FDI AND ECONOMIC GROWTH IN MACEDONIA

AN EMPIRICAL INVESTIGATION

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Abstract

This paper explores the relationship between foreign direct investments (FDI) and the economic development of Macedonia. It examines whether FDI has played a positive role in the economic development, or whether levels of the economic development of the country have encouraged FDI inflows. The study uses World Bank data on the FDI and the economic growth of Macedonia over the period 1997 – 2009. Besides the bivariate analysis on the relationship between these two variables, the analysis was enriched with other factors, in order to study the links in a multivariate context. The additional variables include imports and exports, as well as measures of human capital of the recipient country, theoretically expected to be related to both FDI and the economic growth. The empirical evidence is drawn by using VAR and the Granger causality tests. The study provides significant insights on the factors affecting FDI, thereby fostering the policy making process by recommending evidence-based policies for the economic development of the country and the attraction of FDI flows.

Keywords: FDI, Economic Growth, VAR, Granger causality, imports, exports, human capital

INTRODUCTION

The economic reforms in Macedonia have been moving steadily forward, but several phenomena have negatively affected the economic growth of the country. These include corruption, lack of finance and an unclear regulatory environment, which in addition have also negatively influenced the inflow of foreign direct investments and resulted in high unemployment levels. The economic conditions at the beginning of the transition process in Macedonia were

unfavourable. The reforms that the government undertook towards an open economy, especially the privatization process, have considerably improved the economic performance of the country, resulting in considerably improved indicators and increasing trends, as well as periods of high economic growth. The GDP growth of the country recorded a sharp decline in the first few years of transition, and did not record positive figures until 1996. This is clearly shown in Figure 1. The figure also indicates that the Macedonian economy has experienced shifts in different directions in the last two decades, representing itself as an unstable economy. The initial increasing trend, although associated with modest figures of GDP growth, continued until the end of the decade, when GDP growth reached a peak of 4.5 percent. However, this trend was interrupted and a decline of about 9 percentage points was recorded at the beginning of the next decade. Several reasons remain behind this economic shrank, but the conflict in Kosovo was one of the most important ones, that directly affected foreign trade and investment, because Serbia was a major trading partner of the country. The economy recovered quickly, reaching positive figures of around 3-5 percent during 2003 - 2006 and exceeding these figures in 2007 and 2008. Because of global economic downturn, the economy shrank again in 2009.

Figure 1. GDP growth and GDP per capita growth in Macedonia in 1991 - 2009
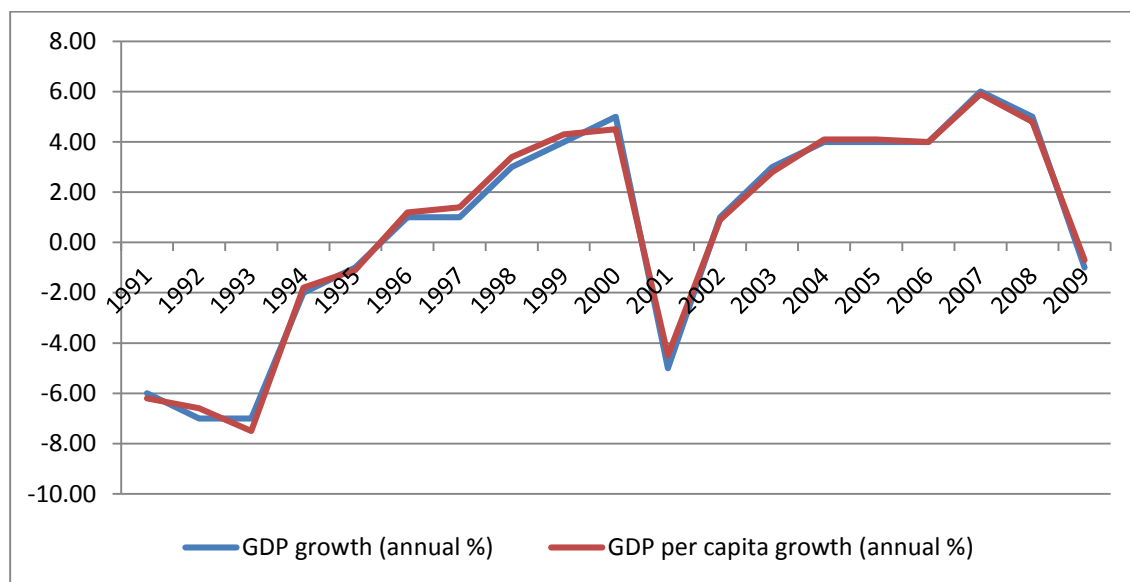
Source: World Bank

Balkan is one of the less stable regions in the world, with little inspiration for capital investment and foreign ownership. Macedonia is part of this peninsula, but given the general expectations about what affects foreign investors' decisions, there is still quite a road ahead. Vaknin (2006) suggests that GDP, the rates of inflation and of interest, the living standards, the available

infrastructure, and the banking system are not the first question to be asked by them. Instead, foreign investors need to know about the property rights, the role of the state and the court, the legislation in vigour, the crime rate and its persistency, the characteristics of the people, officials and politicians, bureaucracy, the ease of doing business and similar issued that would affect the foreign investor in the longer term. Data suggests that Macedonia has lacked behind in projecting a friendly- to-business country to foreign businesses, although given the lack of domestic capital and a low level of domestic savings, FDI is considered as a crucial component for supporting the transition process and a sustainable economic growth in the long run. Nevertheless, a considerable number of international companies from different countries have started operations in Macedonia.

The transition period of the Republic of Macedonia has been associated with several external shocks affecting the socio-economic activity of the country. Despite of the need for foreign investments, Macedonia is one of the transition countries that has attracted lower levels of FDI compared to other transition economies. The process of liberalization of foreign trade noticed some important progress in 2001 with the Stabilization and Association Agreement with EU that ensured duty-free access to European markets for the majority of the goods, provided extended autonomous trade preferences and provided very liberal access to EU markets; in 2003, when the country accessed the WTO, and another important step in 2006 when it joined the regional CEFTA. Nowadays, foreign trade accounts for more than 90 percent of GDP, a level that surely exposes the country to external developments.

In the early years after the independence the FDI inflows were very modest. During the 1990s, the majority of foreign investments were in the manufacturing and construction sectors, but most recent inflows have been invested in the service sector. The vast majority of FDI has been privatisation-related, a process that is now almost complete. However, once the privatisation process started, the inflow increased noticeably, reaching a peak of USD 447 million in 2001.According to the Statistical Bureau and the National Bank of the Republic of Macedonia, the cumulative value of FDI in the Republic of Macedonia at the end of 2002 was equivalent to approximately USD 106 million, the majority being accounted for by privatization deals transacted through the Macedonian Stock Exchange. The trend showed constant increase until 2004 reaching USD 323 ml. In 2005, an FDI inflow worth of USD 97 million was recorded. The trend recovered dramatically in 2006 reaching USD 225 million mainly due to the sale of the Electric Power Company. In 2007, the FDI inflow increased to USD 699 million followed by a sharp decrease in the subsequent years.

Figure 2. FDI inflows in the transition years in Macedonia
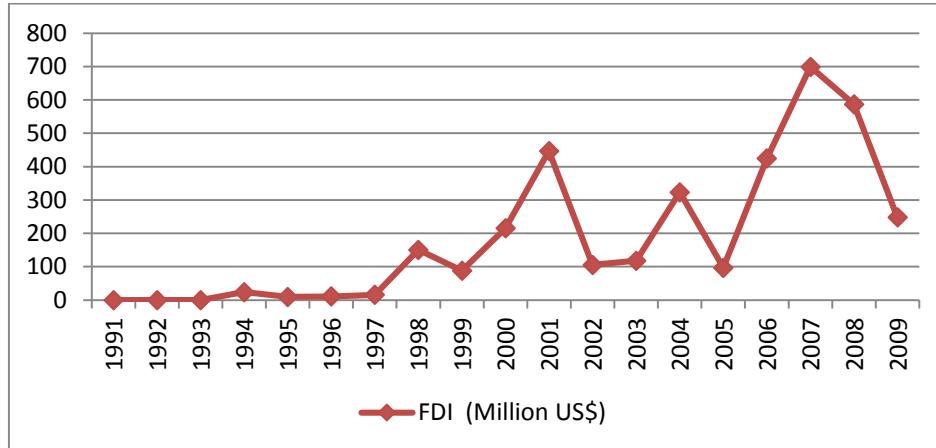
Source: World Bank

LITERATURE REVIEW

A vast of literature on FDI and economic growth points to a positive relationship between the two. However, a few explanations are provided in support to this evidence. Theoretically, economic growth may encourage FDI inflow when FDI is seeking consumer markets, or when growth leads to greater economies of scale. FDI may also indirectly affect economic growth through its impact on capital stock, technology transfer, skill acquisition or market competition.

The relationship between economic growth and FDI has attracted the attention of many researchers and policymakers through the years. Evidence suggests that FDI can stimulate economic growth through different channels, which have been the focus of the theoretical analysis of different authors such as Solow (1956), MacDougall (1960), Kemp (1961) and Diamond (1965), among others. Empirical evidence was sought with regard to the effect of FDI on the economic growth of developing countries through its effect on the productivity levels (Stoneman, 1975), through the impact on the technological progress (Findlay, 1978) or via international trade, imports and exports (Bhagwati, 1978; Balasubramanyam et al., 1996).

The theoretical developments in the field as well as the dynamics of the developing economies, pointing out both positive and negative effects of FDI in the economic performance of the receiving countries, revealed the need to empirically study which of these effects prevail. Using cross-sectional data and OLS regressions for 46 developing countries over the period 1970 to 1985, Balasubramanyam et al. (1996) estimated the FDI effects on economic growth. Although the results may not be reliable due to the use of the OLS regression and the two-way causality between FDI and economic growth, they found that FDI has positive spill-overeffects on economic growth, but these effects are stronger in countries that adopt export-promoting

policies compared to import substituting economies. Olofsodotter (1998) also used OLS on cross-section data for 50 developing and developed countries for the period 1980to1990 and found that the FDI stock has a positive effect on the economic growth rate, the effect being stronger for host countries with a higher level of institutional capability.

Borensztein et al (1998) also used cross-section data, for an extended panel of 69developing countries for the period 1970 to 1989. They used seemingly unrelated regression and found that FDI has a positive effect on economic growth, and that the magnitude of the relationship depends on the quality of the human capital of the host country. De Mello (1999) used time series and fixed-effects on a sample of 32 developed and developing nations for the estimation of the impact of FDI on capital accumulation and output growth in the recipient economy. The results indicate that FDI can lead to better technology and enhanced management in the host country. However, the evidence was relatively weak on whether FDI affects the economic growth. Similar conclusions reached Choe (2003) when analyzing 80 countries by using the panel data causality tests.

Carkovic and Levine (2002) used the GMM technique to analyze the relationship between FDI inflows and economic growth on a panel dataset covering 72 developed and developing countries. They found no evidence on the impact of FDI on economic growth. Bangoa and Sanchez-Robles (2003) examined the relationship between FDI, economic freedom and economic growth in Latin America. They conclude that FDI has a significant positive effect on host country economic growth but similar to Borensztein et al. (1998) the magnitude depends on host country conditions.

Basu et al. (2003) used a panel of 23 countries from different continents and found a co-integrated relationship between FDI and GDP growth. Their results emphasised trade openness as a crucial determinant for the impact of FDI on growth. They found two-way causality between FDI and GDP growth in open economies, both in the short and the long run. However, in relatively closed economies the long run causality is unidirectional from GDP growth to FDI. This evidence was further supported from the results of Trevino and Upadhyaya (2003) in their study of five developing countries in Asia, who found that the positive impact of FDI on economic growth is greater in more open economies. Johnson (2006) estimated the relationship between FDI and economic growth for a panel of 90 countries and found that FDI inflows positively affect economic growth in developing economies, but not in developed economies.

Chowdhury and Mavrotas (2006) took a different route by testing for Granger Causality using data from 1969-2000, and found that FDI did not Granger-cause GDP in Chile, whereas there is a bi-directional causality between GDP and FDI in Malaysia and Thailand. Hansen and Rand (2006) found strong causal link from FDI to GDP for a group 31developing countries

during 1970-2000. Bloomstrom et al. (1994) found that FDI Granger caused economic growth, conditional on the richness of the country. Hsiao and Hsiao (2006) has examined the Granger causality relations between GDP, exports, and FDI among eight rapidly developing East and Southeast Asian economies using panel data from 1986 to 2004. For the individual country time series causality tests, they did not find systematic causality among GDP, exports, and FDI variables. However, the panel data causality results reveal that FDI has unidirectional effects on GDP directly and indirectly through exports, and there also exist bidirectional causality between export and GDP.

METHODOLOGY

In addition to the variables discussed in the previous section: GDP growth and GDP per capita growth and the net inflows of FDI, the empirical analysis will also be extended to multivariate contexts by including other factors that are related to economic growth and FDI. These variables include employment as a percentage of total population, secondary school enrolment as a proxy for human capital and the share of the sum of export plus imports to GDP as a proxy for trade openness of the country. Although the theory is very rich in factors of these kinds, the selection of the variables that will be considered in this analysis is restricted because of non-availability of data on a range of other variables or availability of a limited number of observations (years). The consideration of these limited data would result in a very low of observations for the multivariate analysis, and thus, the empirical results would have been unreliable. The frequency of the data considered for the empirical analysis is annual.

The analysis begins with stationarity tests of the series under consideration. As Nelson and Plosser (1982) argue, macroeconomic time-series data are usually non-stationary. The results of the unit root tests would be used in deciding the integration range of the series, and thus to avoid spurious regression. Three separate methods for the stationarity test are employed in this study. First, we conduct an Augmented Dickey-Fuller (ADF) test by carrying out a unit root test based on the structure in (3):

$$\Delta X_t = \kappa + \rho \cdot t + \theta_i \cdot X_{t-i} + \sum_{i=1}^{n} \varphi_i \cdot \Delta X_{t-i} + \varepsilon_t$$

Where, X is the variable under consideration, Δ is the first difference operator, t captures any time trend, ε_t is a random error, and n is the maximum lag length. The optimal lag length is identified so as to ensure that the error term is white noise. If we cannot reject the null

hypothesis $\theta=0$, then we conclude that the series under consideration has a unit root and is therefore non-stationary. In addition, Dickey-Fuller GLS and the Phillips-Perron tests (Phillips, 1987; Phillips-Perron, 1988) were also performed.

The results of the stationarity tests are reported in Table 1 in the Appendix. The unit root tests on the levels of each variable reveal the corresponding series to be non-stationary for all countries. Analogous tests on the first-difference measures of the variables, however, reveal both series to be integrated in the first order and, hence, stationary at the first-difference level. These results also suggest that first-differences of the respective series must be used in the Granger causality tests.

ANALYSIS AND RESULTS

Before proceeding with the Granger causality test, we first estimate a vector autoregression model, taking into account the number of degrees of freedom that in our case due to data limitations is fairly small. The results of this estimation are presented in Table 2 in the Appendix. The results of the Granger tests are presented in Table 3 in the Appendix. Starting with the tests for the first equation, the first is a Wald test that the coefficients on the two lags of the first difference of the (natural) logarithm of the FDI that appear in the equation for the first difference of the growth of GDP are jointly zero. The null hypothesis that D1GDP does not Granger-cause D1LNFDI cannot be rejected. The same can be said for the Granger causality of D1LNFDI onD1GDPG, tested in the second equation. Thus, the results indicate that these variables do not Granger cause each other. The same analysis is carried for the relationship between the per capita annual growth of the GDP and the FDI flows. As expected (because of the previous results), the results indicate that these variables do not Granger cause each other. These results are presented in Table 4 in the Appendix.

Hence, the results of the Granger causality test carried out above do not support any FDI-growth causal relationship. Growth seems not to significantly affect FDI and likewise, FDI seems not to affect growth. Possible explanations on the lack of causality between FDI and GDP can be found in the way these two variables affect each other, shortly discussed in section 2. A more thorough discussion can be found in Carcovic and Levine (2002) and Ayanwale (2007). It is possible that foreign investors are not much interested in investing in countries that perform economically well, rather than in countries that provide good business climate, have good business legislation, where courts and other institutions perform well, where the education, culture and tradition of the people fulfils their expectations and favours their business perspectives. Furthermore, recent research has pointed out the differences on the impacts

between FDI and remittances, both considered and defined as inflows of money. The main reason behind this difference may be the use of the profit of the international firms out of the recipient country. An additional caveat to FDI is the possibility of international firms to pay higher wages in comparison to national firms. This leads to employment of the brightest professionals of the country, thus negatively affecting the performance of the national firms. These reasons, among others, may jeopardize any positive effects that FDI per se may have on economic growth. However, it is also possible that the nature of this relationship is influenced by other institutional and economic factors, some of which are explored below.

Due to the limitations of the data, namely the low number of observations because of unavailability, it is almost impossible to get reliable results if in the new model we will include shorter series. For this reason, we decided to include the imports and exports (as shares of GDP) for which we have full series, and will have the same number of observations, thus lowering the degrees of freedom of the VAR model only due to increased number of variables. The results of the Granger-causality tests for this estimation are presented in Table 5 in the Appendix. They indicate that neither GDP, nor FDI are Granger caused by the import and export variables. These results indicate that only exports and imports Granger cause each other. We conclude the same, even when considering the per capita GDP Growth instead of the GDP growth.

However, enriching the analysis with proxies of human capital significantly changes the results. Unit root tests were also carried out for the secondary school enrolment rates, and the series was differentiated once to be stationarity. The results of the VAR regression are presented in Table 6, the respective diagnostics and the selection-order and optimal lag criteria in table 7, and the Granger causality tests in the Table 8 in the Appendix. As it can be seen from the figures in this table, enriching the analysis with human capital variables results in significant two-way causality between GDP growth and FDI. GDP growth affects the FDI in the horizon of two years, while the feedback from FDI to GDP is realized in a one-year lag. The signs of the relationship also vary. The FDI has a positive impact on the GDP growth, while the effect of an increase in the GDP of the country has a negative effect on the FDI inflows. The other variables do also Granger-cause each other, but their relationship is beyond the interests of this study, but it is interesting to note that there is an insignificant effect of the human capital proxy on the economic growth, which suggests that there is a shortage of skilled labour in the country. However, when considering these results for policy implication it must be taken into account that this analysis draws upon a small number of observations and thus, on a low number of degrees of freedom.

CONCLUDING REMARKS

This study aimed at exploring empirical the relationship between FDI and GDP growth in Macedonia. Data were collected from prestigious international institutions such as the World Bank. The results vary among different specifications suggesting that in general FDI does not contribute to Macedonia's economic growth, and vice versa. This result holds for two specifications, the bivariate one and another controlling for trade variables only. However, there is a significant change in the results when a human capital proxy is added to the model. The results of this latter model suggest that FDI has a positive effect economic growth of the country, suggesting that the business climate is healthy. However, the changes in the results because of an additional variable included in the analysis, namely the human capital variable, is an indicator of the lack of robustness of the results, which can be argued mainly on the basis of small sample size.

Given some of the previous results, one can conclude that, since FDI is expected to positively affect economic growth, it needs to be encouraged. Nevertheless, the sectors of main interest, those that have the highest potential for contributing to growth, need to be identified and the FDI needs to be properly channelled and integrated into the mainstream of the economy. This latter issue may be relevant and an issue of interest for future research in the field, not only enriching the pool of academic studies on FDI and its impacts on the economy of the country, but also in fostering the policy decision-making process with more appropriate recommendations. Finally, in terms of future research, it is important to enrich the number of observations, not only by using more years, but also by using higher frequency data. This would increase the reliability of results, but more importantly, it would add to the investigation of short run dynamics of the relationship between FDI and economic growth in Macedonia.

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APPENDICES

Table 1. Unit root tests

Test	Variable	Level	P-value for z(t)	First Diff.	P-value for z(t)
Augmented DF (no trend)	FDI (in million US$)	-2.608	0.658	-2.946**	0.040
	Ln(FDI)	-1.886	0.339	-2.891**	0.046
	Annual GDP Growth	-2.271	0.182	-3.165**	0.022
	Annual Growth of GDP per capita	-2.235	0.194	-2.967**	0.038
Augmented DF (with trend)	FDI (in million US$)	-2.388	0.386	-2.580*	0.097
	Ln(FDI)	-2.202	0.489	-2.891**	0.046
	Annual GDP Growth	-2.201	0.489	-3.576**	0.031
	Annual Growth of GDP per capita	-2.283	0.443	-3.432**	0.047
Philips-Perron	FDI (in million US$)	-1.955 (2)	0.307	-4.271*	0.001
	Ln(FDI)	-2.017 (2)	0.279	-6.036*	0.000
	Annual GDP Growth	-2.165 (2)	0.219	-4.573*	0.000
	Annual Growth of GDP per capita	-2.140 (2)	0.229	-4.347*	0.000
			Critical value at 5%		**Critical value at 5%**
DF-GLS	FDI (in million US$)	-3.318 (1)	-3.476	-0.125 (6)	-4.391
	Ln(FDI)	-1.354 (1)	-3.476	-1.721 (2)	-3.151
	Annual GDP Growth	-2.264 (1)	-3.476	-2.794 (1)	-3.421
	Annual Growth of GDP per capita	-2.209 (1)	-3.476	-2.659 (1)	-3.421

* minimum number of lags in brackets

Table 2. VAR Results

```
Sample:  1994 - 2009                     No. of obs     =        16
Log likelihood = -64.83649               AIC            =  9.354561
FPE          =   41.34953                HQIC           =  9.379288
Det(Sigma_ml) =  11.34534                SBIC           =  9.837429

Equation          Parms     RMSE     R-sq      F        P > F
-----------------------------------------------------------------
D1GDPG               5     4.14428  0.1243   .3904525   0.8113
D1LNFDI              5     1.23824  0.2811   1.075292   0.4145
-----------------------------------------------------------------

-----------------------------------------------------------------------
          |     Coef.   Std. Err.      t     P>|t|    [95% Conf. Interval]
----------+------------------------------------------------------------
D1GDPG    |
    D1GDPG|
      L1. |  -.3408814  .3354533   -1.02   0.331   -1.079209    .3974464
      L2. |  -.2631273  .3378196   -0.78   0.452   -1.006663    .4804086
          |
   D1LNFDI|
      L1. |   .2265998  .9825084    0.23   0.822   -1.935887   2.389086
      L2. |   .5044757  .9802156    0.51   0.617   -1.652964   2.661916
          |
     _cons|   .5311393  1.284909    0.41   0.687   -2.296926   3.359205
----------+------------------------------------------------------------
D1LNFDI   |
    D1GDPG|
      L1. |   .0670282  .1002276    0.67   0.517   -.1535713   .2876276
      L2. |   .0591699  .1009346    0.59   0.570   -.1629856   .2813255
          |
   D1LNFDI|
      L1. |  -.5645951  .2935564   -1.92   0.081   -1.210708   .0815181
      L2. |  -.3548066  .2928713   -1.21   0.251    -.999412   .2897989
          |
     _cons|   .6204472  .3839084    1.62   0.134   -.2245294   1.465424
----------------------------------------------------------------------
```

Table 3. Granger causality Wald tests for the relationship between first differences
of GDP growth and the first difference of (ln) FDI

```
+--------------------------------------------------------------------+
|       Equation          Excluded |    F    dfdf_rProb> F |
|---------------------------------+----------------------------------|
|       D1GDPG            D1LNFDI | .13256    2     11    0.8772  |
|       D1GDPG                ALL | .13256    2     11    0.8772  |
|---------------------------------+----------------------------------|
|       D1LNFDI            D1GDPG | .29839    2     11    0.7478  |
|       D1LNFDI               ALL | .29839    2     11    0.7478  |
+--------------------------------------------------------------------+
```

Table 4. Granger causality Wald tests for the relationship between first differences of GDP
growth per capita and the first difference of (ln) FDI

```
+--------------------------------------------------------------------+
|       Equation          Excluded |    F    dfdf_rProb> F |
|---------------------------------+----------------------------------|
|      D1GDPGPC           D1LNFDI | .07874    2     11    0.9248  |
|      D1GDPGPC               ALL | .07874    2     11    0.9248  |
|---------------------------------+----------------------------------|
|       D1LNFDI          D1GDPGPC | .29778    2     11    0.7483  |
|       D1LNFDI               ALL | .29778    2     11    0.7483  |
+--------------------------------------------------------------------+
```

Table 5. Granger causality Wald tests for the extended model with (first differences)
of import and export shares

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+--------------------------------------------------------------------+
|       Equation          Excluded     |   F    dfdf_rProb> F |
|---------------------------------+----------------------------------|
|       D1GDPG            D1LNFDI| .00171    2     7    0.9983  |
|       D1GDPG            D1EXPORT | .04776   2     7    0.9537  |
|       D1GDPG            D1IMPORT | .9331    2     7    0.4373  |
|       D1GDPG                ALL | .7382     6     7    0.6363  |
|---------------------------------+----------------------------------|
|       D1LNFDI            D1GDPG | 1.1246    2     7    0.3771  |
|       D1LNFDI          D1EXPORT | .0951     2     7    0.9104  |
|       D1LNFDI          D1IMPORT | .05945    2     7    0.9428  |
|       D1LNFDI               ALL | .82038    6     7    0.5874  |
|---------------------------------+----------------------------------|
|       D1EXPORT           D1GDPG| .98515    2     7    0.4198  |
|       D1EXPORT          D1LNFDI | 1.3313    2     7    0.3236  |
|       D1EXPORT         D1IMPORT | 5.1809    2     7    0.0416  |
|       D1EXPORT              ALL | 1.9908    6     7    0.1943  |
|---------------------------------+----------------------------------|
|       D1IMPORT           D1GDPG | .21347    2     7    0.8128  |
|       D1IMPORT          D1LNFDI | .95807    2     7    0.4288  |
|       D1IMPORT         D1EXPORT | 6.2362    2     7    0.0279  |
|       D1IMPORT             ALL| 2.4801    6     7    0.1301  |
+--------------------------------------------------------------------+
```

Table 6.VAR extended model with (first differences) of import and export shares,
and secondary school enrollment

```
Sample:  1996 - 2009                              No. of obs     =        14
FPE          = -1.64e-27
Det(Sigma_ml) = -4.09e-32

Equation          Parms      RMSE     R-sq      chi2    P>chi2
------------------------------------------------------------------
D1GDPG              11      3.44294   0.8148   61.58751   0.0000
D1LNFDI             11      .452673   0.9546   294.1541   0.0000
D1EXPORT            11      5.45381   0.7551   43.16549   0.0000
D1IMPORT            11      5.64809   0.8520   80.62638   0.0000
D1SCH               11      .480248   0.9165   153.6516   0.0000
------------------------------------------------------------------


------------------------------------------------------------------------------
            |    Coef.    Std. Err.     z    P>|z|    [95% Conf. Interval]
------------+-----------------------------------------------------------------
D1GDPG      |
     D1GDPG |
        L1. | -.3114531   .2979998   -1.05   0.296   -.8955219    .2726158
        L2. |  -.500174   .3304477   -1.51   0.130    -1.14784    .1474917
            |
    D1LNFDI |
        L1. |   2.42464   .7831581    3.10   0.002    .8896785    3.959602
L2. |    .697191   .4368383    1.60   0.110   -.1589962    1.553378
            |
   D1EXPORT |
        L1. |  .4751256   .2715594    1.75   0.080   -.0571212    1.007372
        L2. | -.9123104    .247218   -3.69   0.000   -1.396849    -.427772
            |
   D1IMPORT |
        L1. | -.5969633   .2138411   -2.79   0.005   -1.016084   -.1778424
        L2. |  .4854288   .2416713    2.01   0.045    .0117618    .9590958
            |
      D1SCH |
 L1. | -1.838855     1.1366   -1.62   0.106   -4.066551     .38884
        L2. |  .6234459   1.360916    0.46   0.647     -2.0439    3.290791
            |
      _cons |  1.080217   .9898414    1.09   0.275   -.8598361    3.020271
------------+-----------------------------------------------------------------
D1LNFDI     |
     D1GDPG |
        L1. |  -.142583   .0391806   -3.64   0.000   -.2193757   -.0657904
        L2. | -.2098954   .0434469   -4.83   0.000   -.2950497   -.1247411
            |
    D1LNFDI |
        L1. | -.3676674   .1029686   -3.57   0.000   -.5694822   -.1658526
        L2. | -.2082803   .0574349   -3.63   0.000   -.3208507   -.0957099
            |
   D1EXPORT |
        L1. |   .367599   .0357043   10.30   0.000    .2976199    .4375782
        L2. | -.0862087   .0325039   -2.65   0.008   -.1499152   -.0225022
            |
   D1IMPORT |
        L1. | -.1746633   .0281156   -6.21   0.000   -.2297688   -.1195578
        L2. |  -.048703   .0317746   -1.53   0.125   -.1109802    .0135741
            |
      D1SCH |
        L1. |  .8663162   .1494388    5.80   0.000    .5734216    1.159211
        L2. | -.5918316   .1789315   -3.31   0.001   -.9425308   -.2411323
            |
      _cons |  .5861949   .1301431    4.50   0.000    .3311191    .8412707
------------+-----------------------------------------------------------------
D1EXPORT    |
     D1GDPG |
        L1. |  1.145959    .472049    2.43   0.015    .2207601    2.071158
        L2. |   .524207   .5234484    1.00   0.317   -.5017331    1.550147
```

```
               |
      D1LNFDI  |
          L1.  |  -.2777676   1.240568    -0.22   0.823    -2.709236    2.153701
          L2.  |  -1.776758    .6919771   -2.57   0.010    -3.133008   -.4205074
               |
     D1EXPORT  |
          L1.  |   .9517878    .4301659     2.21   0.027     .1086781    1.794898
          L2.  |   .0499915    .3916076     0.13   0.898    -.7175453    .8175283
               |
     D1IMPORT  |
          L1.  |  -1.042128    .3387368    -3.08   0.002    -1.70604    -.3782162
          L2.  |  -.0069846    .3828213    -0.02   0.985    -.7573007    .7433314
               |
        D1SCH  |
          L1.  |  -3.750527    1.800441    -2.08   0.037    -7.279326   -.2217284
          L2.  |   4.838245    2.155769     2.24   0.025     .6130147    9.063475
               |
         _cons |   1.409599    1.567966     0.90   0.369    -1.663558    4.482756
--------------+----------------------------------------------------------------
D1IMPORT      |
       D1GDPG  |
          L1.  |   .9236413    .4888644     1.89   0.059    -.0345154    1.881798
          L2.  |   .7975183    .5420948     1.47   0.141    -.2649681    1.860005
               |
      D1LNFDI  |
          L1.  |  -.8892591    1.28476     -0.69   0.489    -3.407342    1.628824
          L2.  |  -1.957886    .7166269    -2.73   0.006    -3.362449   -.5533232
               |
     D1EXPORT  |
          L1.  |   1.64632     .4454894     3.70   0.000     .773177     2.519463
          L2.  |  -.0238336    .4055576    -0.06   0.953    -.8187118    .7710446
               |
     D1IMPORT  |
          L1.  |  -1.74681     .3508034    -4.98   0.000    -2.434372   -1.059248
          L2.  |  -.0456977    .3964583    -0.12   0.908    -.8227417    .7313463
               |
        D1SCH  |
          L1.  |  -5.732395    1.864577    -3.07   0.002    -9.386898   -2.077892
          L2.  |   6.630864    2.232563     2.97   0.003     2.255122    11.00661
               |
         _cons |   3.474683    1.623821     2.14   0.032     .2920529    6.657313
--------------+----------------------------------------------------------------
D1SCH         |
       D1GDPG  |
          L1.  |   .1728694    .0415674     4.16   0.000     .0913988    .25434
          L2.  |   .0389408    .0460935     0.84   0.398    -.0514008    .1292824
               |
      D1LNFDI  |
          L1.  |   .0843074    .1092412     0.77   0.440    -.1298014    .2984162
          L2.  |   .3259888    .0609337     5.35   0.000     .206561     .4454167
               |
     D1EXPORT  |
          L1.  |  -.0381678    .0378793    -1.01   0.314    -.1124098    .0360743
          L2.  |  -.0994271    .034484     -2.88   0.004    -.1670144   -.0318398
               |
     D1IMPORT  |
          L1.  |   .0628599    .0298283     2.11   0.035     .0043975    .1213223
          L2.  |   .0891746    .0337103     2.65   0.008     .0231037    .1552455
               |
        D1SCH  |
          L1.  |   .3027326    .1585421     1.91   0.056    -.0080043    .6134695
          L2.  |   .5322395    .1898315     2.80   0.005     .1601767    .9043023
|
         _cons |  -.4224081    .138071     -3.06   0.002    -.6930224   -.1517938
--------------------------------------------------------------------------------
```

Table 7. Diagnostics of the VAR model extended with import and export shares and secondary school enrollment

```
 Selection-order criteria
 Sample:  1998 - 2009                          Number of obs      =       12
 +--------------------------------------------------------------------------+
 |lag |   LL      LR      df    p     FPE      AIC      HQIC      SBIC    |
 |----+---------------------------------------------------------------------|
 | 0 | -126.689                    2346.61  21.9482   21.8734   22.1502  |
 | 1 | -79.5149  94.348*  25  0.000  95.2171  18.2525   17.8037   19.4648  |
 | 2 |    .        .      25     .  -9.9e-59*    .         .         .     |
 | 3 |  1935.93    .      25     .     .     -312.655* -313.552*  -310.23* |
 | 4 |  1931.53 -8.7958   25     .     .     -311.922  -312.819  -309.497  |
 +--------------------------------------------------------------------------+
  Endogenous:  D1GDPG D1LNFDI D1EXPORT D1IMPORT D1SCH
   Exogenous:  _cons
```

```
 Selection-order criteria
 Sample:  1996 - 2009                          Number of obs      =       14
 +--------------------------------------------------------------------------+
 |lag |   LL      LR      df    p     FPE      AIC      HQIC      SBIC    |
 |----+---------------------------------------------------------------------|
 | 0 | -148.822                    2407.56  21.9745   21.9534   22.2028  |
 | 1 | -101.118  95.408*  25  0.000  126.149  18.7311*  18.6043*  20.1005* |
 | 2 |    .        .      25     .  -1.6e-27*    .         .         .     |
 +--------------------------------------------------------------------------+
  Endogenous:  D1GDPG D1LNFDI D1EXPORT D1IMPORT D1SCH
   Exogenous:  _cons
```

```
 Eigenvalue stability condition
 +---------------------------------------+
 |        Eigenvalue      |   Modulus   |
 |------------------------+--------------|
 |    .9106465            |   .910646   |
 |    -.906171            |   .906171   |
 | -.2329466 +  .8551699i |   .886329   |
 | -.2329466 -  .8551699i |   .886329   |
 | -.6316134 +   .61723i  |   .883124   |
 | -.6316134 -   .61723i  |   .883124   |
 |   .126309 +  .8288965i |   .838465   |
 |   .126309 -  .8288965i |   .838465   |
 |  .1503082 +  .1615464i |   .220658   |
 |  .1503082 -  .1615464i |   .220658   |
 +---------------------------------------+
  All the eigenvalues lie inside the unit circle.
  VAR satisfies stability condition.
```

Table 8. Granger causality Wald tests for the extended model with (first differences) of import and export shares, and secondary school enrollment

```
 Granger causality Wald tests
 +------------------------------------------------------------------+
 |      Equation          Excluded |   chi2    dfProb> chi2 |
 |---------------------------------+--------------------------------|
 |        D1GDPGD1LNFDI |  9.6092    2    0.008    |
 |        D1GDPG           D1EXPORT | 18.823     2    0.000    |
 |        D1GDPG           D1IMPORT | 34.592     2    0.000    |
 |        D1GDPG              D1SCH |  5.0307    2    0.081    |
 |        D1GDPG                ALL | 53.443     8    0.000    |
```

```
|-----------------------------------+---------------------------|
|     D1LNFDI          D1GDPG |  23.554    2    0.000    |
|     D1LNFDI         D1EXPORT |  122.93    2    0.000    |
|     D1LNFDI         D1IMPORT |  50.712    2    0.000    |
|     D1LNFDI            D1SCH |  40.449    2    0.000    |
|     D1LNFDI              ALL |  232.61    8    0.000    |
|-----------------------------------+---------------------------|
|     D1EXPORT         D1GDPG |  8.5894    2    0.014    |
|     D1EXPORT         D1LNFDI |  8.7043    2    0.013    |
|     D1EXPORT         D1IMPORT |  16.842    2    0.000    |
|     D1EXPORT            D1SCH |  5.2041    2    0.074    |
|     D1EXPORT              ALL |  39.977    8    0.000    |
|-----------------------------------+---------------------------|
|     D1IMPORT         D1GDPG |  3.5796    2    0.167    |
|     D1IMPORT         D1LNFDI |  8.4633    2    0.015    |
|     D1IMPORT         D1EXPORT |  13.987    2    0.001    |
|     D1IMPORT            D1SCH |  10.039    2    0.007    |
|     D1IMPORT              ALL |  65.714    8    0.000    |
|-----------------------------------+---------------------------|
|     D1SCH            D1GDPG |  35.753    2    0.000    |
|     D1SCH            D1LNFDI |  35.697    2    0.000    |
|     D1SCH            D1EXPORT |  8.6917    2    0.013    |
|     D1SCH            D1IMPORT |  7.2147    2    0.027    |
|     D1SCH               ALL |  96.668    8    0.000    |
+-----------------------------------------------------------+
```