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Slawomir I. Bukowski[1]

DEVELOPMENT OF EQUITY MARKET AND ITS SIGNIFICANCE IN THE SLOVAK ECONOMY[2]

Abstract

The aim of the paper is to present results of the empirical research into the equity market development and its significance in the Slovak economy and especially to answer the following questions:

- *What is the significance of the equity market in Slovak economy and its impact on economic growth?*
- *What is the degree of the Slovak equity market integration with the euro area equity market?*

The following methods have been applied in the research: statistical analysis of the Slovak equity market significance in economy, analysis of the relationship between equity market development and economic growth based on the econometric model, analysis of the Slovak equity market integration with the Eurozone equity market based on the "news-based measure" and GARCH (1.1) model.

The significance of the equity market is relatively smaller in Slovak economy than in other small- and medium-sized economies in the euro area. Yet, a statistically significant correlation between equity market development and economic growth exists in the Slovak economy. Slovak equity market was more integrated with the global market in the period 1999-2004, whereas in the years 2005-2011 it revealed a higher integration degree with the euro area equity market than with the global equity market.

JEL Classification Code: **G10, G15.**

Keywords: financial market integration, degree of financial market integration, equity market, equity market integration, economic growth financial assets econometric models.

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[1] Professor of economics, Ph. D. , Habil., Kazimierz Pułaski University of Technology and Humanities in Radom, Faculty of Economics, Department of Business and International Finance.

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Introduction

International integration of equity markets is synonymous with their globalization. The larger the role of global shocks (common for many markets not just the local ones) in affecting yields on equity market indices is, the more integrated the equity markets are.

A special case is the monetary union where there are no barriers, not even in capital flows related to the existence of multiple currencies.

In the euro area a fairly advanced degree of the financial market (including equity market) integration has been achieved. Analogically, here as everywhere else a higher degree of integration indicates the increased proportion of shocks common for the euro area countries rather than that of the local shocks in affecting the yield.

Slovakia joined the eurozone on 1 January 2009. One of the crucial conditions of achieving a surplus of receipts over expenses in the process of monetary integration is a high degree of the financial market integration with the uniform financial market in the euro area. One of the major segments of the financial market is equity market.

The aim of this paper is to present the results of empirical research into development of the equity market and its significance in Slovak economy and in particular answering the following questions:

What is the equity market significance in the Slovak economy and in particular its impact on economic growth?

To what extent is the equity market in Slovakia integrated with the euro area equity market?

Functions of the equity market in economy and equity market integration on the international scale

Equity market plays an important role in economic development as a source of financing long-term activities of business entities being an alternative to bank credit, issuance of debt securities and other forms of financing. Thus it enables to convert financial capital into capital in-kind (productive assets). What is more, it enables valuation of a company's capital taking into account current and anticipated yields and risk related to business activity. The role of the equity market is equally important in stimulating economic growth which has been proved by a number of research works (see more: Bukowski, 2011, pp. 25-31). However, this research also points to the fact that a correlation between the equity market development or, broadly speaking, financial markets and economic growth is probably two-directional (see more: Dębski et. al., 2010). Following R. Levine the correlation between the financial market development and economic growth can be presented in the way depicted in Figure 1.

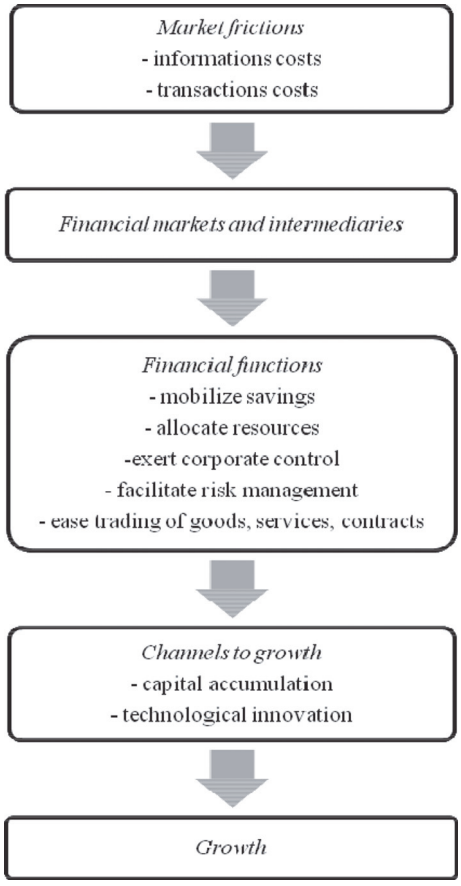

Figure 1. Theoretical correlation between finance and economic growth
Source: Levine 1997, p. 691.

International integration of financial markets plays an important role in the development of financial markets and their impact on economic growth. Equity market integration on international scale can be defined more precisely according to the law of one price. Application of the law of one price means that the assets generating identical monetary flows have the same price (rate of return, yield). In the case of shares, in two countries (regions) the price of capital raised in the financial market by issuing shares should be the same (cf. Adam et. al., p. 4). In accordance with a broader definition of the financial market integration put forward by L. Baele, A. Ferrando, O. Hördal, E. Krylova, C. Monnet (see: Baele et. al., 2004, pp. 6-7), equity markets are considered fully integrated if all the possible economic agents involved in transactions at the same price:

– are governed by the same rules when they decide to participate in share trading,

– have equal access to shares,
– are treated equally when they operate in the market.

Such a broad approach to the financial market integration implies also functioning of the law of one price. The law of one price causes that assets are characterized by identical risks and yields. The quoted definition comprises the law of one price. If the law of one price is not met, then there is room for arbitration which restores validity of the law (on condition there are no barriers to the financial market integration) (see: Baele et.al., 2004, p. 7; Kowalak, 2006, pp. 34-38).

Figure 2 depicts a theoretical correlation between the integration of financial markets (including equity market).

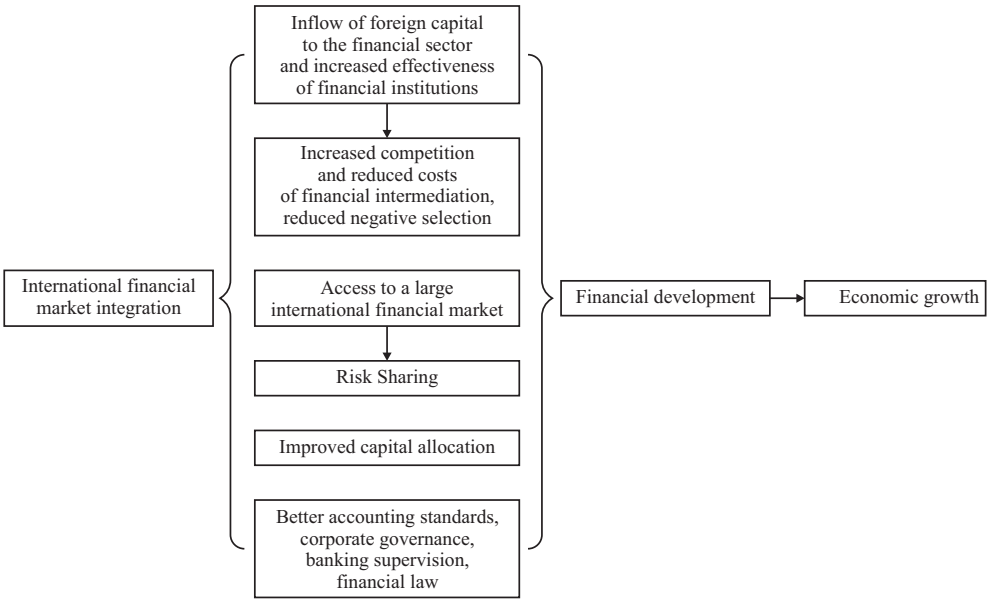

Figure 2. Theoretical correlation between international financial market integration and financial development and economic growth

Source: Bukowski, 2011, p. 35.

An increased degree of financial market integration means also an increased interdependence and sensitivity of markets to any kind of financial turbulences which may unexpectedly occur in different regions of global economy or in some countries of an integrated group. Integrated financial markets are becoming a major channel for financial turbulence transmission on an international scale. The turbulences in question are transmitted via the mechanisms of:

– changes in interest rates,

– changes in exchange rates,
– changes in financial asset prices (Bukowski, 2011, pp.52-53).

One must also point to a significant role of the financial market (including equity markets) integration in a monetary union with a uniform currency and uniform monetary policy, hence also for the economy of a country which is a member of such a union.

– levelling out of asset-generated revenues and consumption through diversification of portfolio and mechanism of risk sharing,
– better synchronization of business cycles and economic shocks,
– reducing investment risk,
– neutralization of the shock impact on the size of incomes and consumption,
– increased synchronization degree of business cycles and reduced asymmetry of economic shocks,
– better effectiveness of uniform monetary policy of the supranational central bank[3].

On the other hand it is worthwhile to draw attention to the fact that financial market integration can also be a factor strengthening economic destabilization of the monetary union economies in the environment of growing budget deficits and public debt which result mainly from a bad expansionary fiscal policy in the past and the structure of fiscal expenses as well as in the case when the share of foreign debt dominates (Bukowski 2011, p. 73).

Trends in the equity market development in Slovakia

The Stock Exchange in Bratislava was set up on 15 March 1991. The first session took place on 6 April 1993. The SAX index was introduced in March 1994[4].

The Stock Exchange in Bratislava is a small local stock exchange which is accounted for by the size of Slovak economy. Also the basic equity market development indices on the Bratislava stock exchange included in Table 1 testify to this. As the content of the Table shows the ratio of the equity market capitalization is very small and in the period 1994-2009 it never exceeded 10%. The value of the stock exchange turnover in relation to GDP increased rapidly in the years 1995-1996, but from 1997 it started to fall and between 2005 and 2009 it reached the level below that of 1994. Also following the rapid growth in the years 1994 -1997, later on, the Stock Exchange Turnover Ratio went down to a very low level. The number of companies listed on the stock exchange per 10 000 inhabitants was equally low.

[3] See more on the topic: (Bukowski, 2011, pp. 67-74).

[4] See more on the history and development of the Stock Exchange in Bratislava as an institution at: (www.bsse.sk; Bieniewicz, Mobus, 2008, pp. 497-522).

Table 1. Basic development indices for the Slovak equity market in the years 1994-2009

Stock exchange market development indices	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Stock exchange capitalization/GDP* (%)		4,85	6,16	7,02	4,81	3,35	3,78	4,60	5,14	5,66	6,81	7,23	7,32	7,77	6,48	5,44	4,94
Value of stock exchange turnover / GDP**(%)		1,87	5,67	7,85	5,50	2,53	2,29	3,09	2,63	1,82	1,27	0,60	0,12	0,08	0,03	0,11	0,20
Stock Exchange Turnover Ratio*** (%)		34,41	74,09	64,64	44,46	31,70	61,97	55,88	36,98	23,20	16,71	1,56	1,85	0,49	0,40	4,21	4,65
Number of companies listed at stock exchange per 10 000 inhabitants	0,03	0,03	1,52	1,62	1,55	0,87	0,91	0,96	0,66	0,57	0,48	0,39	0,32	0,28	0,23	0,20	0,17

*the coefficient calculated according to the formula: $\{0.5[M_t/P\_e_t + M_{t-1}/P\_e_{t-1}]\}/PKB_t/P\_a_t$, P_e_t – end-of-year inflation rate (*CPI*), *M* – equity market capitalization, P_e_{t-1} beginning of year inflation rate (*CPI*), P_a_t – average annual inflation rate (*CPI*), GDP_t – *GDP* over year *t*, *t* – year.

** T_t/GDP_t.

*** the coefficient calculated according to the formula: $T_t/P\_a_t/\{(0.5)*[M_t/P\_e_t + M_{t-1}/P\_e_{t-1}]$ where *T* is the value of total equity turnover, *M* is market capitalization value, P_e_t – end-of-year inflation rate (*CPI*) , *M* – equity market capitalization, P_e_{t-1} beginning of year inflation rate (*CPI*), P_a_t – average annual inflation rate (*CPI*), *t* – year.

Source: author's own compilation on the basis of: T. Beck, E. Al-Hussainy, *Financial Structure Dataset*, Revised March 2010, World Bank, Washington D.C. 2010.

Comparison of equity market capitalization in relation to GDP in Slovakia and in other euro area countries also reveals that the Stock Exchange in Bratislava is the smallest equity market both in the eurozone and in Europe. It is interesting that such a small country as Malta is a much bigger market (see: Table 2).

Considering the above facts, a question arises: is it worthwhile to examine the Stock Exchange in Slovakia from the point of view of its role in the process of economic growth? It seems it is, which will be proved later in this paper. The equity market in Slovakia, as a local and relatively small market. Functioning in a small economy, it is not very attractive for foreign capital. This explains the small stock exchange turnover. Certainly, in the last four years a drop in the stock exchange turnover was also affected by increased risk of investment in shares in connection with a slump in the market related to global recession and financial crisis as well as the fiscal crisis in the euro area.

Table 2. Equity market capitalization to GDP ratio* in Slovakia and eurozone countries in the years 1999-2009 (%)

Country/year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Austria	15.80	16.36	14.24	13.63	17.12	24.28	34.78	49.46	56.05	63.53	73.01
Belgium	85.23	79.72	75.95	58.69	48.86	62.47	76.32	87.73	87.96	88.18	88.39
Cyprus	48.76	61.27	54.91	53.32	37.04	30.87	33.95	no data	106.88	no data	no data
Finland	192.25	265.90	195.62	122.50	94.45	94.35	101.43	113.89	129.61	148.77	172.51
France	84.66	110.74	98.86	74.01	64.91	71.24	78.29	94.03	102.16	112.32	124.38
Germany	58.99	71.63	62.58	44.08	36.48	41.81	43.73	49.83	57.09	64.98	74.69
Greece	91.77	110.48	66.36	45.92	39.78	44.26	48.01	57.81	66.10	75.48	85.99
Ireland	70.30	78.58	75.99	55.89	46.65	54.69	57.46	63.62	60.84	58.23	55.79
Italy	54.12	68.60	58.64	41.63	36.57	40.94	45.27	49.79	50.19	50.59	51.01
Luxembourg	168.84	173.74	144.68	107.68	107.98	131.32	139.94	159.09	256.49	426.08	738.79
Malta	36.95	51.18	44.93	32.73	32.32	42.05	59.07	68.20	no data	no data	no data
Netherlands	158.10	174.65	138.64	98.87	83.22	85.12	90.73	104.65	115.80	129.86	145.32
Portugal	53.34	56.85	46.75	35.22	32.53	36.15	37.40	44.35	53.99	65.27	79.99
Spain	67.65	80.99	80.63	68.42	67.81	80.43	85.16	94.11	109.82	128.52	151.49
Slovakia	4.93	5.62	6.63	7.09	7.14	8.60	9.37	9.02	8.42	7.79	7.14
Slovenia	10.64	12.12	13.50	16.46	20.64	25.45	25.30	30.44	48.66	78.94	129.05
Eurozone - average	75.15	88.65	73.68	54.76	48.34	54.63	60.39	67.25	81.88	93.66	123.60

*the coefficient calculated according to the formula: $\{0.5[STOCK_t/P\_e_t + STOCK_{t-1}/P\_e_{t-1}]\}/PKB_t/P\_a_t$, P_e_t – end-of-year inflation rate (*CPI*) , *STOCK* – equity market capitalization, P_e_{t-1} beginning-of-year inflation rate (*CPI*) , P_a_t – average annual inflation rate (*CPI*), *GDPt – GDP* over year *t*, *t* – year.

(Source: author's own compilation on the basis of: T. Beck, E. Al-Hussainy, *Financial Structure Dataset*, Revised March 2010, World Bank, Washington D.C. 2010.)

Equity market and economic growth in Slovakia

Data and a model

In our research into relationships between the equity market development and economic growth we used annual statistical data from the database: T. Beck, E. Al-Hussainy, Financial Structure Dataset, Revised March 2010, World Bank, Washington D.C. 2010 and AMECO.

It was assumed that the correlation between the equity market development and economic growth is two-directional. On the basis of this assumption a model was developed consisting of two interdependent equations which were estimated by means of a double least squares (DLS) method. The model looks as follows:

$$\ln GDPc_t = \alpha_{10} + \beta_{12} \cdot \ln STOCK_{t-1} + \alpha_{11} \cdot \ln GDPc_{t-1} + \alpha_{12} \cdot \ln NCF_t + \\ + \alpha_{13} \cdot \ln NCF_{t-1} + \alpha_{14t} + \varepsilon_{1t}$$

$$\ln STOCK_t = \alpha_{20} + \beta_{21} \cdot \ln GDPc_t + \alpha_{21} \cdot \ln STOCK_{t-1} + \alpha_{22} \cdot \ln NCF_t + \\ + \alpha_{23} \cdot \ln NCF_{t-1} + \alpha_{24t} + \varepsilon_{2t}$$

The following notations were adopted for the sake of the model:
GDPc – GDP per capita in constant prices for the year 2005,
STOCK – stock exchange capitalization to GDP ratio (see explanations below Table 2),
NCF – net investment per capita in constant prices for the year,
t – time variable,
ε – random factor.

Results

Tables 3 and 4 present model estimation results. All independent variables are statistically significant for both equations of the model.

The tests conducted prove correctness of the model equation specification (Hausman test), legitimacy of the use of instruments (Sargan test) and lack of autocorrelation (LM test). The co-integration test indicates the absence of a unit root and co-integration of time series for both equations.

Estimation results for equation 1 reveal a statistically significant correlation between the ratio of stock exchange capitalization from the previous period (t-1) to GDP growth per capita over time t. The change in the stock exchange to GDP ratio growth rate of 1 percentage point causes a change in GDP growth per capita by 0.24 percentage points. However, the correlation between the two variables is two-directional. As Table 4 shows, a change in GDP per capita growth rate by 1 percentage point entails a 3.2 percentage point change in the stock exchange capitalization to GDP ratio. Thus the interdependence between economic growth and equity market development is two-directional.

Table. 3. Equation 1: Double LS estimation, observations used 1996-2009 (N = 14)

Dependent variable: l_GDPc

Modified by instruments: l_STOCK_1

Instruments: const l_NCFc l_NCFc_1 time l_GDPc_1

	Coefficient	*Standard error*	*z*	*p value*	
Const	10.2397	0.489101	20.9357	<0.00001	***
l_NCFc_1	-0.0747842	0.0294408	-2.5402	0.01108	**
l_STOCK_1	0.244795	0.0750262	3.2628	0.00110	***
Time	0.0478135	0.0036757	13.0080	<0.00001	***

Arithmetic mean of dependent	9.032725	Standard deviation for dependent variable	0.193415
Sum of squared residuals	0.011318	Residual standard error	0.033642
Coefficient of determination of R2	0.976802	Corrected R squared	0.969842
F(3, 10)	139.5516	p value for the F-test	1.85e-08
Residual autocorrelation – rho1	-0.111488	Durbin-Watson statistic	1.766867

*** statistically significant at 10% significance level, ** statistically significant at 5% significance level, * statistically significant at 1% significance level.

Hausman Test
Null hypothesis: The least squares method estimator is consistent
Asymptotic test statistic: Chi-squared(1) = 1.50821
at the p value = 0.219413

Sargan test for overidentifying restrictions –
Null hypothesis: all instrumental variables are valid - justified
Test statistic: LM = 0.0636603
at the p value = P(Chi-squared(1) > 0.0636603) = 0.800801

Augmented Dickey-Fuller test for the uhat process
For 1st order lag of the (1-L)uhat process
sample size 13
Null hypothesis: there is a unit root a = 1; process I(1)
*model: (1-L)y = b0 + b1*t + b2*t^2 + (a-1)*y(-1) + ... + e*
1st order residual autocorrelation: -0.016
estimated value (a-1) equals: -1.79065
Test statistic: tau_ctt(3) = -5.27416,
Asymptotic p-value = 0.003681
Dickey-Fuller critical value = -3.60 at an insignificant level =0.05.
A unit root is not present. The test result indicates integration of time series.

Table. 4. Equation 2: Double LS Estimation, observations used 1996-2009 (N = 14)

Dependent variable: l_STOCK

Modified by instruments: l_GDPc

Instruments: const l_NCFc l_NCFc_1 time l_STOCK_1

	Coefficient	*Standard error*	*z*	*p value*	
Const	-35.2033	14.0998	-2.4967	0.01254	**
l_GDPc	3.25051	1.50514	2.1596	0.03080	**
l_NCFc	0.351541	0.130465	2.6945	0.00705	***
Time	-0.159048	0.0755741	-2.1045	0.03533	**

Arithmetic mean of dependent variable	-2.600974	Standard deviation for dependent variable	0.192209
Sum of squared residuals	0.219713	Residual standard error	0.148227
Coefficient of determination of R2	0.549966	Corrected R squared	0.414956
F(3, 10)	3.409619	p value for the F-test	0.061182
Residual autocorrelation – rho1	0.032398	Durbin-Watson statistic	1.750646

*** statistically significant at 10% significance level, ** sstatistically significant at 5% significance level, * statistically significant at 1% significance level.

Hausman Test
Null hypothesis: the least squares method estimator is consistent
Asymptotic test statistic: Chi-squared(1) = 0.374662
at the p value = 0.540474

Sargan test for identifying restrictions -
Null hypothesis: all instrumental variables are valid - justified
Test statistic: LM = 5.34254e-007
at the p value = P(Chi-squared(1) > 5.34254e-007) = 0.999417

Lagrange multiplier (LM) test for 1st order autocorrelation -
Null hypothesis: lack of the random component autocorrelation
Test statistic: LMF = 0.0157188
at the p value = P(F(1,9) > 0.0157188) = 0.90332

Augmented Dickey-Fuller test for the uhat process
for 1st order lag of the (1-L)uhat process
sample size 13
Null hypothesis: there is a unit root a = 1; process I(1)
*model: (1-L)y = b0 + b1*t + b2*t^2 + (a-1)*y(-1) + ... + e*
1st order residual autocorrelation: 0.007
estimated value (a-1) equals: 1.63243
Test statistic: tau_ctt(3) = -7.27509
Asymptotic p value = 2.178e-007
Dickey-Fuller critical value = -3.60 at an insignificant level =0.05.
A unit root is not present. The test result indicates a co-integration of time series

Integration degree of the Slovak equity market with the eurozone equity market

Measures of international integration of equity markets

One of the measures of the financial market integration, including equity market integration is the one based on news.

The news-based measures grasp the impact effect of the news concerning predicted shocks in financial markets and investment risk related to them. In fully integrated markets, investment portfolios should be well diversified. Information coming from local markets should not have a major effect on the prices of assets, unlike global information regarding the entire integrated market which affects price changes quite significantly. The systematic risk degree is the same in various countries whose markets have been integrated. Measurements from this group show to what extent information specific for a local financial market is significant for the remaining markets in comparison to the effect of information of global character (see: Baele et.al, 2008, p. 20; Kowalak 2006, p. 38 and onwards). In the case of equity market, a model of the "increased impact of the common news component on equity market yields" is such a measure. The "common news component" is the news concerning changes in the US equity market index yields (global news). In the euro area the common news component is the news concerning changes in yields on the broad DJ EUROSTOXX index corrected by the influence of the global "news" impact, i.e. from the US equity market. The higher the degree of particular countries' equity market integration with the global market is, the lower the impact of local (domestic) turbulences on shaping the yields on assets in particular countries but the higher the impact of global factors (information, signals) coming from the United States.

In the case of the euro area countries, the larger the impact of common factors (the common "news" component) for the euro area than the local (specific for the particular countries of the eurozone) ones on shaping the yields in domestic equity markets is, the higher the integration degree for these countries is. Similarly, if the examined countries are from outside the euro area, then the larger the impact of the common component for the euro area on shaping the equity market yields in these countries is, the higher the integration degree between their markets and the eurozone market is. On the other hand, the impact of the "news" from the US market will define the integration degree between a given market and the global market (see: Bukowski, 2011, p. 46-47).

Data and a model

Our examinations covered the monthly data from the period 1999:01-2011:12 concerning yields on SAX, DJ EUROSTOXX and DOW JONES COMPOSITE AVERAGE indices. We divided the whole period into two sub-periods of 1999:01 – 2004:12 and 2005:01-2011:12 in order to include also the effect of the EU membership. Changes in yields on the DOW JONES COMPOSITE INDEX were treated as the global news (signal, shock), like in the case of investigations and statistics of the European Central Bank concerning equity market integration (see: Financial Integration in Europe, April, Statistical Annex. ECB 2011). The data sources were the ECB database (Statistical Data Warehouse) and data from Warsaw Stock Exchange and Bratislava Stock Exchange.

To measure the stock exchange integration degree we applied the measures based on the model of the "increased impact of the common news component on equity market yields" i.e. the above mentioned measures of the global shock spillover and yield variance proportion. The model was estimated in three stages by means of the GARCH(1,1) process[5]. Firstly, the equation for the US market yields was estimated[6]:

$$R_{US,t} = \mu_{US,t} + \varepsilon_{US,t}$$

where:
$R_{US,t}$ – equity market yield (on the stock exchange index) in country *i* over time *t*, the expected yield component, $\mu_{i,t} = \alpha_{i,t} + \gamma_i \cdot R_{US,t-1}$
$\varepsilon_{i,t}$ – the unexpected yield component.
Secondly the conditional variance for the US market was estimated:

$$E(\varepsilon^2_{US,t}) \equiv \sigma^2_{US,t}$$

where E(.)is the expected value operator.
The subsequent stage consisted in an estimation of the euro area market yield equation:

$$R_{EU,t} = \mu_{EU,t} + \varepsilon_{EU,t}$$

where: $\mu_{EU,t} = \alpha_{EU,t} + \gamma_{EU} \cdot R_{EU,t-1}$

and $\varepsilon_{EU,t} = \beta^{US}_{EU} \cdot \varepsilon_{US,t} + e_{EU,t}$, $e_{EU,t}$ – pure local shock.

The conditional variance takes the form of: $E(e^2_{EU,t}) \equiv \sigma^2_{EU,t}$

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[5] On the subject of the GARCH (1,1) model application for examining the relationships between the yields on equity market indices see more in: (Brzeszczyński, Kelm, 2002, pp. 95-119; Jajuga, 2008; Mills, Markellos, 2008, pp. 182, 323 and onwards).

[6] On the model of the "increased *impact of the common news component on the equity market yields*" see more: (Baele et.al., 2004, pp. 20-21; Baltzer et. al., 2008, pp. 8-10, Bukowski, 2011, pp. 46-47).

In the last stage the yields for the Slovak equity market were estimated:

$$R_{SK,t} = \mu_{SK,t} + \varepsilon_{SK,t}$$

where:

$\varepsilon_{SK,t} = \beta_{SK}^{US}\varepsilon_{US,t} + \beta_{SK}^{EU}e_{EU,t} + e_{SK,t}$, $\mu_{SK,t} = \alpha_{SK,t} + \gamma_{SK}R_{SK,t-1}$, $e_{SK,t}$ – pure local shock

and the conditional variance $E(e_{SK,t}^2) \equiv \sigma_{SK,t}^2$

$\beta_{SK,t}^{eu}$ and $\beta_{SK,t}^{us}$ indicate a dependent on the Slovak market over time t sensitivity to information concerning yields in the eurozone and the United States, respectively. The magnitude of both coefficients is a measure of intensity with which the shock originating in the euro area and the United States (global shocks), respectively, spill over the Slovak equity market.

Then the variance ratio was computed:

$$VR_{SK,t}^{EU} = \frac{(\beta_{SK,t}^{EU})^2\sigma_{EU,t}^2}{\sigma_{SK,t}^2} = \rho_{SK,EU,t}^2, \quad VR_{SK,t}^{US} = \frac{(\beta_{SK,t}^{US})^2\sigma_{US,t}^2}{\sigma_{SK,t}^2} = \rho_{Sk,US,t}^2$$

Conditional variances for the eurozone, the United States and the local equity market are obtained from the standard GARCH(1,1) model.

The higher the value of the yield variance ratio (the higher the ratio of the euro area or US shock to the local shock impact) is, the higher the Slovak equity market integration degree with the one or the other equity market is.

Results

In the 1999-2004 period the SAX index yield was affected by shocks from the US equity market, however, the correlation between shocks from the eurozone and the SAX index yields was negative. In the period 2005-2009 the intensity with which the shocks originating in the USA spilt over was lower, whereas the intensity with which the shocks originating in the euro area spilt over in the Slovak market was higher (see: Fig. 3).

In the period 1999-2004 the changes in the SAX index yields were explained mainly by the shocks spreading from the USA.

In the years 2005- 2011 everything changed radically and shocks from the euro area accounted for changes in the SAX index yields, while the role of shocks originating in the USA declined in comparison to the period 1999-2004 (see: Fig. 4). As Figure 4 reveals, in the period 2005-2011 shocks from the USA accounted for 6% of changes in the SAX index yields, whereas those from the euro area – for 10%.

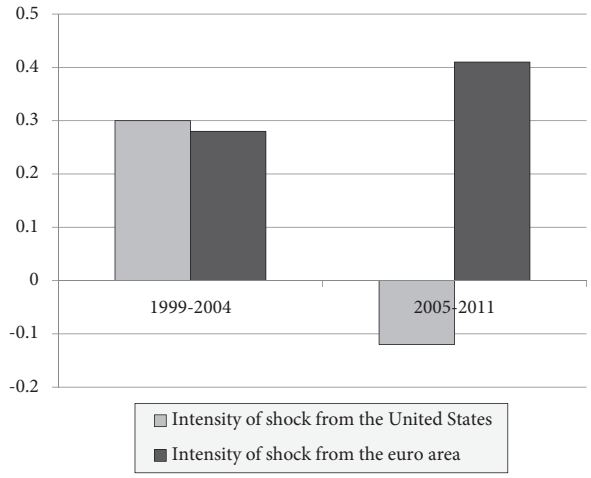

Figure 3. Intensity of global shock spillover (from the United States) and the euro area in the Slovak equity market in the periods 1999-2004 and 2005-2011 measured by $\beta^{us}_{SK,t}$, $\beta^{eu}_{SK,t}$ coefficients

Source: author's own compilation on the basis of the estimation of the model of the "increased impact of the common news component on the equity market yield" with the use of the GRETL program.

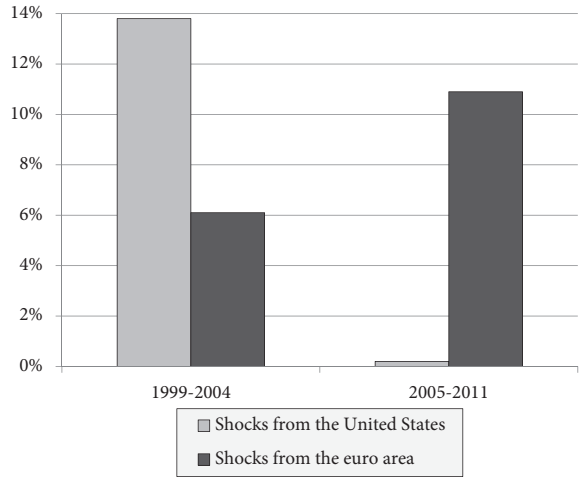

Figure 4. Slovak equity market – variance ratio for the SAX index yield explained by shocks from the euro area ($VR^{EU}_{SK,t}$) and the United States (($VR^{US}_{SK,t}$)) in the periods 1999-2004 and 2005-2011

Source: author's own compilation on the basis of the estimation of the model of the "increased impact of the common news component on the equity market yield" with the use of the GRETL program.

Joining the euro area by Slovakia and consequently disappearance of the exchange rate risk may have been crucial factors of the increased degree of integration of the Slovak market with the eurozone market. However, the degree of integration of the Slovak equity market with the eurozone equity market is relatively low. The SAX index yield rates are still affected strongly by idiosyncratic local shocks.

Conclusions

An analysis carried out in our paper allows us to formulate the following conclusions:

- the significance of the equity market and its development in Slovak economy is considerably lower than in other euro area and EU countries,
- there is a statistically significant two-directional correlation between the equity market development and economic growth in Slovak economy, the economic growth impact being stronger on the equity market capitalization than that of the equity market capitalization on the economic growth rate,
- in the years 1999-2004 the Slovak equity market was more integrated with the global market, whereas in the years 2005-2011 its integration with the eurozone market was stronger than with the global market,
- a higher degree of integration between the Slovak and the eurozone equity markets resulted from the fact that Slovakia joined the euro area on 1 January 2009.

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