indeed, if study findings by Minnesota University that by 2050, the world's population growth rate will outstrip the food growth rate are taken into account, the problem of increase in agro-based industries' output will certainly become burning. However, this problem, despite its critical importance in terms of people's physical survival, has also an industrial character, while aggregate growth data of all industries, regardless of their involvement in the process of public consumption, are the subject of the modern economic growth theory.

What other increasing people's needs can be satisfied by enterprises? Let's take the wireless phone market, for instance. It will be reasonable to suppose that nowadays, the technology and industrial bases can provide everyone who has enough funds with this devise. But there is growing evidence (still not confirmed in formal records, though) that manufacturers which have the possibilities to ensure a trouble-free service of these devices for at least 5 years of operation, voluntarily cut their real useful life to one to two years. After that, cell phones break down and the consumer is forced to buy another model. So, with regard to this industry, the explanation of the economic growth purpose from the viewpoint of needs satisfaction seems at least absurd: the purchasing needs are satisfied, while the production turnover growth (achieved by also including the above mentioned method) of the corresponding industries serves to achieve a certain purpose.

It is reasonable to ask how far this purpose meets public interests, considering the amount of resources involved in the process of achieving it.

Let us try to study this purpose by transcending the boundaries of the above mentioned industry and take the macroeconomic approach.

We will start with the quotation from the work of J.M. Keynes "The General Theory of Employment, Interest and Money": "Consumption is satisfied partly by objects produced currently and partly by objects produced previously, i.e. by disinvestment. To the extent that consumption is satisfied by the latter, there is a contraction of current demand, since to that extent a part of current expenditure fails to find its way back as a part of net income... Now all capital-investment is destined to result, sooner or later, in capital-disinvestment. Thus, the problem of providing that new capital-investment shall always outrun capital-disinvestment sufficiently to fill the gap between net income and consumption, presents a problem which is increasingly difficult as capital increases" (Keynes, 2012, p.107).

Thus, the great scientist connects the following two issues: the pace of investment growth, which is, as you know, the main factor for economic growth in the Keynesian approach, with a temporary gap between demand and supply.

We shall consider this connection into more detail by using an abstract model of the national economy without external commercial relations. To simplify the model we will also suppose that there are no government expenditures and dues in the system. In the economy, some industries operate producing final products in the amount of Y. These industries consume the production, which is manufactured by intermediate fields, in the amount of X. Wages paid to employees of all industries w are formed by means of the aggregate income Y+X. Under certain conditions, all enterprises get profit, which is calculated by subtraction of material expenditures and wages from their income. Material expenses of end industries are equal to the sum of production expenditures of intermediate industries X, while material expenses of intermediate industries are equal to the sum of all other production expenditures.

Taking into account the basic assumption of import absence, we draw attention to the fact that a wage has to be the source of payment for the total output (Y). In such a way, the payment passes directly to end industries, while to the interim ones, it is indirect - through purchasing of their products, i.e. raw materials, components etc., by end industries. However, under these given conditions, Y>w, since wages are formed as part of the aggregate income. Then, what will be a payment source for that part of the output the next time, which will remain after the salary payment? For instance, the output is equal to RUB 15 trillion. Of this amount, RUB 12 trillion are spent for wages (also indirectly via the financing of interim industries, which pay wages to their employees). And, assuming an absence of savings, the same amount of wages has to be spent on products purchases. But the aggregate cost of purchased production is equal to RUB 15 trillion. Where is the missing RUB 3 trillion then? And if it is assumed that savings are involved, then the problem will appear in other terms: now the wages fund, which could be spent on consumption, is decreased even more: for example, to RUB 10 trillion. Now, there is underconsumption in the sum of 5, but not 3 trillion as before!

Further, the part of the aggregate income that was not allocated to the wages fund (RUB 5 trillion) would have to be channeled to an investment financing. Thus, the

following question arises: Will companies be able to finance investments in the total amount of RUB 5 trillion, if their production at the same value of RUB 5 trillion is not purchased?

On the other hand, in an equilibrium, the RUB 2 trillion of savings are fully converted into investments via the financial market mechanisms. By this financial injection, the companies will cover RUB 2 trillion of investment costs. But we still have RUB 3 trillion, which is not compensated either by consumption of wages earners or by their savings.

Consequently, part of investments (both long-term and for current expenses) just cannot be financed. A reasonable solution arises: investments can be financed through a loan. But the loan has to have its source. Savings accumulated by the banking system are the main source. But the savings amount in our example is part of the wages paid by companies to their employees: RUB 2 trillion. This is the part of money that was withdrawn from current consumption and returns to the economic turnover through a crediting system. In other words, RUB 12 trillion from RUB 15 trillion of final output is spent on wages. RUB 2 trillion from this amount is directed for savings. RUB 10 trillion of wages, in turn, is spent for production payment. Businesses receive another RUB 2 trillion from loans derived from savings. Again RUB 3 trillion of production is not recovered! In addition, it will be necessary to pay for a credit. The real value of this payment is a differential in the credit interest rate and the deposit rate. And this value just decreases the total amount that remains available for enterprises: say, this time only RUB 11.5 trillion of production will be covered instead of RUB 12 trillion.

Results

Thus, it may be concluded that the propensity to costs reduction by reducing the wages creates a condition for reducing the aggregate income. Plus, income reduction will have to be speeded up. The last conclusion can be easily proved by elementary arithmetic.

The following question will be quite reasonable: how has this system been in existence for nearly two hundred years, if the principle resulting in a cascade (cumulative) decrease of aggregate income has been accepted as a basis? The doubt can be removed if attention is paid to the fact that the situation has been considered from a static aspect: a momentary interaction between enterprises, wages earners and banks. But real economic processes develop within a period of time, even more, we so not speak only about change stages, but about a process development. In order to forestall the consideration of economics as a dynamic process we will specify two conditions: the first one was mentioned above referring to J.M. Keynes and the point is that there is a time gap between consumption and products sale, and the second one includes an admission of the technological progress existence as a fundamental condition for economic growth.

Now, let us consider the interaction of supply and demand implemented in several steps.

The part of income received in stage 1 (denoted by Y_{t1}) is spent on investments (improvement of manufacturing processes, creation and updating of new production methods). As a consequence, an output is increased up to Y_{t2} in the next stage. But, a wage W_{t2} has to be grown together with the output, i.e. by the amount that will enable to buy the production volume of the previous stage, which is equal to the profit amount received also in the previous stage - i_{t1}.

Wages paid to employees in the second stage is the only means to pay in full the production output produced in the previous stage. For instance, in the given example above, the new amount of output is RUB 18 trillion. 15 trillion from this amount is total wages. Some part of these wages is spent for financing the output produced in the previous stage (i.e. those RUB 3 trillion which formed the profit). But a new contradiction emerges. Profit is also generated in the second stage - the same RUB 3 trillion (18 trillion minus 15 trillion). This amount, in its turn, can be financed by part of the wages that will be formed in the next stage.

It seems evident that if at any stage the investment efficiency turns out to be insufficient for creating the wages-fund as needed, then part of the output produced in the previous stage will stay stored at warehouses. As a result, the income from sales of these products that companies hoped for will not be fully received. Further, to avoid decreasing the profit rate (due to losses in the previous period), companies can make a decision to reduce salaries. But in accordance with the scheme given above, the reduction of wages will undermine the aggregate demand even more. And the economic growth process, powered by investments in technological development in each stage, will give room to a falling process that will also have a self-spiraling accelerated behavior. Let us compare this conclusion with the conclusion of J.M. Keynes given on page 3 of this article, that amounts of new investments always have to be sufficient enough to fill up the gap between the net income and consumption.

Thus, a modern market economy can be compared with a two-wheeler, which is required to gain a certain speed continuously in order not to fall sideways. Back to the issue of economic growth necessity stated in the beginning of this article we will formulate the following hypothesis: the fact of profit existence by itself inevitably pushes owners and management of companies to an output expansion and products sale without regard to whether they meet public needs or not. And the higher the profit rate, which companies count on, the more investment efficiency in economic growth is required. And it is quite in tune with the conclusion of J.M. Keynes that "financial reserves, which are not spent on current investment, affect adversely the level of consumption and employment, and stimulate the increase of new investments" (Keynes, 2012, p.101).

Discussion of results

Before moving to the next point, it is necessary to touch on one more problem aspect of no small importance.

Namely, the increased amount of output in each stage (or in each period) has to be provided by sufficient volume of financial resources. Thus, the growth rate of economic money supply has to be adequate to the expected growth rate of gain in production that is quite corresponding with the monetarism doctrine (Fisher, 2001). And it turns out that such a brittle system of aggregate product reproduction is kept from downfall only because of the possibility of continuous increase in labor and capital productivity together with a balanced policy of money supply. But will there always be a possibility to successfully combine these two factors of economic growth? It is obvious that the answer will be negative, because scientific and technological development acting as the primary instrument of labor productivity is not a properly predictable unit.

Consequently, there must be another mechanism, which allow to recover possible losses upon occurrence of unfavorable circumstances. To reveal the nature of these mechanisms, let us assume the existence of foreign trade relations in the system taken. Then, it turns out that the gap between the aggregate output and aggregate demand (in the amount of RUB 3 trillion as shown on page 4 of this article) can be filled in by export income. And if earnings from sales of products abroad are at least not less than the total profit, then there will be no necessity to increase the output of products for domestic sales so significantly. However, it seems that such an attractive way to avoid the problem of domestic demand has its restrictions. In particular, the expansion of production capacity delivered abroad can lead to conflict of interests between the countries which are competitors in some fields on the international market: export incomes of one country are formed by withdrawal of money resources from circulation of an importing country, which in other cases could be spent on domestic demand.

In the end, we would like to summarize the conclusions formulated in the article, which reflect the authors' point of view regarding the issue discussed:

1. It is proposed to consider the profit as a "negative" factor of economic growth, i.e. the growth serves as feedback response to the total profit increase, or as a method of negotiation related to its destabilizing influence;
2. By closing the gap between aggregate demand and aggregate supply resulting from the profit by production capacity expanding, companies get an incentive to continuously increase their production output without regard to whether their products are really demanded by the society or not. In this case, the motive of economic growth such as job creation just amends this conclusion, since salaries will not be fully paid to new employees because of the profit-maximizing reason;
3. Continuous development of labor productivity (achievable through scientific and technical progress, business activity) together with a balanced policy of money supply is an inviolable factor for sustainable economic growth;
4. Expansion of products export facilitates the stabilization a country's economic

situation and decreases the dependency on domestic demand, which is not always sufficient to cover the supply during a long-run equilibrium. At the same time, the possibilities for export expansion are limited, and one of the most significant constraints is determined by competitive and differently directed interests of countries entered in international trade flows as participations of a "zero-sum play".

At the same time, the authors of the article accept that the suggested approach requires further amendments by taking in consideration the following factors: taxation and government expenditures, functioning of securities and currency markets, government debt, exchange rate, etc. The authors express their thanks in advance for the constructive comments on this thesis.

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