The impact of financial crisis on the relation between the stock market and the real economy

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Abstract
The relationship between the stock market and the real economy is a widely discussed subject, especially in the context of the actual financial crisis.

In this paper, we intend to capture the interdependency between the real economy and the stock market, by taking into account the isolated influences of other factors like: integration in a monetary union and the existing differences between countries from the economic development perspective.

We will especially focus on the evolution of the real economy and the stock market relationship during the financial crisis, for the EU-27 economies.

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1. Introduction

In general there are four research directions which analyze the link between the capital market and the real economy: the existence of a strict unidirectional link, in one sense or the other, the existence of a bidirectional connection between the real economy and the capital economy or the total absence of such a link.

Numerous empirical researches have underlined the importance of the existence of a influential capital market, in regard to the developing economies.

Adjasi (2006), Nowbutsing (2009) have empirically shown that the development of financial markets has a positive impact on the economic environment.

Humpe A. *et al.* (2009) studied the link between the evolutions of the capital market and the real economy, showing that the US capital market is positively influenced by the dynamics of the industrial production and that the inflation and long-term interest rate have had a negative impact on the stock trends.

Taking into account that the interdependence between the financial markets has recently experienced mounting levels, Milani (2011) analyzed the impact of the capital market on the macro-economic variables of countries characterized by an open economy. The study concludes

that the capital markets of the US and Germany have an influence on the macroeconomic variables of countries such as Australia, Canada, New Zeeland, Ireland, Austria and the Netherlands, which is brought by the cross-country wealth channel.

Raunig and Scharler (2010), when studying the link between the volatility of the capital markets and the real economy, have examined the uncertainty hypothesis, which states that the capital market fluctuations do not *per se* affect the real economy through aggregate demand, but rather the volatility manifested in the capital market is the origin of this influence. By investigating the data for the US economy for the 1960-2007 period, the authors reach to the conclusion that an increasing level of volatility is reflected by a higher degree of uncertainty. Consequently, this increase of the uncertainty level leads to the decrease of consumption and investments, and this decrease is reflected by the aggregate demand, finally leading to a decreasing economic growth.

Næs, R., Skjeltorp, J., Ødegaard, B.A. (2011), in their article that will soon be published in *The Journal of Finance*, present the liquidity of the capital market as a predictor of the real economic crisis. Using quarterly data for the US economy for the 1947-2008 period, the study shows that the liquidity indicators of the capital market contain relevant information to predict the future trend of the economy. The tests show that this is a unidirectional link, from the capital market and to the real economy, and that the models have high performances *in-sample* as well as *out-of-sample*.

The ability to predict the capital market indicators was recently studied by Junttila and Korhonen (2010); they propose a model for evaluating the intrinsic value of a stock based on the nominal value of the dividend and on the expected rate of economic growth[1], taking also into consideration the two equilibrium relations that make use of the inflation and the real exchange rate. The conclusion of the study is that the capital market variables are of great significance in predicting the macroeconomic variables, especially during periods with increased turbulences.

Also, in terms of unidirectional perspective from the capital economy towards the real economy, Cetin (2011) analyzes the relationship between the stock prices and the inflation rate by using monthly data for the US economy for the 1983-2010 periods, the considered variables being *Thomson Reuter/Jeffries CRB Commodity Futures Index* and *Consumer Price Index*[2] as a measure of inflation. The conclusion of this econometric technique[3] is that there is a significant link between the stock prices and the inflation rate, but it is unidirectional as the inflation does not influence the fluctuations of the stock market.

A small percentage of the studies dedicated to this correlation have shown a unidirectional causality, from the real economy towards the capital market. The argument is that economic growth leads to an increase in certain financial instruments' demand and that the markets adapt to the economy.

Dimitrova (2005) shows that there is a negative, unidirectional impact of the exchange rate on the efficiency of the US and the UK stock markets and Kilian and Park (2009) reach the same conclusion by studying the impact of the oil price shocks on the US capital market.

There are numerous studies that pointed to the existence of a feedback between the dynamics of the economy and that of the capital market. Shahbaz and Ali (2008), by estimating the *ARDL* models and by performing a Granger causality analysis for the Pakistani economy, have reached to the conclusion that there is a bidirectional, positive relationship between the economic growth and the development of the capital market.

Giannellis *et al.* (2008), by estimating the bivariate EGARCH(2,1) models, conclude that there was a significant short-term relationship between the capital market and the real economy for the US and the UK, during the 1970-2002 period. Furthermore, this relationship is

[1] factors which were already discussed by Gordon's classic model.
[2] CPI.
[3] Granger causality and regression models.

bidirectional, with a stronger influence in the case of the UK. For this country there is an asymmetry in volatility transmission, the negative shocks on the capital market having a stronger impact on the volatility of the economic activity than the positive shocks.

Bjornland and Leitemo (2009) have studied the interdependence between the monetary policy of the US and *S&P 500 stock index* by using the *structural vector autoregressive (VAR)* methodology. The study concludes that there is a significant and strong bidirectional connection between the monetary policy and the real prices of stocks.

There are very few studies which show that there is no significant relationship between the capital market and the real economy. One may quote Singh (2008), who analyses the relationship between the capital market and the real economy for the developing countries with a low GDP per capita. The conclusions of his study are somehow surprising and contrary to the literature which points out to the positive role of the capital markets on the economic development, especially for the emerging economies. Therefore, the poorest countries, with yet no capital market established or a rudimentary one, would gain more on a medium and long run by developing the banking system, rather than the capital market.

In another study (Jamil (2010)) analysis the link between the volatility of the capital markets and the economic development for developing countries. Among the conclusions of the studies the following are reminded: i) the existence of a bidirectional link between the capital market indicators and the economic growth indicators; ii) the volatility of the capital market has a negative influence on the economic growth; when this volatility is compensated through high values of returns, the negative influence is insignificant; iii) the development of the capital market is a significant factor which influences the GDP per capita.

2. Relationship between stock market and real economy using panel data

In order to investigate the relationship between stock market and real economy for EU-27 countries, a panel data analysis was performed, using the following variables:

- ΔGDP_t - real economic growth, quarterly data, provided for each country by EUROSTAT;
- $R_t = \log P_t - \log P_{t-1}$ - daily logreturns for stock market indexes, data provided by Bloomberg;
- σ_t - daily volatilities for each stock market index, computed using daily logreturns data.

Since real *GDP* growth has a quarterly periodicity, we have transformed daily logreturns and daily volatilities into quarterly ones.

Quarterly logreturn was computed as an average of daily logreturns; also, a quarterly volatility was estimated using the following relation:

$\sigma_{QUARTERLY} = \sqrt{60}\sigma_{DAILY}$, assuming that a full transaction year has approximately 240 days.

Our data[4] covers the time interval 2000-2011 (first quarter of 2000-second quarter of 2011) and the analysis was divided into two subsamples: 2000-2007 (before financial crisis) and 2008-2011 (financial crisis).

[4] All data have been desezonalised using TRAMO/SEATS procedure form Eviews 5.0.

Table 1. Country stock market index

Country	Stock Market Index	Euro-zone
Netherlands	AEX	1 January 1999
Greece	ASE	1 January 2001
Austria	ATX20	1 January 1999
Belgium	BEL20	1 January 1999
Romania	BET	-
Hungary	BUX	-
France	CAC40	1 January 1999
Cyprus	CYSMMAPA	1 January 2008
Germany	DAX	1 January 1999
UK	FTSE100	-
Italy	FTSEMIB	1 January 1999
Spain	IBEX	1 January 1999
Ireland	ISEQ	1 January 1999
Luxemburg	LUXX	1 January 1999
Malta	MSE	1 January 2008
Denmark	OMX Copenhaga	-
Sweden	OMX Stockholm	-
Finland	OMXH15	1 January 1999
Portugal	PSI20	1 January 1999
Czech Republic	PX50	-
Latvia	RIGSE	-
Slovenia	SBITOP	1 January 2007
Bulgaria	SOFIX	-
Lithuania	VILSE	-
Poland	WIG	-
Estonia	OMX Tallin	1 January 2011
Slovakia	BSSE	1 January 2009

Also, a separate analysis was conducted for countries from Euro-zone and countries outside Euro-zone, in order to observe the differences between these two groups of countries[5].

2.1. Panel data regression models

Using the variables described above, one can estimate either fixed effects or random effects regression models.

The *Fixed Effects (FE) model* has the following expression:

$$y_{it} = (\alpha + u_i) + X_{it}^{'}\beta + v_{it} \qquad (1)$$

where y_{it} is the dependent variable, X_{it} is a matrix of explanatory variables, $v_{it} \sim IID(0, \sigma_v^2)$.

The *Random Effects (RE) model* could be expressed as:

[5] all the results of the estimated models can be found in the *Appendix.*

$$y_{it} = \alpha + X_{it}^{'}\beta + (u_i + \nu_{it}) \qquad (2)$$

where y_{it} is the dependent variable, X_{it} is a matrix of explanatory variables and $\nu_{it} \sim IID(0, \sigma_\nu^2)$.

There are two major differences between the two models: in the *FE model* the intercept is varying across groups or time periods, while in the *RE model* the intercept is constant.

Also, the variance of residual term is constant for *FE model*, while in *RE model* this variance is not constant over time or across groups.

Hausman test is used in order to choose between fixed and random effects; in this approach, we are testing the null hypothesis that the incercepts are orthogonal to both explanatory variables and residual variable.

Let $\hat{\beta}_{FE}$ be the estimator for fixed effects model and let $\hat{\beta}_{RE}$ be the estimator for random effects model.

If the null hypothesis is true, then both $\hat{\beta}_{FE}$ and $\hat{\beta}_{RE}$ are consistent, but only $\hat{\beta}_{RE}$ is efficient; if the null hypothesis is rejected, then only $\hat{\beta}_{FE}$ is consistent.

The test statistic $HT = T(\hat{\beta}_{RE} - \hat{\beta}_{FE})^{'}[Var(\hat{\beta}_{RE}) - Var(\hat{\beta}_{FE})](\hat{\beta}_{RE} - \hat{\beta}_{FE})$ follows a Chi-square distribution with $k = \dim(\hat{\beta}_{RE} - \hat{\beta}_{FE})$ degrees of freedom.

In the following only the relevant models (either *RE* or *FE*) are shown, according to *Hausman test.*

2.2. Stock market performance and the real economy

In order to asses the correlation between the stock market performances and the real economy, we have estimated the following model (*RE-Random Effects*):

$$\Delta GDP_{it} = \alpha + R_{it-1}^{'}\beta + (\nu_{it} + u_i) \qquad (3)$$

where $i = 1...27$ represents the country and t is the time index (where $i = 1...27$ represents the country and t is the time index (successively, we estimated the model for the entire period 2000-2011, then for subperiods 2000-2007 and 2008-2011).

As one can notice, the estimated model is valid and the influence of stock market performance is statistically significant.

There is a direct, significant relationship between capital market performance and macroeconomic developments.

The sense of this relation is from stock market to real economy, with a delay of one quarter, and this relationship was stronger in the period 2008-2011, the period of economic and financial crisis (for pre-crisis period the explanatory power of the model is small-2%).

2.3. Real economy as a predictor of stock market performances

In order to asses the ability of economic environment to predict stock market performances, we have estimated the following model (*FE-Fixed Effects*):

$$R_{it} = (\alpha + u_i) + \Delta GDP_{it-1}^{'}\beta + \nu_{it} \qquad (4)$$

where $i = 1...27$ represents the country and t is the time index (successively, we estimated the model for the entire period 2000-2011, then for the subperiods 2000-2007 and 2008-2011).

For the entire period analyzed (2000-2011), the estimated model is not valid, so we cannot infer the existence of a significant causality from the real economy to the capital market.

The only significant relationship of this type occurs in the pre-crisis period (2000-2007), although the relationship has an extremely low intensity.

The most conclusive result is obtained for the period 2008-2011 (the crisis period), when there is a 97.5% probability of rejecting the existence of a significant influence of economic growth on stock market performance.

2.4. Stock market volatility as a predictor of economic growth

In order to asses the ability of the stock market risk (measured by volatility) to predict real economic growth, we have estimated the following model *(FE-Fixed Effects):*

$$\Delta GDP_{it} = (\alpha + u_i) + \sigma'_{it-1}\beta + \nu_{it} \qquad (5)$$

where $i = 1...27$ represents the country and t is the time index (successively, we estimated the model for the entire period 2000-2011, then for the subperiods 2000-2007 and 2008-2011).

As all three models are valid, one can infer that before, as well as during the financial crisis, the stock market volatility could be seen as a predictor of the real economic growth.

A higher volatility has a negative impact on macroeconomic developments, which could be explained by an increasing level of uncertainty on the stock markets which would cause leaks of capital and low market liquidity levels, which are reflected in the real economy through the consumption channel.

Yet, real economic growth was more sensitive to stock market volatility during financial crisis, regression estimates for 2008-2011 being significantly higher (in absolute value) than the estimates for 2000-2007.

In the Euro area, we observed the same significant influence of the stock market volatility on economic growth. This influence was more important during financial crisis and from this point of view the countries from the Euro-zone have the same behaviour as the entire European Union.

The influence of stock market volatility on real economic growth keeps the same pattern for countries of Euro-zone and countries outside Euro-zone.

Yet, economic growth is more senzitive to stock market uncertainty for countries outside Eurozone.

2.5. Real economic growth as a predictor of stock market volatility

In order to asses the ability of the economic growth to the predict stock market risk, we have estimated the following model (*FE-Fixed Effects*):

$$\sigma_{it} = (\alpha + u_i) + \Delta GDP'_{it-1}\beta + \nu_{it} \qquad (6)$$

where $i = 1...27$ represents the country and t is the time index (successively, we estimated the model for the entire period 2000-2011, then for the subperiods 2000-2007 and 2008-2011).

For EU countries as a whole, the impact of real economic growth on stock market volatility is significantly smaller than the impact of volatility on economic growth.

The estimated models have a very low explanatory power, esepcially during financial crisis(5%).

Analysis on the two groups of countries (Euro-zone countries and the countries outside the Euro-zone) conducted to the detection of two distinct behaviours:

- during the 2000-2007 period, both groups of countries have the same pattern of influence of the economic growth on the stock market volatility in the sense that there is a negative relationship between the two variables, in other words, a negative rate of economic growth is reflected in a higher volatility of the stock market; however, during this period, economic growth had a higher impact on the uncertainty of the capital markets for the Euro-zone countries;
- as for the Euro-zone countries, during the 2008-2011 period, causality from economic growth to stock market volatility mantains its direction, but it occurs with much higher intensity (during the 2000-2007 period the regression coefficient is -3.843, and during the 2008-2011 period is -9.897).

- for countries outside the Euro-zone the financial crisis brought a changed the nature of this causal relationship, economic growth not longer having a significant impact on the stock market volatility.

Conclusions

In this paper we have investigated the relationship between the stock market and the real economy for EU-27 countries, before and during the financial crisis. Unlike the previous studies oriented towards studying the interdependencies between these two entities, which got to the conclusion that there is a bidirectional causality between the two of them in the case of emerging economies, our main finding is that this sense of causality does not maintain during the financial crisis.

Actually, this relationship is unidirectional, from the stock market to the economic growth, and it stands for both of the most important stock market dimensions: return and volatility.

This research can be further developed by making use of other econometric methodologies and by determining some predictors of macroeconomic developments.

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Appendix

Table 1. Stock market performance as a predictor of real economy (2000-2007) – EU countries

Dependent Variable: DGDP				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
R(-1)	0.017	0.003	4.588	0.000
C	0.909	0.088	10.264	0.000
R-squared	0.028			
Adjusted R-squared	0.027			
F-statistic	20.749			
Prob(F-statistic)	0.000			

Table 2. Stock market performance as a predictor of real economy (2008-2011) – EU countries

Dependent Variable: DGDP				
Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
R(-1)	0.058	0.006	10.428	0.000
C	0.058	0.100	0.583	0.560
R-squared	0.244			
Adjusted R-squared	0.242			
F-statistic	108.580			
Prob(F-statistic)	0.000			

Table 3. Economic growth as a predictor for stock market performance (2000-2007) – EU countries

Dependent Variable: R				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	1.316	0.344	3.825	0.000
C	0.838	0.446	1.880	0.061
R-squared	0.083			
Adjusted R-squared	0.053			
F-statistic	2.698			
Prob(F-statistic)	0.000			

Table 4. Economic growth as a predictor for stock market performance (2008-2011) – EU countries

Dependent Variable: R				
Sample 2008Q1-2011Q2				

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.258	0.455	-0.567	0.571
C	-4.068	0.792	-5.137	0.000
R-squared	0.039			
Adjusted R-squared	-0.035			
F-statistic	0.525			
Prob(F-statistic)	0.975			

Table 5. Stock market volatility as a predictor for economic growth (2000-2007) – EU countries

Dependent Variable: DGDP				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-3.060	0.711	-4.305	0.000
C	1.233	0.071	17.379	0.000
R-squared	0.315			
Adjusted R-squared	0.290			
F-statistic	12.714			
Prob(F-statistic)	0.000			

Table 6. Stock market volatility as a predictor for economic growth (2008-2011) – EU countries

Dependent Variable: DGDP				
Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-12.832	1.320	-9.718	0.000
C	1.467	0.195	7.539	0.000
R-squared	0.278			
Adjusted R-squared	0.221			
F-statistic	4.883			
Prob(F-statistic)	0.000			

Table 7. Stock market volatility as a predictor for economic growth (2000-2007) – Euro-zone

Dependent Variable: DGDP				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-3.843	1.237	-3.107	0.002
C	1.020	0.117	8.712	0.000
R-squared	0.161			
Adjusted R-squared	0.128			
F-statistic	4.858			
Prob(F-statistic)	0.000			

Table 8. Stock market volatility as a predictor for economic growth (2008-2011) – Euro-zone

Dependent Variable: DGDP				

Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-9.897	1.386	-7.140	0.000
C	1.198	0.208	5.761	0.000
R-squared	0.290			
Adjusted R-squared	0.233			
F-statistic	5.066			
Prob(F-statistic)	0.000			

Table 9. Stock market volatility as a predictor for economic growth(2000-2007) – countries outside Euro-zone

Dependent Variable: DGDP				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-2.316	1.145	-2.023	0.044
C	1.491	0.115	12.916	0.000
R-squared	0.351			
Adjusted R-squared	0.328			
F-statistic	15.080			
Prob(F-statistic)	0.000			

Table 10. Stock market volatility as a predictor for economic growth (2008-2011) – countries outside Euro-zone

Dependent Variable: DGDP				
Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-17.393	3.174	-5.480	0.000
C	1.798	0.459	3.920	0.000
R-squared	0.280			
Adjusted R-squared	0.222			
F-statistic	4.807			
Prob(F-statistic)	0.000			

Table 11. Economic growth as a predictor for stock market volatility(2000-2007) - EU countries

Dependent Variable: VOL				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.006	0.002	-2.930	0.004
C	0.095	0.002	37.878	0.000
R-squared	0.165			
Adjusted R-squared	0.134			
F-statistic	5.465			
Prob(F-statistic)	0.000			

Table 12. Economic growth as a predictor for stock market volatility(2008-2011) - EU countries

Dependent Variable: VOL				

Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.008	0.002	-3.968	0.000
C	0.130	0.004	35.609	0.000
R-squared	0.121			
Adjusted R-squared	0.053			
F-statistic	1.772			
Prob(F-statistic)	0.016			

Table 13. Economic growth as a predictor for stock market volatility(2000-2007) - Eurozone countries

Dependent Variable: VOL				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-3.843	1.237	-3.107	0.002
C	1.020	0.117	8.712	0.000
R-squared	0.161			
Adjusted R-squared	0.128			
F-statistic	4.858			
Prob(F-statistic)	0.000			

Table 14. Economic growth as a predictor for stock market volatility(2008-2011) - Eurozone countries

Dependent Variable: VOL				
Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-9.897	1.386	-7.140	0.000
C	1.198	0.208	5.761	0.000
R-squared	0.290			
Adjusted R-squared	0.233			
F-statistic	5.066			
Prob(F-statistic)	0.000			

Table 15. Economic growth as a predictor for stock market volatility(2000-2011) - Eurozone countries

Dependent Variable: VOL				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-9.251	0.822	-11.251	0.000
C	1.354	0.097	13.911	0.000
R-squared	0.232			
Adjusted R-squared	0.211			
F-statistic	11.062			
Prob(F-statistic)	0.000			

Table 16. Economic growth as a predictor for stock market volatility(2000-2007) - countries outside Eurozone

Dependent Variable: VOL				
Sample 2000Q1 2007Q4				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.006	0.003	-1.898	0.059
C	0.098	0.005	19.024	0.000
R-squared	0.204			
Adjusted R-squared	0.175			
F-statistic	7.136			
Prob(F-statistic)	0.000			

Table 17. Economic growth as a predictor for stock market volatility(2008-2011) - countries outside Eurozone

Dependent Variable: VOL				
Sample 2008Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.007	0.003	-2.407	0.018
C	0.127	0.006	20.317	0.000
R-squared	0.119			
Adjusted R-squared	0.047			
F-statistic	1.655			
Prob(F-statistic)	0.119			

Table 18 . Stock market performance as a predictor of real economy(2000-2011) – EU countries

Dependent Variable: DGDP				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
R(-1)	0.048	0.003	15.763	0.000
C	0.577	0.055	10.490	0.000
R-squared	0.177			
Adjusted R-squared	0.176			
F-statistic	248.014			
Prob(F-statistic)	0.000			

Table 19. Economic growth as a predictor for stock market performance(2000-2011) – EU countries

Dependent Variable: R				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	1.117	0.242	4.623	0.000
C	-0.514	0.363	-1.416	0.157
R-squared	0.031			
Adjusted R-squared	0.009			
F-statistic	1.412			
Prob(F-statistic)	0.082			

Table 20. Stock market volatility as a predictor for economic growth(2000-2011) – EU countries

Dependent Variable: DGDP				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-10.592	0.692	-15.309	0.000
C	1.671	0.082	20.498	0.000
R-squared	0.227			
Adjusted R-squared	0.208			
F-statistic	12.167			
Prob(F-statistic)	0.000			

Table 21. Stock market volatility as a predictor for economic growth(2000-2011) – Euro-zone

Dependent Variable: DGDP				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-9.251	0.822	-11.251	0.000
C	1.354	0.097	13.911	0.000
R-squared	0.232			
Adjusted R-squared	0.211			
F-statistic	11.062			
Prob(F-statistic)	0.000			

Table 22. Stock market volatility as a predictor for economic growth(2000-2011) – countries outside Euro-zone

Dependent Variable: DGDP				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
VOL(-1)	-13.364	1.498	-8.922	0.000
C	2.134	0.173	12.362	0.000
R-squared	0.211			
Adjusted R-squared	0.191			
F-statistic	10.660			
Prob(F-statistic)	0.000			

Table 23. Economic growth as a predictor for stock market volatility(2000-2011) - EU countries

Dependent Variable: VOL				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.012	0.001	-9.492	0.000
C	0.110	0.002	59.684	0.000
R-squared	0.142			
Adjusted R-squared	0.121			
F-statistic	6.900			
Prob(F-statistic)	0.000			

Table 24. Economic growth as a predictor for stock market volatility(2000-2011) - countries outside Euro-zone

Dependent Variable: VOL				
Sample 2000Q1-2011Q2				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DGDP(-1)	-0.010	0.002	-6.239	0.000
C	0.109	0.003	37.153	0.000
R-squared	0.214			
Adjusted R-squared	0.194			
F-statistic	10.823			
Prob(F-statistic)	0.000			