

## **EXPORTS AND FOREIGN DIRECT INVESTMENT AS FACTORS FOR ECONOMIC GROWTH IN THE EU NEW MEMBER STATES**

The relationships between the inward foreign direct investment and the export dynamics, on the one hand, and the economic growth, on the other, are studied. Panel econometric estimates confirm the hypotheses for an export-oriented and/or (domestic and foreign) investment-based economic growth for the EU New Member States in the past fifteen years. A factor contribution analysis reveals the leading role of exports as well as the positive contributions of a similar magnitude of domestic and foreign direct investment for the economic activity dynamics. The implementation of economic policies by the EU New Member States aimed at promoting the export orientation of domestic production and maintaining an attractive business environment for foreign direct investors could be recommended based on these empirical results.<sup>1</sup>

JEL: C23; E10; F43; O47

Achieving sustainable economic growth is one of the main objectives of economic policy and is among the main themes in economic theory. Nowadays a leading role in this respect is attributed to the processes of creating, adapting and economically effectively applying new knowledge. The deepening of international economic integration strengthens competition and the importance of implementing successful growth strategies. An essential role in this respect is played by the foreign direct investment (FDI) and the export orientation of domestic production.

From a theoretical point of view, a positive relationship between the undertaken foreign activity and economic growth is derived by both the microeconomic approach of the new international trade theory and the macroeconomic and financial analysis. A confirmation of these theoretical results for the case of the EU New Member States (NMS) would ascertain the essential role of these processes for the achievement of sustainable economic growth. In this respect, the key hypotheses underlying the presented empirical econometric analysis are those for an export-oriented and/or (domestic and foreign) investment-based economic growth. A panel econometric analysis is utilised and applied to the macroeconomic processes observed in the NMS in the past fifteen years. The obtained empirical results provide a basis for formulating some recommendations to the economic policies of the NMS.

### **The export-oriented and investment-based growth hypotheses**

The foreign direct investment and export orientation of production are a focal point of extensive scientific research. FDI represent transactions related to the establishment of a foreign ownership or the acquisition of a long-term interest in a local company. Although FDI is a form of international capital flow, it is a much more complex phenomenon related to the acquiring of control, a horizontal and/or vertical

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<sup>1</sup> The views expressed are those of the author and do not necessarily reflect those of the ECB. Any remaining errors and omissions are the sole responsibility of the author.

integration of the production processes, a transfer of manufacturing technology, of good organizational, managerial and marketing practices.

According to the traditional international trade theory, a company's decision to invest abroad is motivated by its objective for a vertical and/or horizontal integration of its production in more than one country. According to Dunning (1977) key advantages in this respect are: ownership - possession of a valuable intangible asset, such as production technology; location - geographic location of production close to the market; and gaining control over another enterprise, i.e. internalization - acquiring high technology and applied knowledge for production, marketing and sales. Nowadays engaging in FDI usually reflects a complex decision, which increases the complexity of analysing it. According to R. Feenstra "foreign direct investment combines aspects of both international trade in goods and international financial flows and is a phenomena more complex than either of these" (Feenstra, 1999, p. 331).

The hypothesis of an economic growth based on exports (i.e. export-oriented) has long being investigated in the economic literature, and these ideas can be traced back to the school of Mercantilism. One of the founders of the modern hypothesis for economic growth based on exports is B. Balassa (Balassa, 1978). Further theoretical development of this idea could be found in the endogenous growth models, among which some include a mechanism of "learning by exporting" (see for example Grossman and Helpman, 1991).

An important factor in performing exports or outward FDI, derived in the new international trade theory, is the heterogeneity between companies in a sector in terms of their productivity (see Helpman, Melitz, Yeaple, 2004). One of the corollaries of their model is the classification of company activities according to their productivity, i.e. the least productive serve the domestic market, the more productive export and the most productive perform FDI and serve the foreign market through a related enterprise. The conclusion that only the most productive firms serve foreign markets through exports or FDI creates a relationship between the foreign activity and economic dynamics at the macroeconomic level, which is at the heart of the hypotheses for an export-oriented and/or investment-based economic growth. From a theoretical point of view, these positive relationships are derived in both the microeconomic approach of the new international trade theory and the macroeconomic and financial analysis, considering FDI as international capital flows and placing the emphasis on the growth of foreign exchange reserves and the expansion of the aggregate demand.

Confirming these hypotheses, most studies based on data for the NMS, find positive effects on economic growth from the FDI inflows and the export orientation of production. For example, Lane and Milesi-Ferretti (2006) emphasize the "technological benefits" of capital flows to the NMS, which contribute to their convergence. Damjan and Rojec (2007) confirm that FDI contribute to the catching-up economic development of the countries in Central and Eastern Europe. Examining interdependencies with domestic investment Mileva (2008) also argues that FDI inflows in 1995-2005 contributed to the gross capital formation in a

number of transition economies and stimulated domestic investment in the host country. Abiad, Leigh, and Mody (2009) emphasize that these capital flows are less volatile and contribute more to economic development than other forms. According to BIS (2009) the positive impact of FDI on economic growth is mainly through the diversification of risk and the knowledge transfer. A number of publications of the International Monetary Fund (IMF) point out, that attracting FDI and the outward orientation of the NMS are among the factors for their long-term economic growth. In a recent study of the relationships between export, FDI and economic growth (the latter represented by industrial production), Fidrmuc and Martin (2011) also find a statistically significant relationship between these variables for most NMS.

Among the research in this area focused on developments in Bulgaria, Balkanska (2009) indicates a strong correlation between FDI and GDP growth. According to Ganchev (2010) "foreign direct investments play a crucial role in the economic development of every country" (Ganchev, 2010, p.40). With respect to the factors for economic growth in Bulgaria the main conclusion in a number of studies, including Minassian (2004), Ganev (2005) Tsalinski (2006), Rangelova (2008), Stattev (2009), is the key contribution of total factor productivity (TFP). This unobservable indicator for the overall efficiency of production in turn depends on the investment and innovation activity, as well as on the technological transfer through FDI.

Despite the theoretical derivation and the overall positive results for the NMS, in general the empirical confirmation of this "main working hypothesis" is not yet unambiguous and conclusive (Lipsey, 2007, Cuaresma et al., 2007). Some studies fail to find positive effects or present and discuss negative effects on economic growth (Herzer et al., 2008). Some of the mechanisms for exerting negative effects on growth are related to an unfavourable specialization of production, crowding-out of domestic investments or a productivity reduction in domestic companies. In this respect, for the case of Bulgaria, Ganchev (2010) writes "a view is emerging that in a qualitative aspect FDI do not match the country's needs and priorities for future economic development." (Ganchev, 2010, p. 55). More generally for the NMS, in the study of Fidrmuc and Martin (2011) not all of the results are positive. Using monthly data for industrial production as a proxy for economic growth, the authors fail to find a long-term relation with the indicators for foreign activity for some of the countries: "... in the long run industrial production has not been influenced by the external variables in Bulgaria, Croatia, Estonia, Hungary and Lithuania. As a result, the export-led growth and/or FDI-led growth hypothesis is rejected in these cases" (Fidrmuc and Martin, 2011, p. 79).

The interdependences between export orientation and inward FDI are also inconclusive. While Brouwer et al. (2008) show complementarity between FDI and foreign trade for the countries that joined the EU in 2004, Balkanska (2009) fails to confirm a positive effect on exports from the inflow of FDI using data for Bulgaria.

This ambiguity of the presented results justifies the carrying out of additional empirical research based on different econometric methods and data samples. The focus of the analysis presented here is on the dynamic elasticities between economic growth and foreign activity for the NMS.

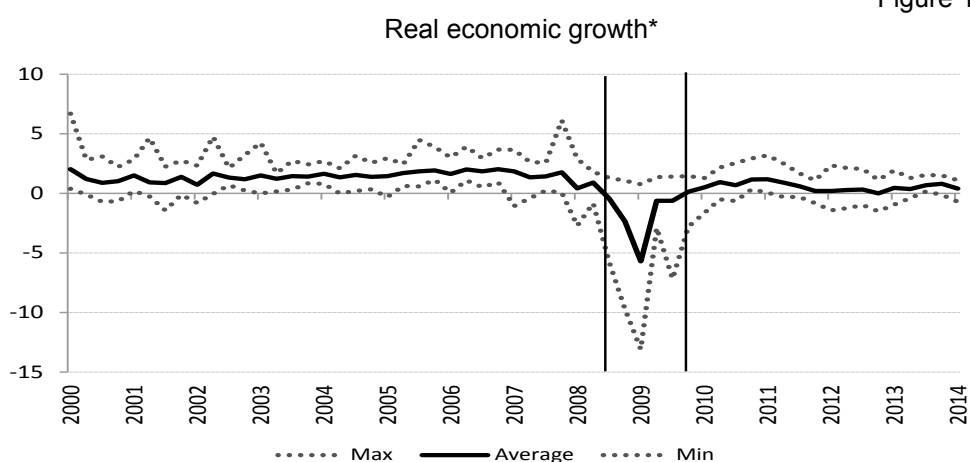
### Data and econometric methods

The relationships between foreign activity (via exports and inward FDI) and economic growth have been studied formally for the NMS by applying panel econometric analysis to a standard macroeconomic production function of a Cobb-Douglas form with two factors of production.

#### *Developments in the main macroeconomic processes*

The main starting point for the analysis is a Cobb-Douglas macroeconomic production function with two factors of production - labour and capital, total factor productivity, defined in a direct relation to the undertaken foreign activity, and taking into account the average technological progress. On this basis, the key macroeconomic processes, used in real terms in the empirical research, are economic growth, employment, gross fixed capital formation expenditures, exports and inward FDI. Quarterly data for the NMS<sup>2</sup> for the period from the beginning of 1999 to the first quarter of 2014 are utilised. The main developments in the observed dynamics of these processes are presented in Figures 1, 2 and 3. For each of the variables the average (unweighted) value for the group of countries is shown, along with the minimum and maximum value observed in each period for the countries. The variables are presented as quarterly growth rates, while for the non-seasonally adjusted data a four-quarter moving average is applied.

Figure 1



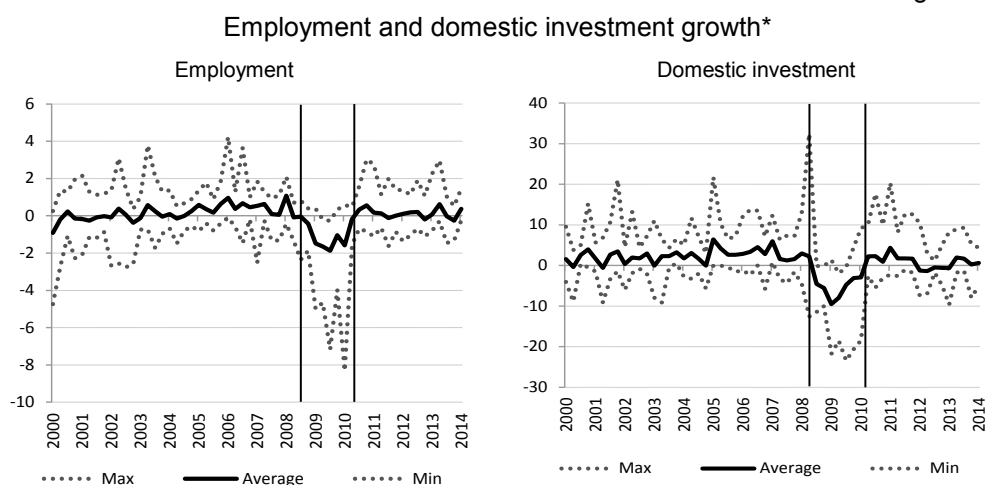
\*Average (unweighted) value for the group of countries, along with the minimum and maximum value observed in each period across countries.

Sources: Eurostat and own calculations.

<sup>2</sup> The group of NMS includes the countries that joined the EU in 2004-2007, excluding Cyprus and Malta. The latter two countries have very different structural and economic characteristics and therefore are excluded from the group of the remaining ten countries, namely Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia and Slovakia.

With respect to the real economic growth observed on average for the NMS in the past fifteen years and measured on a seasonally-adjusted quarterly basis, three sub-periods could be distinguished. The first encompasses from the beginning of the sample to the middle of 2008, when the effects of the global financial and economic crisis started to materialise, and is characterized by a relatively high GDP dynamics of the NMS, with an average quarterly growth rate of 1.4%. It was followed by an economic recession from the middle of 2008 to the third quarter of 2009, when GDP fell by 1.6% per quarter on average for the group of countries. In the third sub-period, from the beginning of 2010 onwards, the NMS returned to a positive economic growth, but the average pace of expansion was much more modest than the one in the pre-crisis period - the quarterly average growth for the group of countries amounted to 0.6%. Explaining the factors contributing to the significant decline in NMS economic growth in the past four years, further justifies conducting this research focused on the role of foreign activity.

Figure 2



\*Average (unweighted) value for the group of countries, along with the minimum and maximum value observed in each period across countries. A four-quarter moving average is used for the employment in Romania.

Sources: Eurostat and own calculations.

The two main factors of production are labour and capital. Figure 2 shows the dynamics of employment and domestic investment expenditure on average for the NMS. Sub-periods could also be distinguished for these two processes, which are characterised by a more lasting effect of the global financial and economic crisis. The decline in investment expenditures lasted for seven quarters on average for the NMS, and the fall of employment, although initiated for most countries with one quarter delay compared to the economic recession, also continued for seven quarters on average for

the studied countries (and much longer for some, for example in Bulgaria the decline in employment lasted for 14 quarters).

With respect to labour, given the processes of transformation and restructuring of the economies, employment declined in most NMS in the early years of the sample, followed by a gradual stabilization in 2002 and a relatively stable upward trend in 2003-2007, with an average quarterly growth rate of 0.3%. The employment decline was drastic on average for the NMS in the period from late 2008 to mid-2010, with the average rate of decline amounting to 1.2% per quarter, while the recovery is relatively anaemic, with an average growth rate of only 0.1% per quarter from the second half of 2010 to the first quarter of 2014.

The gross fixed capital formation reveals similar trends. Despite the more volatility dynamics (which is reflected in the bigger scale on the chart), the average rate of decline of domestic investment in the NMS during the crisis (-5.5% per quarter) was much more pronounced than the observed pre-crisis average growth (2.4%). In addition, the post-crisis recovery of gross fixed capital formation growth was interrupted by the European debt crisis, which led to a new decline of domestic investment in the NMS in 2012 and early 2013. As a result the observed average quarterly growth rate from the beginning of 2010 onwards amounts to only 0.9%.

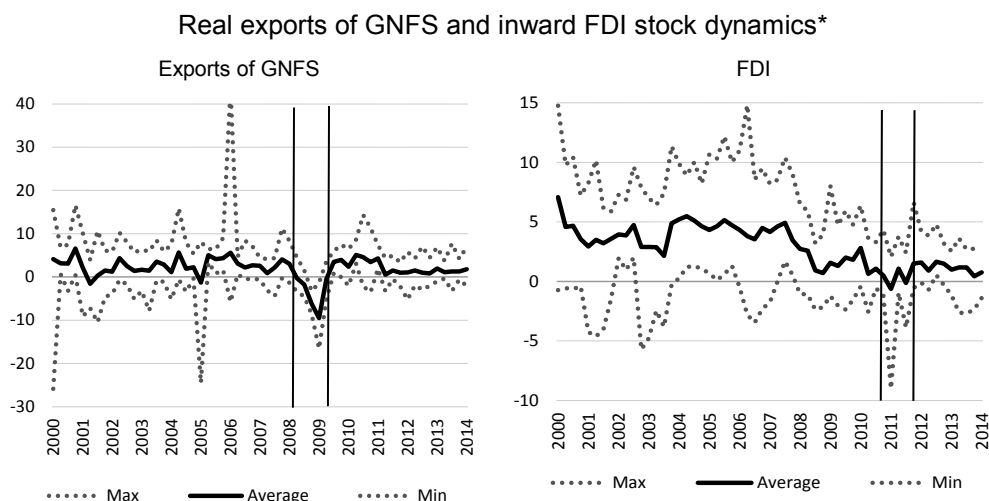
The dynamics of these two factors could probably explain to a large extent the observed lower growth of economic activity in the past four years. However, were recent trends in foreign activity also having a negative impact on economic growth? If the hypotheses for an export-oriented and investment-based growth are true then the dynamics of exports and inward FDI would affect growth beyond their direct (accounting) and indirect contributions via aggregate demand. In terms of the production function this influence would be revealed in the total factor productivity contribution, which would reflect the higher (or lower) efficiency of the production process due to the strengthening (or weakening) of foreign activity.

The average for the NMS dynamics of real exports of goods and nonfactor services (GNFS) reveals a greater volatility than the overall economic activity (see Figure 3) and overall similar to the one of domestic investment. As external demand was one of the main channels through which the global economic crisis was transmitted, the average export growth of the NMS turned negative already in the second quarter of 2008. Growth remained in a negative territory until mid-2009, averaging - 3.6% on a quarterly basis. Since the third quarter of 2009, real exports have recorded steady growth rates, averaging 2.2% per quarter for the group of countries, not much lower than the observed dynamics in the pre-crisis period (2.7% average quarterly growth).

Regarding the inward FDI, converted to constant prices, using the gross fixed capital formation deflator, the effect of the global crisis was the slowest and the smallest. Foreign investment retained a steady growth on average for the NMS in the phase of the economic recession, losing momentum only in 2010 and fluctuating around zero growth in the first three quarters of 2011. From the end of 2011 to the first quarter of 2014 the inward FDI in the NMS grew steadily again, but the average

quarterly growth rate of 1.2% was significantly lower than the pre-crisis dynamics, amounting to 3.7% on average at a quarterly basis.

Figure 3



\*Average (unweighted) value for the group of countries, along with the minimum and maximum value observed in each period across countries. A four-quarter moving average is used for the FDI data.

Sources: Eurostat and own calculations.

The average trends outlined for the group of studied countries overall hold for the included individual countries as well. It is interesting to note, that the highest volatility of the indicators when compared across countries is revealed by domestic investment, with an average standard deviation of the quarterly growth rates between countries of 4.6 percentage points over the whole period, followed by the dynamics of real exports and inward FDI at constant prices, with respectively 3.3 and 2.6 percentage points. The least differences between countries are revealed by the employment dynamics, 0.9 percentage points, and by the real economic growth, with an average standard deviation across the NMS of 1.1 percentage points.

Summing up, there are both similarities between the observed dynamic characteristics of the macroeconomic processes as well as some differences. The former category includes the steady growth rates before the global financial and economic crisis, and the return to positive dynamics (for most indicators) after overcoming the effects of the recession, but at a significantly lower pace. The main differences between the indicators relate to the manifestation and the degree of impact of the global economic crisis. For exports, for example, the effect of the global slowdown in demand occurred quickly, but after a relatively sharp decline growth rates have recovered to levels similar to the pre-crisis ones. For the other four indicators, although the recession has been overcome, the recent growth rates

have been significantly lower than the average growth rates observed before the global economic crisis. The crisis effect on the inward FDI occurred with the biggest delay and to the smallest degree.

*Econometric model: derivation and specification*

The specification of the econometric model and the applied data transformations are presented below. Following the derivation, specification and estimation of the model, accurate quantitative contributions to the actual economic growth of the countries stemming from the main factors could be calculated, including from the undertaken foreign activity.

The starting point for the empirical specification is a standard Cobb-Douglas production function at the macroeconomic level, where GDP ( $Y$ ) is produced with two factors of production - labour ( $L$ ) and capital ( $K$ ), with total factor productivity ( $A$ ) and a measure for the average technological progress ( $\alpha_0$ ).<sup>3</sup>

$$Y_{it} = A_{it} L_{it}^{\beta_1} K_{it}^{\beta_2} e^{\alpha_0 t}$$

The main assumption, aiming at an explicit modelling of the unobserved production efficiency, is that the total factor productivity can be specified as being dependent on the undertaken foreign activity (exports and inward FDI) in the previous and current period, as well as on the domestic investment in the previous period. In particular the function takes the following form:

$$A_{it} = f(FDI, Exp, DI) = FDI_{it}^{\alpha_1} FDI_{it-1}^{\alpha_2} Exp_{it}^{\alpha_3} Exp_{it-1}^{\alpha_4} DI_{it-1}^{\alpha_5},$$

where:  $FDI$  is the inward FDI stock,  $Exp$  - exports,  $DI$  – domestic investment, while the sub-indices  $it$  stand for countries and time periods. As the proposed concrete specification of the total factor productivity is only an approximation for the likely effect of foreign activity on the production efficiency, it could also take an alternative functional form or incorporate a different lag structure. The proposed Cobb-Douglas form can be viewed as a first approximation, aiming at capturing the first-order effect of exports and inward FDI to economic growth.

After substituting the so specified total factor productivity in the production function at the macroeconomic level and taking logarithms and first differences, and adding an unobservable residual component ( $\varepsilon$ ) the equation takes the form:

$$\Delta y_{it} = \alpha_0 + \alpha_1 \Delta fdi_{it} + \alpha_2 \Delta fdi_{it-1} + \alpha_3 \Delta exp_{it} + \alpha_4 \Delta exp_{it-1} + \alpha_5 \Delta di_{it-1} + \beta_1 \Delta l + \beta_2 \Delta k_{it} + \varepsilon_{it},$$

where  $fdi$  is the logarithm of the inward FDI stock,  $exp$  - logarithm of exports,  $di$  – logarithm of domestic investment,  $l$  - logarithm of employment,  $k$  - logarithm of the real capital stock in the economy, and  $\varepsilon_{it}$  are the residuals in the econometric

<sup>3</sup> The empirical specification is close, but adapted in comparison to the models implemented by Cuaresma et al., 2007.



estimation of the equation. As for the capital stock in real terms there are no statistical data, it could be approximated by the volume of domestic investment in the economy, while differences in size and dynamics between the two processes would be reflected in the estimated coefficient of elasticity.<sup>4</sup> Therefore the equation to be empirically verified takes the form:

$$\Delta y_{it} = \alpha_0 + \alpha_1 \Delta fdi_{it} + \alpha_2 \Delta fdi_{it-1} + \alpha_3 \Delta exp_{it} + \alpha_4 \Delta exp_{it-1} + \alpha_5 \Delta di_{it-1} + \beta_1 \Delta I + \beta_2 \Delta di_{it} + \varepsilon_{it}.$$

In addition, the use of panel estimation techniques allows for postulating unobservable country and/or time effects, which could account for the likely imprecise model specification due to the substitution of the unobservable capital stock with the observable domestic investment or due to statistical measurement errors in the reported macroeconomic series.

As regards the data used for the empirical analysis, the available macroeconomic statistical series cover a long period of time and are comparable across countries. Thus it is possible to test the validity of the hypotheses for the group of countries as a whole, but at the same time to also highlight specific features. The study utilises quarterly data for the ten NMS that joined the EU in 2004 and in 2007, covering the period from the beginning of 1999 to the first quarter of 2014. As these countries underwent through a transition period from a planned to market economy in the 1990s, the relationships between the macroeconomic processes during that period would not be indicative for the current conditions, nor would reveal the factors for future economic growth.

The key variables for the empirical analysis are economic growth, employment, FDI, exports of GNFS and domestic investment, represented in real terms at a quarterly frequency. Accordingly, the volumes of GDP, domestic investment and exports of GNFS are calculated in prices of the reference year 2005, whereas the nominal inward FDI stock is transformed in constant prices using the deflator of gross fixed capital formation based at 2005 = 100. Data on GDP, domestic investment and exports of GNFS are according to the final use method of the system of national accounts and are published by Eurostat as seasonally adjusted volumes in accordance with the European System of Accounts, 1995 (ESA95). The nominal inward FDI stock is published by Eurostat according to the balance of payments methodology. All variables (except the dummies) are in logarithms, and data for FDI and for those countries and variables, for which seasonally adjusted series are missing (e.g. employment in Romania), are seasonally adjusted using the standard X12 filter. Performing a series of integration tests confirmed that the variables are integrated of order one in levels and accordingly are stationary in first differences.<sup>5</sup> On this basis, the conducted panel econometric analysis is justified, being focused on the relationships

<sup>4</sup> Alternatively the capital stock in the economy at constant prices could be estimated by various methods, for example by the perpetual inventory method, but this requires making a number of additional assumptions and thus increases the uncertainty of the estimates.

<sup>5</sup> The first differences of the logarithms of the data are approximately equal to the quarterly growth rates.

between the growth rates of these processes, i.e. estimating dynamic elasticities being relevant for the actual economic growth in the short to medium term.<sup>6</sup>

In studying the validity of the hypotheses for an export-oriented and/or investment-based economic growth for the NMS a special attention is given to the likely disproportionate effects of the global financial and economic crisis and the countries' membership in the EU. To this aim, after the estimation of the basic model two additional specifications are estimated sequentially adding two dummy variables: (1) for the effect of the global financial and economic crisis (*Crisis*), which takes the value of one for two quarters, the fourth quarter of 2008 and the first quarter of 2009, and zero for all remaining periods; and (2) for membership in the EU (*EU Membership*), which takes the value of one from the third quarter of 2004 onwards for eight countries and from the first quarter of 2007 onwards for Bulgaria and Romania, and zero before that. These two dummy variables could account for the different responses of the macroeconomic processes to these specific events and thus increase the confidence in validating or rejecting the main hypotheses of the study.

#### **Panel econometric analysis of the effects of exports and FDI for the economic growth in the NMS**

The obtained panel estimates of the real growth dependence on exports and FDI using different specifications of the basic model are presented and discussed below. A decomposition of the actual economic growth for the countries into the respective contributions of the factors included in the main specification of the model is also presented.

All variables were tested for stationarity before conducting the actual econometric analysis of the relationships. A number of checks of the individual country series and the panel data were carried out, with the tests applied being both individual and panel-based. At least two tests were applied to each series, having an alternative null hypothesis. For the individual tests for example the augmented Dickey and Fuller test, having a null hypothesis of unit root, and the Kwiatkowski-Phillips-Schmidt-Shin test, having a null hypothesis of stationarity, have been used. In the panel structured data some of the tests have a null hypothesis of individual unit root for the separate cross-section units (such as the Fisher-ADF test), while others have a null hypothesis of a common process with unit root (e.g. the Levin, Lin and Chu test). In addition, the series were tested in both levels and first differences. To confirm the unambiguity of the results the tests were performed on two time spans: the overall sample and one restricted only to observations before the global economic crisis.

The results from the various tests performed confirmed the hypothesis of a unit root process in the levels of the variables and the stationarity of their first differences.<sup>7</sup>

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<sup>6</sup> The prospective study of long-term relationships requires long time series, representing relatively stable economic characteristics and utilising a co-integration analysis, which is beyond the scope of this study, focused on dynamic elasticities.

<sup>7</sup> The results from these tests are not reported, but are available and can be provided by the author upon request.

These results justified the application of panel econometric techniques to the first differences of the logarithms of the variables, which are characterized by stationarity.

*Panel estimates of the real economic growth dependence on the specified factors*

The results from the application of the model in several alternative specifications are presented in Table 1. In the main specification (Model 1) the derived empirical equation for economic growth is estimated with the panel least squares method. In the next two specifications two dummy variables are sequentially introduced: for the effect of the global crisis and for EU membership. In Models 2a and 3a the lagged value of exports is excluded due to its statistical insignificance, while the exclusion of the overall constant in Models 2b and 3b restores the statistical significance of the real export dynamics in both periods. The dummy variables account for a possible structural break in the average (autonomous) rate of economic growth and change the size of the overall constant of the equation, allowing for a different average dynamics of economic activity in the separate sub-periods. Although the coefficients of elasticity with respect to the main factors in the model change in the alternative specifications, they remain in broadly overlapping confidence intervals.<sup>8</sup>

Table 1

Panel estimates of the economic growth dependence on the main factors  
(panel least squares method)

dlog(GDP)	Model 1		Model 2a		Model 2b		Model 3a		Model 3b	
	coeff.	p-value	coeff.	p-value	coeff.	p-value	coeff.	p-value	coeff.	p-value
dlog(FDI)	0.022	0.019	0.024	0.005	0.047	0.000	0.021	0.013	0.043	0.000
dlog(FDI(-1))	0.024	0.008	0.020	0.015	0.044	0.000	0.018	0.035	0.038	0.000
dlog(Exports)	0.088	0.000	0.039	0.001	0.076	0.000	0.039	0.001	0.058	0.000
dlog(Exports(-1))	0.031	0.012			0.041	0.001			0.026	0.026
dlog(Domestic investment)	0.117	0.000	0.096	0.000	0.099	0.000	0.095	0.000	0.100	0.000
dlog(Domestic investment(-1))	0.049	0.000	0.041	0.000	0.047	0.000	0.040	0.000	0.048	0.000
dlog(Labour)	0.139	0.005	0.142	0.002	0.097	0.042	0.150	0.001	0.096	0.041
Constant	0.003	0.000	0.006	0.000			0.007	0.000		
Crisis			-0.034	0.000	-0.023	0.000	-0.034	0.000	-0.029	0.000
EU Membership							-0.001	0.179	0.004	0.000
R <sup>2</sup>	0.41		0.51		0.45		0.51		0.47	
Adj. R <sup>2</sup>	0.41		0.50		0.44		0.50		0.47	
Sample	1999:3 2014:1		1999:3 2014:1		1999:3 2014:1		1999:3 2014:1		1999:3 2014:1	
Observations	590		590		590		590		590	

It is interesting to note that allowing for country fixed effects in the three main specifications of the model is not supported by the formal test for their joint significance, while the estimated coefficients in this way for the basic specification are very similar to those reported for Model 1. The estimation with unobserved country random effects results in a zero variance of the random effects, i.e. they do not influence the estimated

<sup>8</sup> With the exception of the coefficients for the impact of real exports, which decrease with the inclusion of the dummy variables and maintaining the overall constant of the equation (Models 2a and 3a). In an alternative (unreported) specification, allowing the crisis effect to interact with the export dynamics, the export coefficients are again lower as compared to the main specification (Model 1), but its influence increases during the crisis period.

coefficients with the panel least squares method. As a result, the presented estimates do not include country-specific effects.

Based on the obtained estimates on average for the NMS it could be concluded that all postulated relationships have the correct sign of influence and are statistically and economically significant. Most of the estimated elasticities are in overlapping confidence intervals between the alternative specifications.<sup>9</sup> On this basis the choice of a specific model for the analysis of contributions to economic growth should not affect the main conclusions, although the concretely calculated contributions would be somewhat different. As Model 1 directly corresponds to the derived econometric specification in the previous section, the contribution discussion presented below is based on the estimated elasticities in its empirical application.

Given the estimated dynamic elasticities it could be observed that an increased dynamics of inward FDI increases quarterly real GDP growth in the host country in the range of 0.02 to 0.05 percentage points in the same period and in the range of 0.02 to 0.04 percentage points in the next, depending on the preferred specification. The combined contribution, based on Model 1, of increasing the FDI dynamics by 1 percentage point amounts to 0.045 percentage points higher quarterly economic growth. Similarly, a higher export growth by 1 percentage point is beneficial to economic growth, whose quarterly dynamics accelerates in the range of 0.04 to 0.09 percentage points in the current period and from 0.03 to 0.04 percentage points in the next, or by a total of 0.12 percentage points based on the first specification. Domestic investment, as expected in the postulated model, increases real economic growth in the range of 0.1 to 0.12 percentage points in the current period and in the range of 0.04 to 0.05 percentage points in the next, with the cumulative contribution based on Model 1 being 0.16 percentage points. Increasing employment growth by 1 percentage point according to the estimated models would contribute to raising the quarterly economic growth on average for the NMS in the range of 0.1 to 0.15 percentage points. The autonomous economic growth, reflecting the average technological progress as well as the catching-up trend of the average labour productivity in the NMS towards their more developed economic partners and being unexplained by the factors included in the model, is estimated at 0.3% in the first specification, 0.6% in the second (which accounts for the impact of the economic crisis, ranging from -3.4 to -2.3 percentage points lower economic growth) and 0.7% in the third.

Based on the estimated elasticities it could be concluded that the real economic growth reacts the most to changes in domestic investment, and next, with similar dynamic effects, it is influenced by the dynamics of employment and real exports. The weakest reaction in the pace of economic activity, on average for the NMS, is with respect to changes in the inward FDI. However, as the trend developments in the main factors are different their actual contributions to the observed economic growth are calculated (based on the estimated elasticities in Model 1) and discussed below.

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<sup>9</sup> See the previous footnote.

Turning to the included dummy variables it could be concluded that the global economic crisis had a negative effect on the real economic growth (at least in the short term) to a greater extent than what could be explained by the observed dynamics of the main production factors (Models 2a and 2b). The outcome of the crisis was in the range of 2 to 3.4 percentage points lower average economic growth in the NMS in the fourth quarter of 2008 and the first quarter of 2009. On the basis of the obtained estimates (Models 3a and 3b), the EU membership has not contributed to a higher autonomous growth beyond the effects observed in relation to the higher inward FDI, the intensification of exports and of domestic investment.

The main conclusion from the presented panel estimates of the relationships of economic growth with respect to the undertaken foreign activity is that in all specifications the inward FDI and export performance are statistically significant and positively associated with the actual economic dynamics. On this basis it could be concluded that the hypotheses for an export-oriented and investment-based economic growth are confirmed based on the observed developments in the NMS in the past fifteen years.

#### *Factor contribution analysis of the actual economic dynamics*

Obtaining accurate quantitative estimates of the GDP growth dependence on the factors postulated in the theoretical model provides the basis for calculating accurate contributions for each of the factors to the observed economic dynamics. For this purpose the estimates of the panel Model 1 are used, representing the average elasticities for the NMS. The calculated contributions over time and by country are presented in the Annex, while Table 2 summarizes the information. It could be stated that based on the observed macroeconomic processes and the estimated model of their interrelationships, the actual annual average real GDP growth in the period from early 2000 to the first quarter of 2014, which amounted to 3.3% on average for the NMS, is fully explained in the preferred main empirical specification.

*Table 2*

Contributions of FDI, exports, domestic investment and labour to the actual economic growth in the NMS (on an annual basis)

	Real economic growth, %	Explained growth, %	Factor contribution (in p.p.)				
			FDI	Exports	Domestic investment	Labour	Constant
Bulgaria	3.4	3.8	0.7	0.6	1.1	0.0	1.3
Czech Republic	2.7	3.0	0.5	0.9	0.3	0.1	1.3
Estonia	3.9	3.7	0.5	0.8	1.0	0.1	1.3
Hungary	1.7	2.6	0.3	0.9	0.1	0.0	1.3
Lithuania	4.3	3.6	0.5	1.2	0.8	-0.1	1.3
Latvia	4.0	3.2	0.5	0.8	0.7	-0.1	1.3
Poland	3.6	3.4	0.6	1.0	0.5	0.0	1.3
Romania	3.4	3.8	0.5	1.1	1.0	-0.2	1.3
Slovenia	2.0	2.3	0.4	0.7	-0.1	0.0	1.3
Slovakia	3.9	3.3	0.7	0.9	0.3	0.1	1.3
NMS average	3.3	3.3	0.5	0.9	0.6	0.0	1.3

The autonomous economic growth, corresponding in the theoretical framework to the technological progress, amounted to 1.3% on an annual basis over the whole period. The biggest contribution among the included explanatory factors, amounting to 0.9 percentage points on average for the NMS, stems from the dynamics of exports, which accounted for more than one fourth of the actual real economic growth during the period. The contributions of domestic and foreign direct investment are of a similar magnitude, amounting to respectively 0.6 and 0.5 percentage points. Employment, which records a small, but close to zero, average decline for the studied period and sample of countries, has a contribution of zero to the economic dynamics in the panel.

Although these patterns broadly apply to the individual countries as well, some differences are also observed across countries. For example, the FDI contribution to real economic growth is the biggest in Bulgaria and Slovakia, amounting to 0.7 percentage points, while the largest relative contribution to the actual economic activity dynamics is observed in Bulgaria and Slovenia, where FDI explain respectively 21.5 and 19.5 percent of the annual average growth rates. With respect to exports the biggest absolute contribution is observed in Lithuania (1.2 percentage points) and in Romania (1.1 percentage points), while the largest relative contribution is in Hungary, where it explains 55% of the actual economic growth. Turning to the domestic investment dynamics, according to the model estimates it has contributed the most, both in absolute and in relative terms, to the actual real GDP growth in Bulgaria, amounting to 1.1 percentage points and representing almost one third of the observed average annual growth of 3.4% over the period.

The economic recession, resulting from the global economic crisis of 2008-2009, was associated for most countries with a decline in exports and in domestic investment, but based on the calculated contributions, also with relatively large unexplained by the model dynamics (see the Annex). A relatively large share of the economic downturn during the crisis is unexplained in Latvia, Lithuania, Slovenia, Hungary and Bulgaria. Regarding the differences between the actual and the explained by the model average growth rates, the actual economic dynamics was lower than expected on the basis of the estimated elasticities for the NMS and the corresponding country dynamics of the factors to the biggest extent in Hungary (-0.9 percentage points), Bulgaria (-0.4 percentage points) and the Czech Republic (-0.4 percentage points). In contrast, real economic growth was higher than expected in Latvia (0.8 percentage points), Lithuania (0.6 percentage points) and Slovakia (0.6 percentage points).

Based on the estimated dynamic elasticities and the calculated factor contributions for the NMS over the past fifteen years it could be concluded that the two main forms of foreign economic activity (FDI and exports) are positively associated with economic growth, and the degree of their influence is statistically and economically significant. This conclusion justifies the implementation of targeted policies promoting the inward FDI and the export orientation of production.

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The macroeconomic relationships between attracting FDI and the export dynamics, on the one hand, and economic growth, on the other, were studied in the presented panel econometric analysis based on developments in the NMS in the past fifteen years. The empirical results confirmed the key hypotheses for an export-oriented and/or (domestic and foreign) investment-based economic growth. The postulated theoretical relationships were confirmed econometrically for the case of the NMS: the estimated effects are statistically significant, while the resulting elasticities have the correct sign of influence and economically-relevant size. The deepening of international integration stimulates economic growth in the NMS, and therefore contributes to increasing their social welfare.

Although the presented empirical results should be interpreted with caution, as they are conditional on the utilised specific methods and data, they nevertheless provide a basis for formulating some recommendations to the pursued economic policies. The sustainability of economic development of the NMS requires pursuing consistent governance programmes and implementing a variety of measures for improving competitiveness. The econometrically-confirmed relationships justify focusing the NMS policy makers' efforts towards:

- Maintaining the attractiveness of the domestic business climate to foreign investors. The main measures in this respect are maintaining macroeconomic stability, pursuing sustainable fiscal policy, implementing structural reforms aimed at improving the flexibility of labour markets and the competition in product markets, maintaining the stability of the financial institutions. At the same time, it is necessary that policy makers continue their efforts for improving the quality of production inputs, including of human capital, and promoting their most efficient use.

- Supporting the export orientation of domestic production. The measures in this respect may be specific such as providing export guarantees, insurance and other forms of support, but could also be more general, i.e. improving the business environment and promoting competition and efficiency through encouraging a better allocation of production resources. More general measures of this kind would also be beneficial in attracting foreign direct investors.

The main conclusion emerging from the presented empirical research is that exports and inward FDI are essential to economic growth in the NMS, which justifies their focused encouragement.

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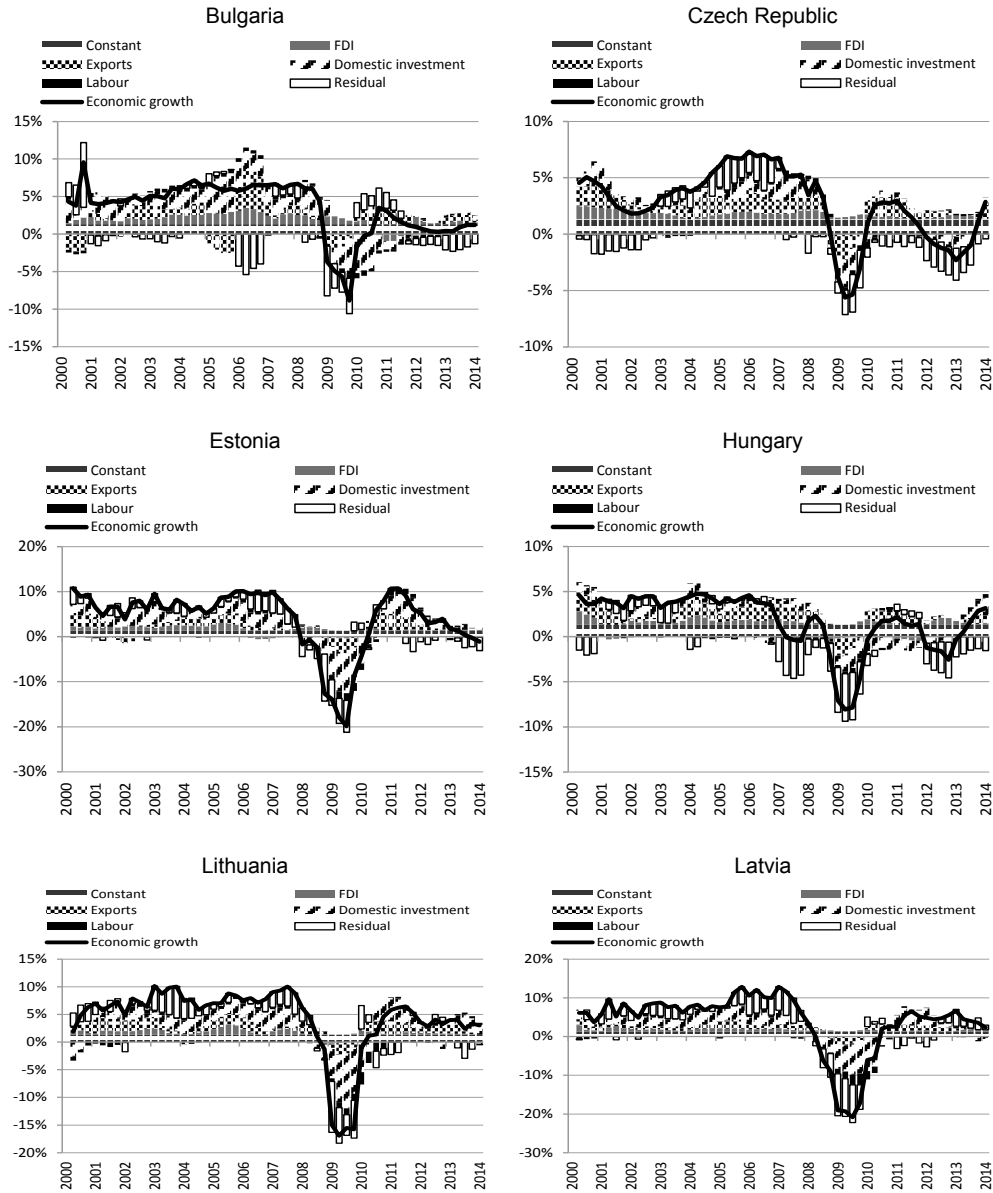
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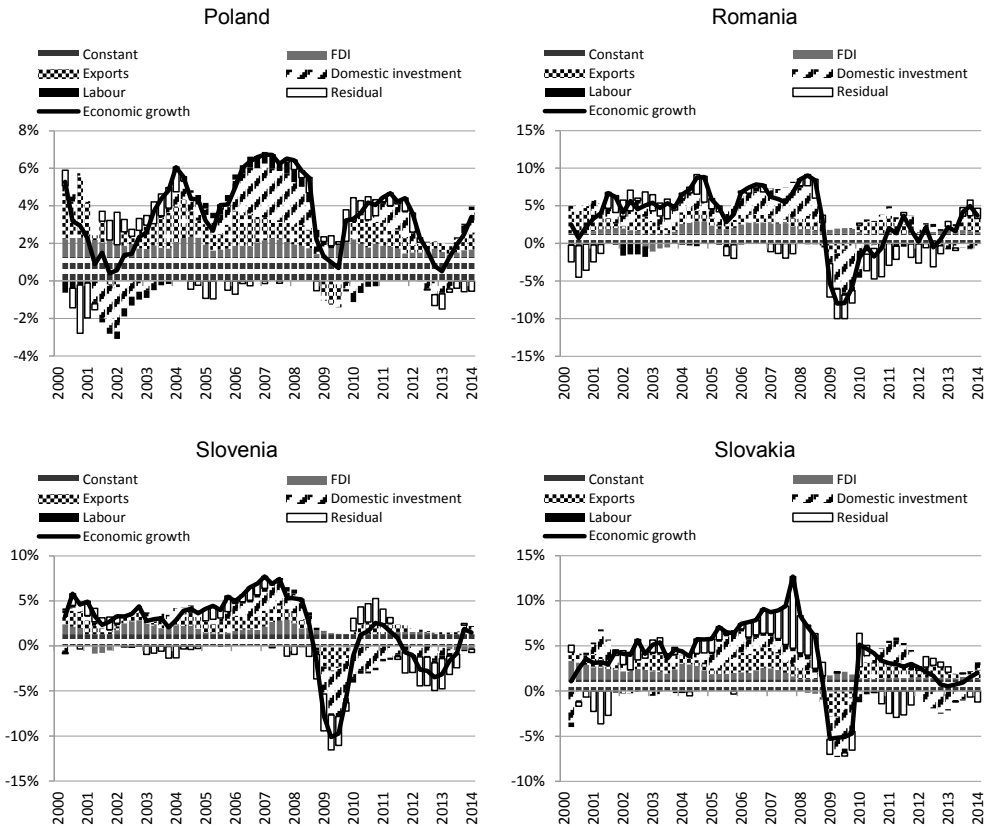


Annex

Contributions of FDI, exports, domestic investment and labour to the actual real economic growth (on an annual basis)\*



Exports and foreign direct investment as factors for economic growth in the EU New Member States



\* The estimates are based on Model 1, presented in the main text.

22.IX.2014