Goce Petreski,
Ss. Cyril and Methodius University, Faculty of Economics-Skopje, Macedonia
Darko Lazarov,
Goce Delchev University, Faculty of Economics, Sthip, Macedonia

THE IMPACT OF GLOBAL ECONOMIC CRISIS ON SOUTH - EAST EUROPEAN ECONOMIES

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Abstract

The aim of the paper is to investigate the impact of financial crisis on the South-East European economies, throughout a series of econometric tests of a range of transmission mechanisms. Aggregate macroeconomic relationships might contain offset mechanisms (budget deficits, foreign and domestic debt increase). The framework of analysis has not an objective to look into the internal mechanics of growth of national economies, elasticity and substitutions, time lags, positions in income distribution, aas well as, Okun's law over the business cycle and related reverse linkages. Moreover, the paper has no ambitions to scrutinize the statistical or administrative and methodology changes, domestic deficits, types of subsidies and other exogenous interventions in the incumbent period, which may significantly influence levels and changes of any economic variables, and consequently distort the general conclusions.

Key words: financial crisis, South-East European economies, economic growth

1.Introduction

Current financial crisis has lagged impact on peripheral economies' growth rates, employment, fiscal performances and external accounts. The external shocks emanating from the crisis have caused downward output trends and macroeconomic instabilities with various amplitudes, due to different initial conditions, levels of openness and institutional response. Deteriorating export demand, declining foreign investment and more stringent external borrowing environment are the main economic impact channels, being the guiding line of incumbent research. The fiscal, social and monetary policy response, by and large differed. Generally they are discernible in rising budget deficits, widening public debts and worsening foreign account positions.

2.Literature review

Limited number of studies in the academic literature explores the impact of global financial and economic crisis on the SEE region countries. Cocozza, Colabella, and Spadafora et al. (2011) analyze the impact of the global crisis on six South-Eastern European countries. Their main objective is to compare macro-financial conditions and policies in the run-up to the crisis, as well as to compare the policy responses to it, so as to highlight, *inter alia*, possible country-specific constraints. The results from their

research show that the global crisis is at first instance transmitted through a financial channel, in the form of lower and more costly external financing, and subsequently through a trade channel, via a significant decline in exports. Peter Sanfey et al. (2010) show how the crisis has evolved in the region, and why it was affected by developments that originated elsewhere. The study argues that the impact has been less harmful than many expected, and the observed resilience can be attributed in a large part to the mature and sensible reaction of the region itself. But it also points out the vital role played by international actors. This research concludes that the region is well-placed to take advantage of a future global upturn – whenever that might take place – but at growth rates that are likely to be subdued compared with those seen in the few years before the crisis. Will Bartlett and Vassilis Monastiriotis et al. (2010), Will Bartlett and Ivana Prica et al. (2012) highlighted that the global financial crisis was experienced as a huge external shock. Since the SEE banking systems were not directly exposed to 'toxic assets', the crisis was transmitted to the region through a number of indirect channels. These included a contraction of international trade, a sudden stop to credit growth, a rapid fall in inflows of foreign direct investment (FDI), and a rapid fall in remittances from migrant workers, each reflecting the impact of the global crisis in financial markets, goods markets, capital markets and labor markets. It is notable that these mechanisms mattered to different degrees in different countries in the region. In common with other transition economies, the economies of South East Europe (SEE) have suffered from the impact of the global recession more than most other regions around the world, Mitra et al. (2009).

3. Economic performances of SEE countries

One of the possible approaches in estimating the impact of global economic crisis to the SEE economies is by exploring the key macroeconomic indicators i.e. GDP growth, inflation and unemployment rates, as synthetic indicators of economic performance.

A comparative longitudinal analysis of levels and relative changes (rates of economic dynamics), before and after crisis, could shed more light on the interplay between GDP growth and its determinants. Aggregate macroeconomic relationships might be interceded by intermediary variables or exogenous interventions.

In the period 2008-2011 (table 1.), Albania and the Republic of Macedonia, registered comparatively high growth rates of 4% and 2% respectively, in the period 2008-2011 and have suffered comparatively minor negative consequences of economic crisis. On the other hand R. Macedonia and Serbia are countries which in the crisis and after crisis period have lowered the unemployment rate by 2.4% and 9.7% on the average, while other countries in the region (except Albania) registered unemployment increase. Albania and Macedonia, in this period, have shown high price stability i.e. inflation rates of 3.15% and 3.24% respectively.

Table1. Key macroeconomic variables (2008-2011)

	Rate of economic growth *per capita* (%)					Average inflation rate (%)	Rate of unemployment increase (%) 2008-2011	Rate of unemployment reduction, (%) 2002-2011
	2008	2009	2010	2011	Average			
Albania	7.30	2.93	3.13	2.63	4.00	3.15	0.76	2.4
Bulgaria	6.71	-5.02	1.08	2.49	1.31	5.21	5.65	6.1
Croatia	2.13	-6.84	-1.16	0.24	-1.41	2.94	5.4	1.5
Republic of Macedonia	4.71	-1.12	1.59	2.87	2.01	3.24	-2.4	0.6
Romania	9.59	-8.36	1.15	-0.14	0.56	6.33	1.6	1.04
Serbia	4.24	-3.11	1.36	2.43	1.23	9.46	-9.7	-9.9

Source: World Bank, EBRD, IMF, calculation of the authors.

The conclusions differ if these indicators were put into perspective of economic performance before the crisis, revealing feeble and fragile economic growth.

Table2. Key macroeconomic variables   (2002-2007) year

	Rate of economic growth *per capita* (%)							Average inflation rate (%)	Rate of unemployment increase (%)
	2002	2003	2004	2005	2006	2007	Average		
Albania	2.49	5.12	5.28	4.93	4.51	5.46	4.63	3.02	-2.6
Bulgaria	6.72	6.11	7.28	6.97	7.07	6.95	6.85	5.89	-10.5
Croatia	4.88	5.37	4.15	4.21	4.98	5.15	4.79	2.48	-5.42
Republic of Macedonia	0.55	2.53	4.36	4.09	4.77	5.90	3.70	1.48	3
Romania	6.69	5.50	8.69	4.42	8.13	6.20	6.60	11.7	-2
Serbia	4.17	2.94	9.56	5.72	4.01	5.83	5.37	9.37	4.3

Source: World Bank, EBRD, IMF, calculation of the authors.

4.Analysis of transmission mechanism for crisis spill-over in the SEE region

The main postulates on which the growth pattern of the SEE countries has been based before the crisis (increased demand for exports, increased inflow of remittances initially caused by increased labour demand on the European labour markets and increased outflow of workers, increased FDI inflow in the region and dramatic credit expansion to the private sector, related to a increased penetration of foreign banks in

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the domestic banking sector) where exactly the key mechanisms for European economic crisis spill over to peripheral economises.

Several economies in the region where seriously affected by underlining negative implications of the global economic crisis, compared to a small group of countries impacted by the crisis in a relatively restrained intensity. The differences in initial conditions before the crisis are the major reason for various divergences in the strength and intensity of its impact on the SEE economies. Economies diverge in the institutional framework built up in the transitional and post transitional period, as well as, the degree of integration into the world and EU economy. The economies which had success in building up a comprehensive institutional framework and have integrated more successfully into the world economy are the countries with strong economic dynamics. These economies took advantage of the possibilities created by the favourable economic environment before the crisis. On the other hand, the economies whose institutional progress has been slothful in the transitional process, characterized with incomplete and sporadic economic reforms, retained low competitiveness of their economies, political instability and low integration into the EU.

5.Econometric test

Before embarking on more thorough analysis of different initial structural conditions, as well as, its influence on transmission mechanisms of external shocks, it is useful, throughout econometric analysis to identify the relative importance of transmission channels for the overall group of countries.[1] (Appendix 1., Descriptive statistics).

OLS cross country panel regression provides for a practical approach for analysis of several determinants (FDI inflow per capita, export share as an approximation of the degree of openness of the economy and its level of competitiveness and the banking credits to the domestic private sector), as main determinants of economic growth in the period 1993-2011.

The econometric model has the following structure:

$$growth\,rate = \gamma_0 + \gamma_1 \log Export + \gamma_2 \log FDI + \gamma_3 \operatorname{Re} mit \tan ce + \gamma_4 \log Bank\,credit + \varepsilon_i$$
(1)

The right side of the equation articulate the rate of economic growth as independent variable, expressed in terms of logarithmic difference between GDP per capita in different time periods. On the right side are independent variables as determinants of economic growth for analysed group of SEE countries, in the period 1993-20011 (FDI

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[1] Six countries are included in the model: Albania, R. Macedonia, Serbia, Croatia, Romania, and Bulgaria.

inflows, exports, remittances, and bank credits to the domestic private sector and households)[2].

DEPENDENT VARIABLES: Rate of economic growth	OLS Panel regression (1)	Fixed-effects (within) regression (2)	Random-effects GLS regression (3)
INDEPENDENT VARIABLES			
Foreign Direct Investment	0.307	0.372**	0.331**
	(0.052)	(0.030)	(0.009)
Remittance	0.219***	0.180**	
	(0.074)	(0.061)	
Export	0.452***	1.295**	0.548**
	(0.0346)	(0.000)	(0.000)
Bank credit to private sector	0.099**	0.637	0.197**
	(0.251)	(0.197)	(0.125)
Constant	6.481*	3.351**	6.866**
	(0.056)	(0.125)	(0.000)
Observations	65	65	65
R-squared	0.607	0.573	0.629
Standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

The obtain regression results demonstrate the strongest influence of export on the rate of economic growth[3]. This conclusion derives from the fact that the group is comprised by small, open economies, whose growth potential was driven by expanding export activities.

$$g_t = 6.481 + 0.451 \log Ex + 0.307 \log FDI + 0.219 \operatorname{Re}mit + 0.099 \log Bank + \varepsilon_i$$
(2)

Correlation between exports and economic growth is statistically highly significant - exports increase by 1% will contributed to 0.45% increase in the rate of economic growth. This is indicated by the 1.93 coefficient of the t-statistics, with a level significance of 0.05 (statistically significant p-value of 0.000).

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[2] The database is composed by combination of sources from relevant specialised agencies and international institutions: World bank, IMF, EBRD international institution
[3] By application of OLS panel model

The inflow of FDI has the same degree of importance for economic growth, taking into consideration that these countries don't sufficiently have recourses for financing their own capital accumulation, including positive effect that FDI bring with (technology transfer, management techniques, organizing skill etc). Export growth and FDI are tightly bonded because economic activities of FDI are export oriented.

The regression results show that an increase of FDI for 1 % will increase the rate of economic growth for 0.307%, hence, the correlation is statistically significant, indicated by the t-test, 1.87, with trust interval 95%. Rather less important and low significant is the linkage between banking credits and economic growth, compared to the influence of FDI and export. The explanation could be correlated with the uncompetitive domestic private sector, the lack of business ideas, entrepreneurial activities and initiatives of the domestic economy. Unlikely the export and the FDI, the intensity of the influence of foreign remittances and banking credits towards the private sector has weaker dynamic. Growth of foreign remittances by 1% would make the economic growth more dynamic for 0.19% with a level statistical significance, t-statistic coefficient 1.85). The banking credits to the private sector are registered as the weakest transmission mechanism in SEE economies. This conclusion can be reconfirmed with the fact (using the tests for statistical significance) that banking credits are statistically insignificant, compared to the rate of economic growth in SEE countries in the analyzed period (value of t-test 0.51) i.e. the lowest range of statistical significance for the independent variable in the regression model). The statistical verification are elaborated and interpreted in details bellow in Appendix.[4]

5.1. Banking sector and credit growth

Global restriction of banking credits especially for those economics that have significant ownership of foreign banks in the domestic banking sector, represented significant transmission mechanisma in the crisis spill over towards peripheral economics in Europe. International banks in search for higher income, in the period before the crisis were highly interested in taking part, mainly through banks acquisitions, in economies with lless developed financial system. Hence, bigger banking grupations, by taking over already exiting banks, or by installing their own affiliations very easily, and for relatively short period of time, managed to expand their operations in the domestic banking sectors in many countries in SEE.

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[4]Statistical description of variables, correlation matrix, kernel density histogram and Shapiro-Wilk test for normality, specification test of the regression model, Breusch-Pagan/Cook-Weisberg test for heteroskedaticity and Cameron & Trivedi's decomposition of IM-test, Variance inflation factor test for multicollinearity.

```
      Source |      SS      df      MS          Number of obs =     30
-------------+------------------------------    F( 1,   28) =    9.41
       Model | 3.08184282    1 3.08184282       Prob > F     = 0.0048
    Residual | 9.17469139   28  .32766755       R-squared    = 0.2514
-------------+------------------------------    Adj R-squared = 0.2247
       Total | 12.2565342   29 .422639111       Root MSE     = .57242
-----------------------------------------------------------------------------
  Growth rate|   Coef.  Std. Err.    t    P>|t|   [95% Conf. Interval]
-------------+---------------------------------------------------------------
 Bank credit |  .5907125  .1926139  3.07  0.005    .1961608   .9852642
       _cons |  4.616001  .6186737  7.46  0.000    3.348706   5.883297
-----------------------------------------------------------------------------
```

Increased demand for credits and penetration of foreign banks in domestic banking sectors, as a logical answer to global financial liberalization, significantly increased the percentage of banking credits to private sector before the crisis in almost every SEE country.

In addition, we present graphical display to interpret the impact of bank credit as a factor of economic growth in the countries of SEE. As results based on econometric estimations that we have made within our research, quantify the correlation between bank credit to the private sector and economic growth, graphical presentation only visually verify econometric results.

**Bank credit to private sector, % of GDP and economic growth**
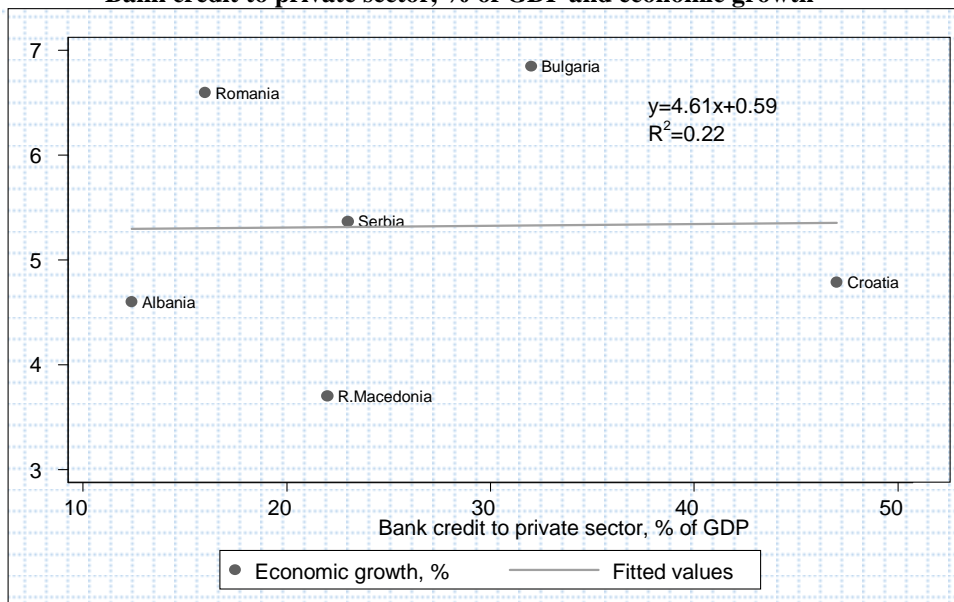
$y=4.61x+0.59$
$R^2=0.22$

The reasons for the drastic reduction of bank loans during the global crisis maybe we should try to find in the participation of foreign capital in the domestic banking sector. The countries with the larges share of foreign capital in domestic bank sector are precisely the countries that have experienced major turbulence in credit activities during the crisis. Most dramatic decline in bank loans was recorded in the Republic of Macedonia and Albania, which de facto is most represented countries with participation of foreign banks, against Turkey and Slovenia mildly significant financial impact due to domestic capital represented in the national banking sectors.

Change in credit growth,% and share of bank assets in foreign ownership (2008-2011)
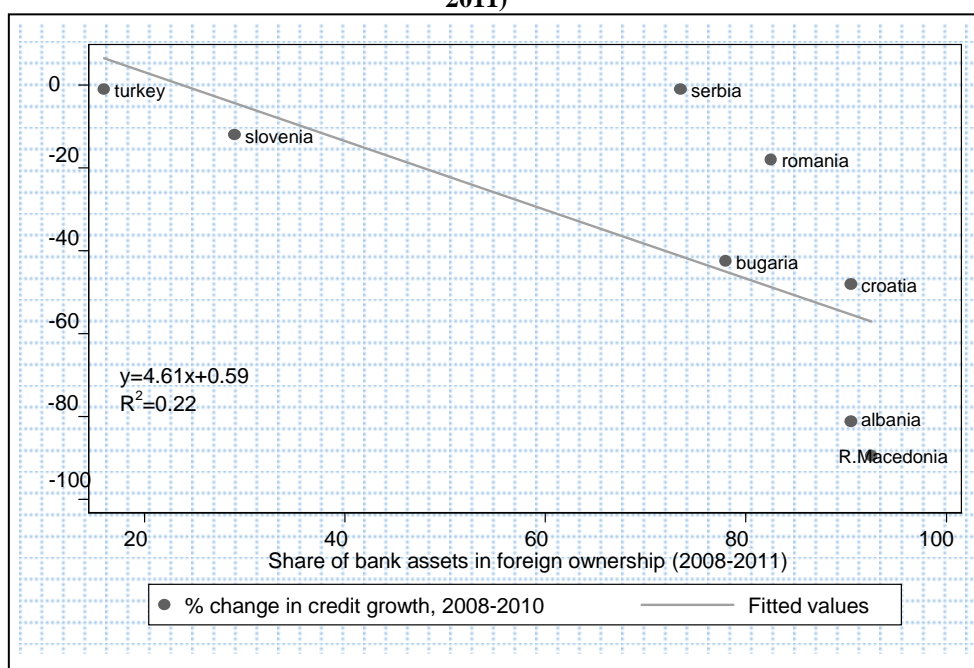
5.2.FDI and economic growth

The fact that the economic growth in larger number of SEE countries before the crisis was based on FDI, indicates the vulnerability upon the changes in the FDI flows towards their economies. One of the transmission mechanisms through which the global economic crisis has shaken up investment and growth fundamentals of peripheral economies was the drastic reduction of the FDI flows. The intensity of negative trends impact of FDI on the performance of individual economies vary greatly because of different initial conditions before the crisis. Those economies that registered the largest FDI inflows before the crisis in seeking growth, were the countries that were most affected by the global economic crisis by the drastic reduction in FDI.

```
      Source |     SS        df      MS            Number of obs =     28
-------------+------------------------------        F( 1,   26) =  22.51
       Model | 5.07776957     1 5.07776957            Prob > F     = 0.0001
    Residual | 5.86612804    26 .225620309            R-squared    = 0.4640
-------------+------------------------------        Adj R-squared = 0.4434
       Total | 10.9438976    27 .405329541            Root MSE     = .475

-----------------------------------------------------------------------------
  Growth rate |   Coef.  Std. Err.    t   P>|t|   [95% Conf. Interval]
-------------+---------------------------------------------------------        Net FDI
   inflow|  .4723533   .099568   4.74  0.000    .2676885   .6770182
     _cons |  3.902074  .5611375   6.95  0.000    2.748639   5.055508
-----------------------------------------------------------------------------
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Econometric analysis using panel regression for the period 2002-07 underscore the above dominant features of growth model of SEE economies. The results show that there is a strong statistical correlation between FDI inflows and the growth rate, whereby the increase in the net inflow of FDI per capita by 1% means increase in GDP per capita of 0.47%. The degree of determination only confirms that the econometric model that analyzes the impact of FDI on the growth rate is functional.

**Net inflow of FDI per capita (2002-2007) and economic growth (2002-2007)**
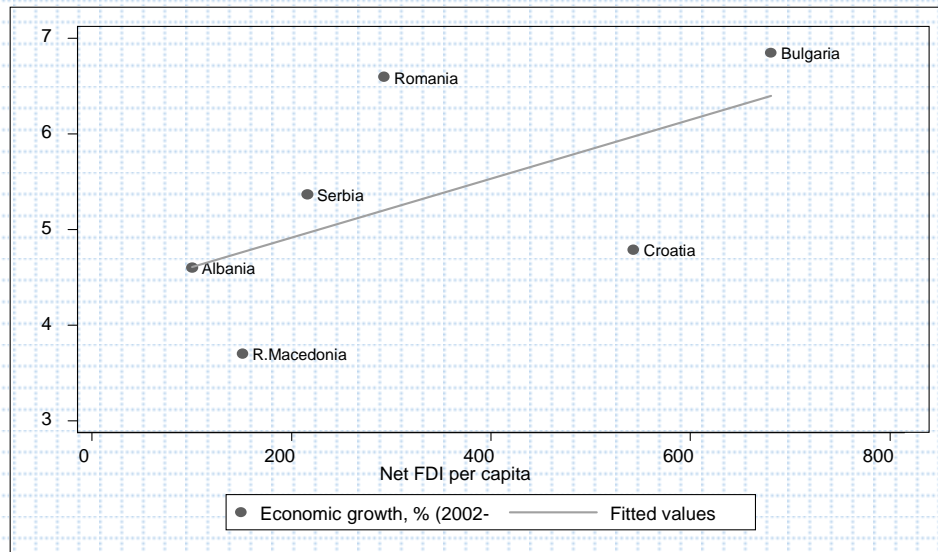
The graphical presentation on a scatter plot visualizes the positive partial correlation and interdependence between FDI inflows per capita and the rate of economic growth. The countries that have managed to attract higher levels of FDI, such as Bulgaria, Romania and Croatia are those countries that before the crisis were economies with the most dynamic growth. It could be stated also that these countries had higher degree of financial integration into the international financial markets. Unlike them, the Republic

of Macedonia and Albania, registered rather sluggish FDI *per capita* inflows, and therefore had relatively slower economic growth.

**Net FDI inflow per capita (2002-2007) and the rate of economic growth (2008-2011)**
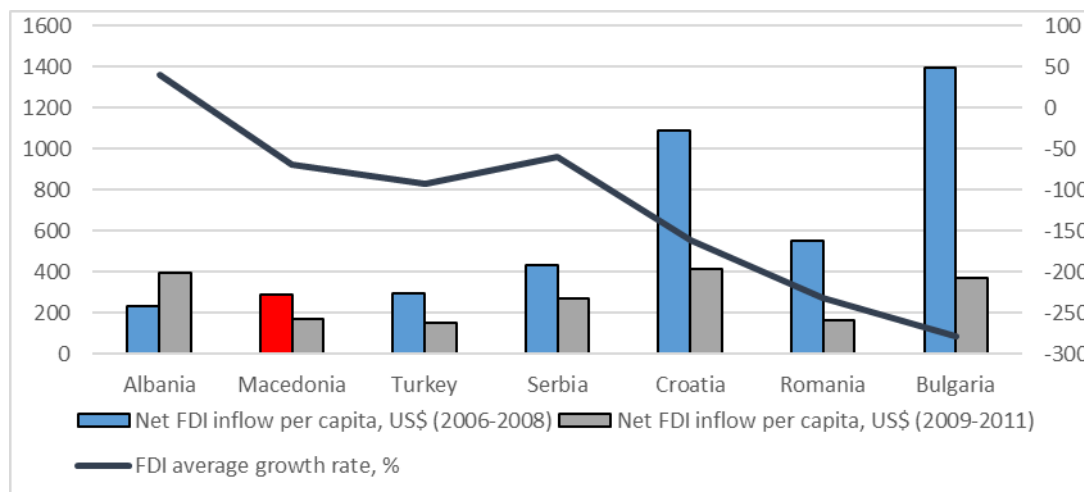
Source: EBRD и World Bank

Within the global trend of reduction in FDI as a consequence of the global economic crisis, the positive trend of FDI in SEE was virtually drastically reduced. The scatter plot represents the dependence between FDI inflows per capita in the period 2002-2007 and the average growth rate for the period after the crisis of 2008-2011.

Net FDI inflow per capita US$ (2002-2007) and the rate of economic growth (2008-2011)
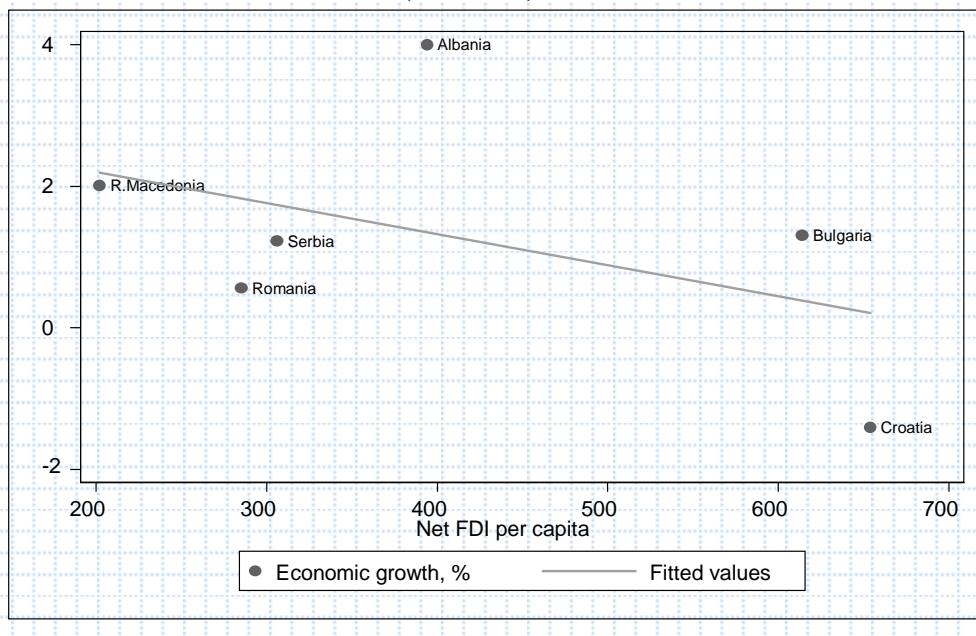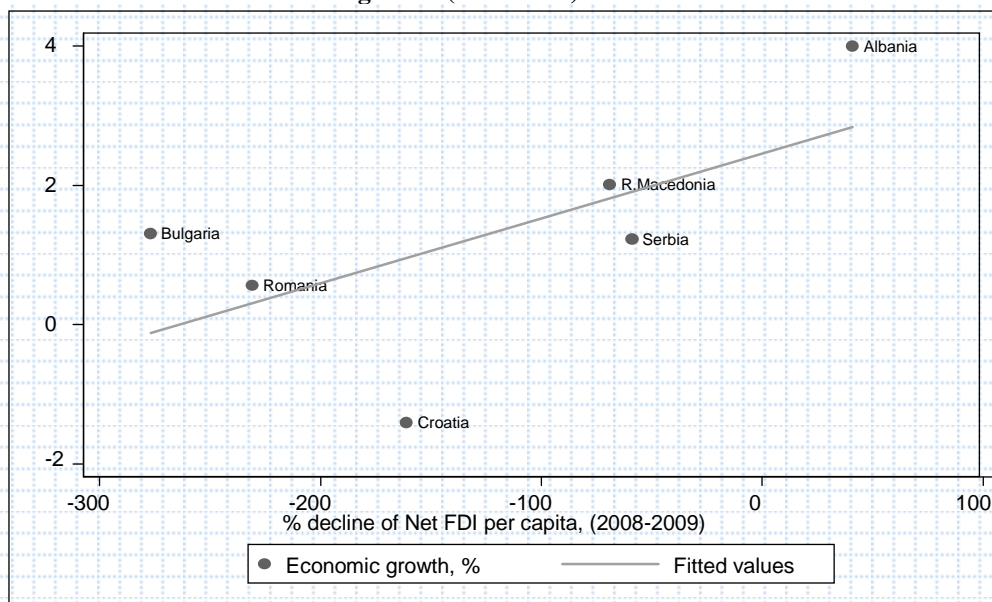

The graph below shows the negative correlation between the rate of decline in FDI and the rate of economic growth during the crisis. Countries that experienced the smallest decline in FDI had the best economic performance during the crisis.

Rate of FDI decline of FDI per capita (2008-2009) and the rate of economic growth (2008-2011)


5.3. Remittances and economic growth

Remittances are an important transmission mechanism for global economic crisis spillover in the SEE countries. The share of remittances in GDP has been traditionally relatively large, the fact that underlines the importance of remittances in maintaining the balance of payments position and domestic aggregate demand. Increased integration of SEE countries in the EU legal and economic environment, including the visa regime liberalization, widened the opportunity for intense migration of workers.The growing labor demand in EU into precrisis period and the large outflow of workers from the countries in the region contributed to a large remittances flow to these countries. Countries that have registered up word trend of remittances in the pre crisis period faced rapid decline in their volume in the period of crisis.

Net remittances inflow per capita, US$ and average percentage decline % (2008-2011)
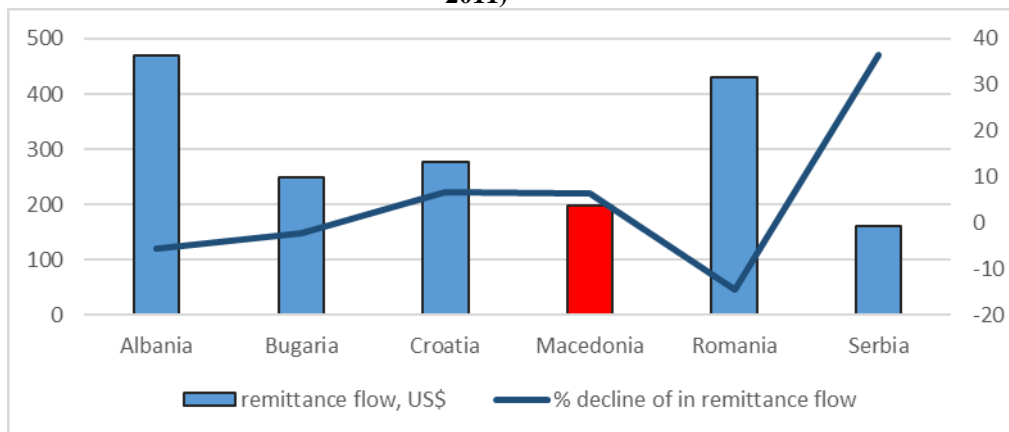

Source: World Bank remittances data base, own calculations

The importance of remittances to the economies of SEE could be analyzed by the balance of payments and the households sector consumption in correlation with the unemployment rate in SEE countries in terms of remittances. This task is difficult because besides remittances there are many factors that determinate the balance of payments and the household consumption, and in that context the identification of the individual impact of remittances is almost impossible. On the other hand, the analysis of the unemployment rate over the flow of remittances also faces many difficulties. For this purpose we are going through an integrated approach to analyze the impact of remittances as a transmission mechanism for spillover of the crisis in SEE countries by including FDI as entities that have the greatest importance in the creation of new jobs in the region having in mind the rather uncompetitive domestic economies. As you can see the Scatter plot, there is a strong negative correlation between the rate of decline in FDI inflows in SEE region in the period of crisis and the decline in the unemployment rate which is logical and expected result if we have in mind the foregoing conclusions about the importance of the FDI to the region.

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Rate of FDI decline of FDI per capita (2008-2009) and unemployment change
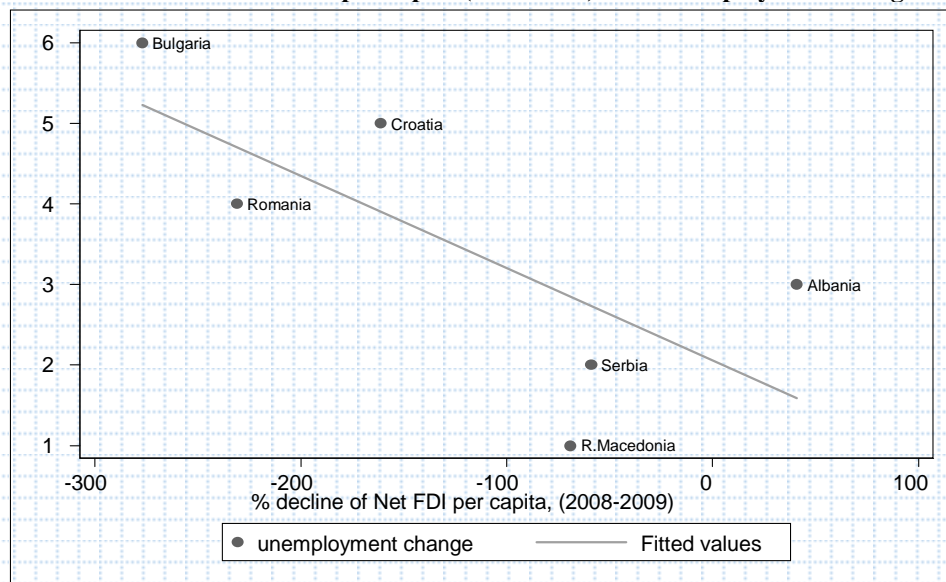
The deviations from the regression line could be explained trough the impact of demand of migrant workers and inflow of remittances as approximate variable. Albania, though only increased the inflow of FDI during the crisis, however, increased unemployment of 0.76% while Serbia recorded a significant reduction in the rate of unemployment in terms of reduced inflow of FDI and that can be explained by a significant increase in inflow of remittances indicator which reflects the migration of workers abroad. The only increase in the unemployment rate that happened in Croatia can not be explained by analysis of remittances from abroad or by FDI, which suggests that the answer must be sought elsewhere. Macedonia and Romania had different results in terms of remittances and FDI inflows during the crisis, which is also evident in the unemployment rate. The Republic of Macedonia recorded an average increase of inflow of remittances from 6.5%, while Romania dropped by 14%, on the other hand, in Macedonia FDI dropped by 69% compared to an average reduction of FDI in Romania to 231%. This suggested the reasons why Macedonia had lower average unemployment rate of 2.4%, compared to Romania, which saw an average increase in unemployment during the economic downturn of 1.6%.

5.4. Export demand and economic growth

Export demand from the EU as a major trading partner of the SEE countries is an important transmission mechanism of the crisis. The intensity of the impact of reduced export demand from the EU for the SEE countries was largely determined by the degree of trade integration of each country before the crisis.

Export as a percent of GDP and rate of decline of export in 2008-2009
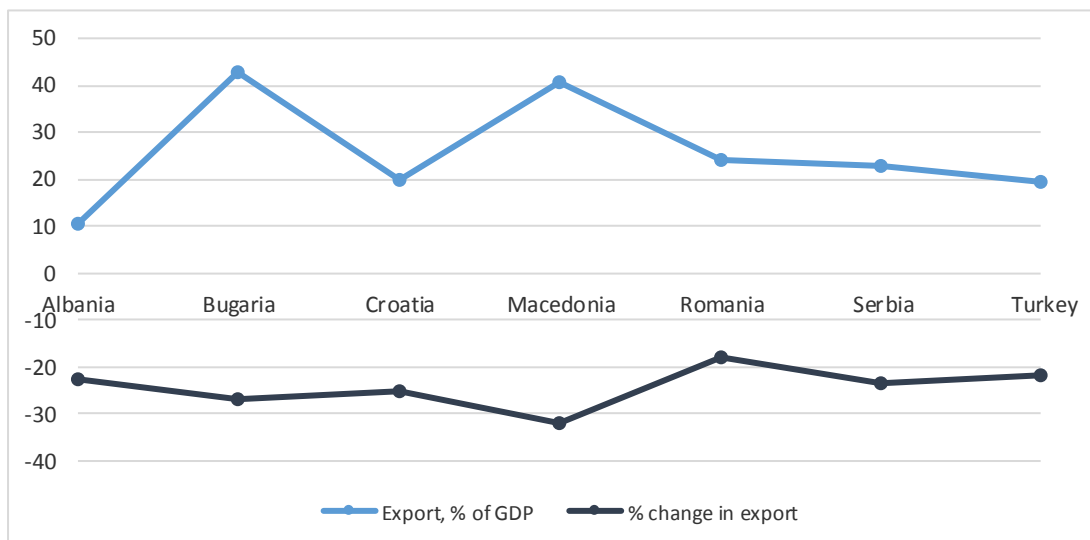
Source: World Bank remittances data base, own calculations

Economies with well built trade integration to the EU, expressed through share of exports in GDP experienced the largest decline in exports during the crisis compared to other economies in SEE.[5]

The positive correlation between the share of exports in GDP and the rate of decline in exports during the crisis is confirmed by the results of the regression that explains the reasons for the varying intensity of declining exports as share of exports in GDP.

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[5] For illustration, the Republic of Macedonia and Bulgaria as countries with the largest share of exports in GDP before the crisis saw the biggest percentage decline in export activities in the period 2008-2009, as a result of reduced export demand in the EU.
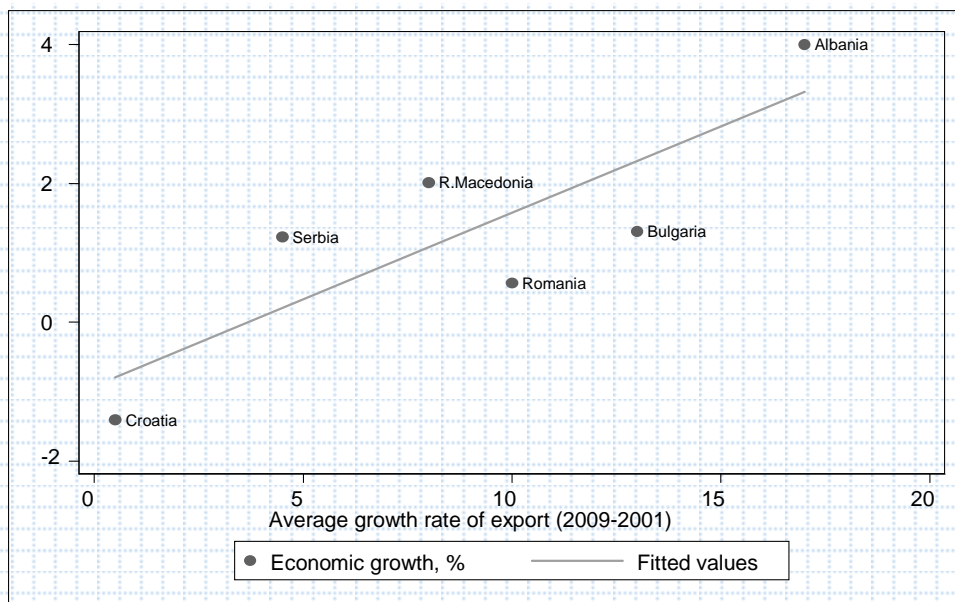
Much more important is the analysis of the role of exports as a transmission mechanism of the crisis in the countries of SEE.

```
      Source |    SS      df      MS           Number of obs =     7
-------------+------------------------------   F( 1,    5) =   3.97
       Model | 52.9534915    1 52.9534915          Prob > F    = 0.1028
    Residual | 66.6265191    5 13.3253038          R-squared   = 0.4428
-------------+------------------------------   Adj R-squared = 0.3314
       Total | 119.580011    6 19.9300018          Root MSE    = 3.6504


--------------------------------------------------------------------------
declineine~t |    Coef.  Std. Err.    t   P>|t|   [95% Conf. Interval]
-------------+------------------------------------------------------------
  exportofgdp | .2525202   .126674   1.99  0.103   -.0731056  .5781461
        _cons | 17.88859  3.545821   5.04  0.004    8.773763  27.00341
--------------------------------------------------------------------------
```

The fact that the SEE countries are heavily dependent on exports (particularly in the EU as the largest partner in the region), which is reflected by a relatively significant share of exports as a component of GDP), suggested the active role of exports in the economic performance of SEE countries.

6. Conclusions

The external shocks emanating from the crisis have caused downward output trends and macroeconomic instabilities with various amplitudes, due to different initial conditions, levels of openness and institutional response.

Some SEE economies have revealed a considerable resilience to external financial and trade shocks. Some countries of South-East Europe remain with ambiguous and fragile medium term economic prospects. Delayed reforms, low structural changes, external vulnerability, lack of foreign direct investment, declining competitiveness, high levels of corruption, seem to be accompanying the prolonged recession and aggravating the convergence towards European Union, medium and long term economic prospects.

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Appendix 1 Regression results

1) <u>OLS cross-country Panel regression</u>

```
  Source |    SS       df     MS              Number of obs =    65
---------+--------------------------          F( 4,   60) =  25.73
   Model | 78.2609653    4 19.5652413         Prob > F     =  0.0000
Residual | 45.6239529   60 .760399215         R-squared    =  0.6317
---------+--------------------------          Adj R-squared =  0.6072
   Total | 123.884918   64 1.93570185         Root MSE     = .87201
------------------------------------------------------------------------
  growth |    Coef.  Std. Err.    t    P>|t|   [95% Conf. Interval]
---------+--------------------------------------------------------------
    bank | .0997856 .1973863    0.51   0.615  -.4946169   .2950457
    remm | .2191196 .1186682    1.85   0.070  -.0182521   .4564913
     FDI | .3073478 .1641781    1.87   0.066  -.0210572   .6357528
  export | .4511741 .2338764    1.93   0.058  -.0166485   .9189966
   _cons | 6.481398 2.019203    3.21   0.002   2.442392   10.52041
------------------------------------------------------------------------
```

2) <u>Panel random effects model GLS regression</u>

```
Random-effects GLS regression          Number of obs    =    65
Group variable: ctry                   Number of groups =     6
R-sq:  within  = 0.3553                Obs per group: min =     3
       between = 0.9018                              avg =   10.8
       overall = 0.6288                              max =    15
Random effects u_i ~ Gaussian          Wald chi2(4)    =   64.11
corr(u_i, X)    = 0 (assumed)          Prob > chi2     =  0.0000
------------------------------------------------------------------------
  growth |    Coef.  Std. Err.    z    P>|z|   [95% Conf. Interval]
---------+--------------------------------------------------------------
    bank | .1968735  .247699    0.79   0.427  -.6823546   .2886075
    remm | .2035281 .1234653    1.65   0.099  -.0384595   .4455157
     FDI | .3303104  .170839    1.93   0.053  -.0045279   .6651487
```

```
    export |  .5487136   .2894097    1.90   0.058   -.018519   1.115946
     _cons |  6.866145    2.25168    3.05   0.002   2.452932   11.27936
------------+----------------------------------------------------------------
   sigma_u |  .30176697
   sigma_e |  .8389601
       rho |  .11455694   (fraction of variance due to u_i)
-----------------------------------------------------------------------------
```

3) <u>Panel fixed effects model (within) regression</u>

```
Fixed-effects (within) regression          Number of obs    =      65
Group variable: ctry                       Number of groups =       6

R-sq:  within  = 0.3681                     Obs per group: min =       3
       between = 0.7916                                     avg =    10.8
       overall = 0.5733                                     max =      15
                                     F(4,55)        =     8.01
corr(u_i, Xb)  = -0.7271                    Prob > F        =   0.0000


-----------------------------------------------------------------------------
    growth |    Coef.   Std. Err.    t   P>|t|    [95% Conf. Interval]
------------+----------------------------------------------------------------
      bank |  .6371709   .4745414    1.34   0.185   -1.588173   .3138313
      remm |  .1800461   .1372818    1.31   0.195   -.0950728   .4551649
       FDI |  .3720584   .1901791    1.96   0.056   -.009069    .7531859
    export |  1.294851   .7767348    1.67   0.101   -.2617602   2.851462
     _cons |   3.35119   5.110335    0.66   0.515   -6.890149   13.59253
------------+----------------------------------------------------------------
   sigma_u |  .68776996
   sigma_e |  .8389601
       rho |  .40193298   (fraction of variance due to u_i)
-----------------------------------------------------------------------------
F test that all u_i=0:    F(5, 55) =    1.96         Prob > F = 0.0985
```

Appendix 1 Descriptive statistics of variables

| Variable	Variable definition	Obs	Mean	Std. Dev.	Min	Max
GDP per capita	GDP per capita, US$	109	3951.572	3230.376	444.45	15694.08
GDP current price	GDP current price, US$	110	3.08E+10	3.82E+10	1.23E+09	2.00E+11
remittance, %	Remittances income, % of GDP	93	5.456022	5.648085	0.03	27.03
Bank credit, %	Bank credit to private sector, % of GDP	106	32.1516	19.61753	3.5	75.5
Growth rate	Growth rate of GDP, US$	80	5.850876	1.351952	.4252869	7.74428
Bank credit	Bank credit to private sector, US$	106	22.17766	1.654572	18.14762	25.24457
Export	Level of Export, US$	97	17.51087	1.45523	13.92526	20.26183
remittance	Remittances income, US$	93	19.99464	1.52643	16.01274	22.95167
FDI	Net FDI inflows, US$	111	15.38932	2.083547	2.302585	18.7482
Investment	Total investment in physical capital, US$	109	17.40527	1.290831	14.29859	20.25841

Appendix 2 Correlation matrix of variables

	Growth rate	Bank credit	Export	Remittance	FDI	Investment
Growth rate	1					
Bank credit	0.7366	1				
Export	0.7433	0.9266	1			
remittance	0.4672	0.5112	0.3186	1		
FDI	0.7645	0.8777	0.8159	0.5433	1	
Investment	0.7892	0.9395	0.9013	0.5451	0.876	1

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Appendix 3 Graph Matrix of relationship between dependent variable (growth rate) and independent variables (bank credit to private sector, export, remittances, FDI and investment).
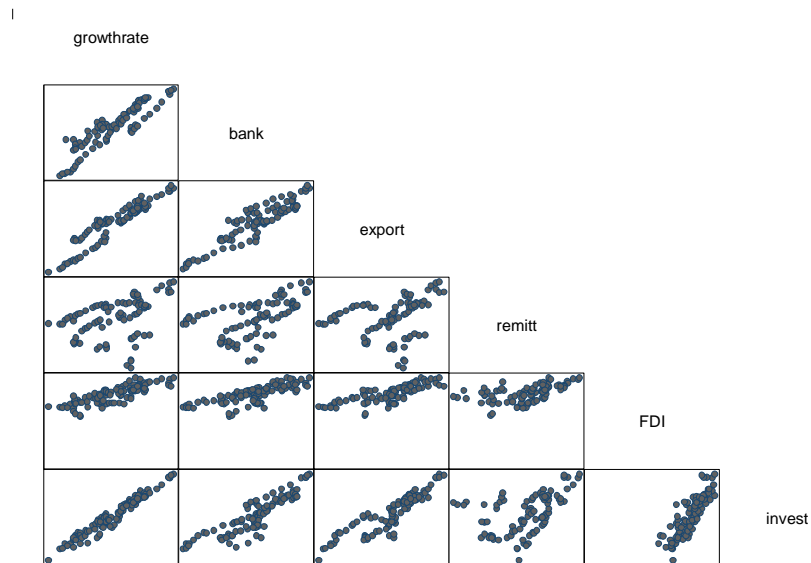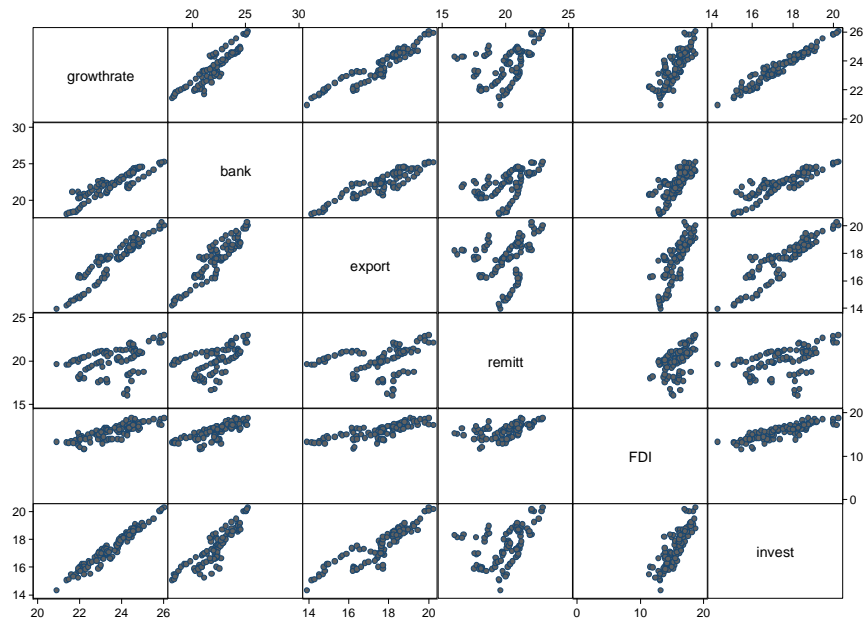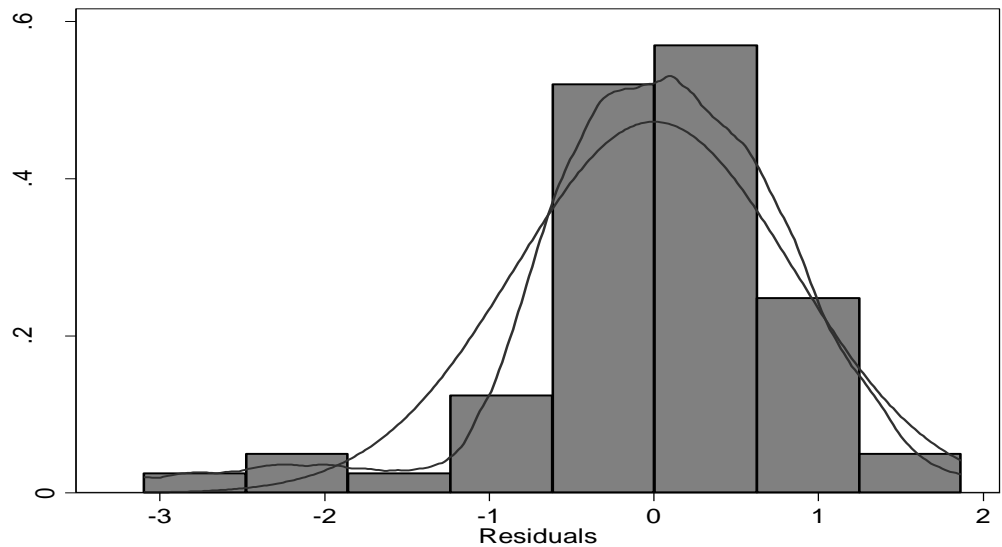
Appendix 4 A kernel density histogram as a kind of testing normality distribution of residual

A main assumption of the regression model (OLS) that guarantee the validity of all tests (p, t and F) is that residuals behave 'normal'.

A kernel density plot produces a kind of histogram for the residuals, the option normal overlays a normal distribution to compare. Here residuals seem to follow a normal distribution with skewness.

A non-graphical test is the Shapiro-Wilk test for normality. It tests the hypothesis that the distribution is normal, in this case the null hypothesis is that the distribution of the residuals is normal.

```
                        Shapiro-Wilk W test for normal data
          Variable |   Obs      W       V        z    Prob>z
          -------------+--------------------------------------------------
               e |    93   0.92983   5.454    3.748  0.009
```

The null hypothesis is that the distribution of the residuals is normal, here the p-value is 0.009 (way under the usual 0.05 threshold) therefore we failed to accept the null. The reason for not normal distribution of the residuals we have to search in presence of skeweness.

Appendix 5 Specification test of the regression model

1) Omitted variable test and

Ramsey RESET test using powers of the fitted values of growthrate
            Ho: model has no omitted variables
                 F(3, 86) =   1.42
                 Prob > F =   0.2423

The null hypothesis is that the model does not have omitted-variables bias, the p-values is 0.2423 higher that the usual threshold of 0.05, so we fail to reject the null and conclude that we do not need more variables in our regression.

2) Specification error test

```
      Source |   SS       df      MS              Number of obs =     90
-------------+------------------------------      F( 2,   87) = 529.96
       Model | 111.370181    2  55.6850904          Prob > F    = 0.0000
    Residual | 9.14150928   87  .105074819          R-squared   = 0.9241
-------------+------------------------------      Adj R-squared = 0.9224
       Total | 120.51169    89  1.35406393          Root MSE    = .32415


------------------------------------------------------------------------------
  growthrate |   Coef.   Std. Err.     t    P>|t|    [95% Conf. Interval]
-------------+----------------------------------------------------------------
        _hat | -1.75769  1.108267    -1.59  0.116   -3.960491    .4451112
      _hatsq |  .0587164  .023588     2.49  0.015    .0118327    .1056
       _cons |  32.3061  12.99869     2.49  0.015    6.469806    58.1424
```

The null hypothesis of link test is that there is no specification error. In our case the p-value of _hats q (0.015) is not significant and we fail to reject the null and conclude that our model is correctly specified and we do not need more variables by running a new regression.

Appendix 6 Testing for homoskedasticity by plotting residuals versus predicted values of regression, using Breusch-Pagan/Cook-Weisberg test and Cameron & Trivedi's decomposition of IM-test
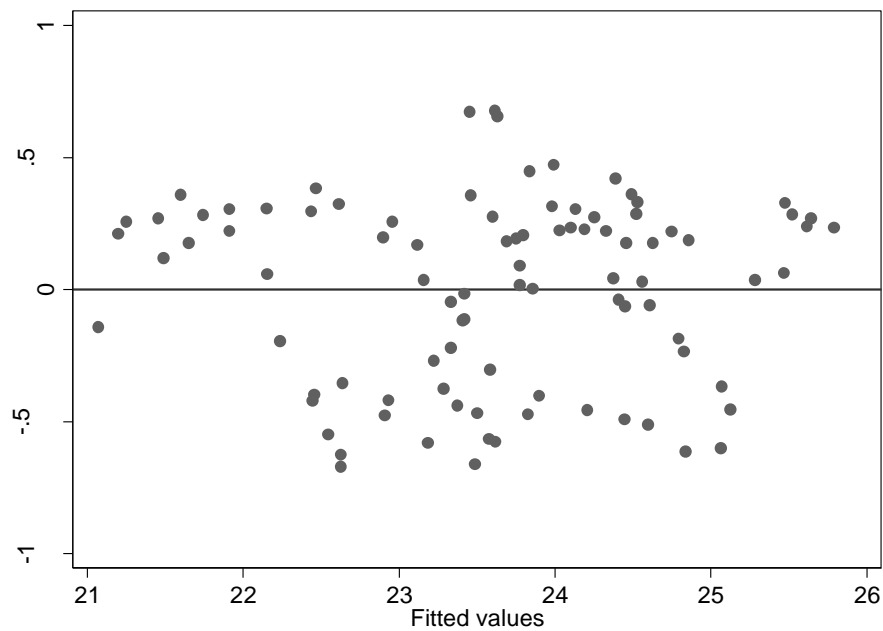
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
    Ho: Constant variance
    Variables: fitted values of growthrate
    chi2(1)   =   0.02
    Prob > chi2 = 0.8770

The null hypothesis is that residuals are homoskedastic. Here we accept the null hypothesis that the variance of the error term is constant because (the p-value 0.8770) is over the usual threshold of 0.05.
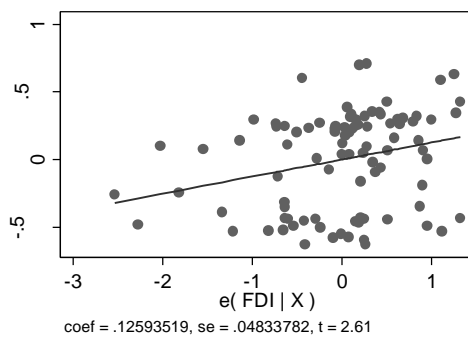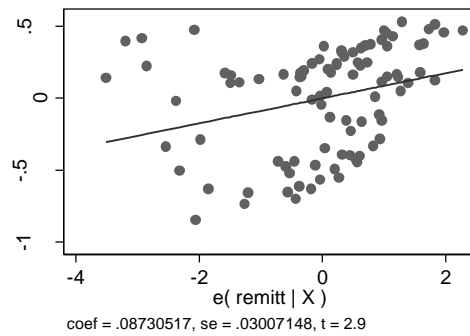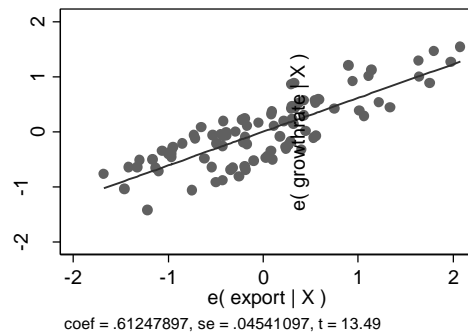
Cameron & Trivedi's decomposition of IM-test

```
----------------------------------------------------
           Source |    chi2   df     p
--------------------+-------------------------------
Heteroskedasticity |   25.29    9   0.0027
         Skewness |   14.84    3   0.0020
         Kurtosis |    9.25    1   0.0024
--------------------+-------------------------------
            Total |   49.38   13   0.0000
----------------------------------------------------
```

Appendix 7 Added variable plot to check for outliers-data points with extreme value (regress growth rate-dependent variable with each independent variables: export, remittance and FDI)

coef = .61247897, se = .04541097, t = 13.49

coef = .08730517, se = .03007148, t = 2.9

coef = .12593519, se = .04833782, t = 2.61

Appendix 8 Testing for multicollinearity by using variance inflation factor (factor of growth of variance)

An important assumption for the multiple regression model is that independent variables are *not perfectly multicolinear*.

```
    Variable |     VIF     1/VIF
-------------+----------------------
      export |   10.35   0.096644
        bank |   10.10   0.098987
         FDI |    4.08   0.244824
       remitt |   2.23   0.448553
-------------+----------------------
    Mean VIF |    6.69
```

If coefficient vif>10 or a 1/vif<0.10 it means that the variables are relate each other. In our case all variables are relate (the VIF of Export and Bank credit is 10.35 and 10.1, respectively) and (1/VIF of FDI and Remittance is 0.244 and 0.448, respectively), but there is not perfect multicolinearity in our regression model).