DOCUMENTOS DE ECONOMÍA Y FINANZAS INTERNACIONALES

Working Papers on International Economics and Finance

DEFI 11-05
Mayo 2011

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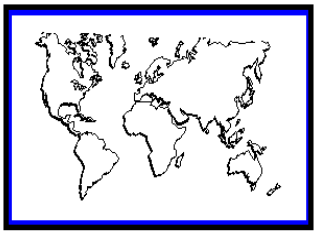

Asociación Española de Economía y Finanzas Internacionales
www.aeefi.com
ISSN: 1696-6376

Do exports cause growth? Some evidence for the new EU members*

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Abstract

In this paper, we analyze the relationship between international trade and economic growth, from the point of view of one of the most traditional hypothesis within this field, namely, the export-led growth hypothesis. To this end, we apply Granger-causality tests, in a cointegration framework, to data on exports and GDP of the eight CEECs that became members of the EU in 2004.

Key words: Economic growth, Exports, Transition countries

JEL Classification: F41, F43, O40

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* The authors thank financial support from the Spanish Ministry of Science and Innovation, through the project ECO2008-05072-C02-01, and from the Department of Education and Science of the regional government of Castilla-La Mancha, through the project PEII09-0072-7392.

1. Introduction

The relationship between international trade (or, more generally, external openness) and economic growth is a widely discussed topic in economics, but still a controversial one. A large amount of empirical literature, dating back to the 1960s and 1970s, have tested the hypothesis that international trade and, in general, a more open commercial policy, means a major factor in order to explain economic growth. This line of research, indeed, has been given a renewed impulse with the development of endogenous growth theories, on allowing to provide it with more solid theoretical foundations. In particular, it has been emphasized that a more liberalized trade stance allows countries to enjoy a higher amount of intermediate inputs at a lower cost, and encourages technological progress; and all this would result in higher rates of growth. This literature, which is mostly concerned about the case of developing countries, has been surveyed in Edwards (1992, 1993).

Such a literature has received a renewed impulse later on; see, among others, Dollar (1992), Ben-David (1993), Sachs and Warner (1995), or Frankel and Romer (1999). However, the evidence in favour of this hypothesis is far from being unambiguous, as shown in an influential paper by Rodríguez and Rodrik (2001). As these authors point out, the relationship between external openness and economic growth would be rather a contingent one, dependent on a host of particular characteristics, both country-specific and external; and, among them, the importance of institutions would be crucial.

On the other hand, the case of transition economies, and in particular the Central and Eastern European countries (CEECs) already members of the European Union (EU), can be an interesting case study in this context. Before the beginning of the current economic crisis, these countries had experienced remarkable growth rates, with an important potential for catch-up and convergence with the Western EU member countries. In addition, most of them showed high and increasing levels of external openness, particularly regarding exports. Tables 1 and 2 present GDP growth rates, and exports of goods and services as percentage of GDP, respectively, of the eight CEECs that joined the EU in 2004, over the years 1996-2009.

[Table 1 here]

[Table 2 here]

In this paper, we will analyze the relationship between international trade and economic growth, from the point of view of one of the most traditional hypothesis within this field, namely, the export-led growth hypothesis. To this end, we will apply Granger-causality tests, in a cointegration framework, to data on exports and GDP of the eight CEECs that became members of the EU in 2004. The theoretical framework and empirical methodology, together with the main results, are presented in the next section; the final section concludes.

2. The export-led growth hypothesis: an application to the new EU members

The so-called export-led growth hypothesis was formally derived by Feder (1982), from previous intuitive ideas mostly aimed to empirical purposes. This author developed a model made up of two sectors: one producing export goods, and the other producing for

the domestic market. Feder made two crucial assumptions: (i) the exportable sector yields positive externalities on the domestically-oriented sector (through the development of more efficient management techniques, the introduction of improved production technologies, the training of more skilled labour, and the like); and (ii) marginal factor productivities are higher in the exportable sector. From here, it follows that a trade liberalization policy that leads to a reallocation of resources into the exportable sector, and out of the domestically oriented sector, will increase the level of aggregate output. In particular, assuming standard production functions for both sectors, the rate of growth of GDP (i.e., aggregate output) will be given by the sum of the contribution of factor (i.e., capital and labour) accumulation, and the gains from shifting factors from the low productivity to the high productivity sector (i.e., from the domestically-oriented to the exportable sector). Using data for a group of semi-industrialized less developed countries over the period 1964-1973, Feder found empirical support for the hypothesis.

The traditional export-led growth model has been restated in terms of the theory of endogenous growth by Ahumada and Sanguinetti (1995). In a model for an open economy with three sectors: exportable, importable, and non-tradable, the authors found that exports are the "engine" of economic growth. Specifically, the exportable sector sustains the continuing increase in per capita output by means of two channels: (i) the exportable sector yields positive externalities on the rest of the economy (as in Feder); and (ii) both human and physical capital in the exportable sector are not subject to diminishing returns.

However, in an influential paper, Jung and Marshall (1985) raise the possibility that causality might run the other way round, i.e., from output to exports. Consider the case of a growing economy, where growth is mostly concentrated in a few sectors. Thus, if domestic demand does not grow as much as the production of these dynamic sectors, producers are likely to turn to foreign markets to sell their goods so that, in this case, causality would run from output to exports. Accordingly, Jung and Marshall perform Granger-causality tests between exports and GDP for 37 developing countries over the period 1950-1981, and find evidence on causality from exports to output for just four countries.

The export-led growth hypothesis has been tested extensively over the years, from both the estimation of production functions including exports as an additional input, and performing Granger-causality tests; a recent and up-to-date survey of empirical studies is provided in Donoso and Martín (2010). The available evidence, however, is far from being unambiguous, depending on the countries and the sample period concerned.

In the rest of this section, we will perform Granger-causality tests between exports and GDP of the eight CEECs that became members of the EU in 2004 (Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia). All the data are quarterly, measured in million of euros of 2000, seasonally adjusted, and cover the period 1996.I-2009.IV. The data source is Eurostat.

Notice that the Granger-causality analysis should be modified if the variables under analysis have a unit root and are cointegrated (Granger, 1988). Specifically, if the variables tested for Granger-causality are both I(1) and cointegrated, Granger-causality

tests should be performed on the variables in first differences, and including an error-correction term (i.e., the residual of the cointegrating regression between the two variables).

We begin by testing for the order of integration of the variables exports and GDP, by means of the tests of Ng and Perron (2001). These authors propose using the tests statistics $\overline{MZ}_\alpha$ and $\overline{MZ}_t$, which are modified versions of the Z_α and Z_t Phillips-Perron tests aimed to improve the tests with regard to both size distortions and power. The results are shown in Table 3, and the null hypothesis of no stationarity cannot be rejected, independently of the test, for the two series in levels. In turn, the presence of two unit roots is rejected in most cases at the conventional significance levels; some doubts appear, however, for the exports of Estonia, and the GDP of Hungary and Latvia. Hence, with these caveats in mind, we conclude that the exports and GDP series are I(1).

[Table 3 here]

Next, we have tested for the presence of cointegration between exports and GDP, for every country analyzed, using the tests of Johansen (1991), and the results appear in Table 4. According to the results from both the trace and maximum eigenvalue test statistics, the null hypothesis of no cointegration between exports and GDP cannot be rejected for all the countries considered at the usual levels of significance. Accordingly, Granger-causality tests should be performed on the variables in first differences, but without an error-correction term, since no cointegration was found.

[Table 4 here]

Finally, the results from the Granger-causality tests are shown in Table 5, where up to four lags of the two variables were taken. As can be seen, only in the case of the Czech Republic it is possible to reject the null hypothesis of no Granger-causality from exports to GDP, at the 2% level. The same null hypothesis would be rejected at the 15% level for Lithuania and Slovenia, and at the 18% level for Slovakia. Rejection would be much clearer in the rest of cases. Therefore, the export-led growth hypothesis would find some support just for the case of the Czech Republic.

[Table 5 here]

Taking together the results of this paper with those in Bajo-Rubio and Díaz-Roldán (2009), it can be said that, in the Czech Republic, the trade balance would have not arrive at unsustainable positions, hence not restraining GDP growth until the beginning of the current economic crisis. Accordingly, the foreign sector would have played a quite beneficial role in the economic evolution of the Czech economy over the last fifteen years. The results for the other countries would be rather neutral regarding the role of the foreign sector, with the exception of the Baltic states (in particular Latvia and Lithuania), which run external deficits potentially unsustainable in the long run. In fact, the latter countries are those currently suffering, by far, the greatest fall in their growth rates (see Table 1).

3. Conclusions

In this paper, we have analyzed the relationship between international trade and economic growth, from the point of view of one of the most traditional hypothesis within this field, namely, the export-led growth hypothesis. The empirical methodology has made use of Granger-causality tests in a cointegration framework, between exports and GDP of the eight CEECs that became members of the EU in 2004. Before the beginning of the current economic crisis, these countries had experienced remarkable growth rates, with an important potential for catch-up and convergence with the Western EU member countries; at the time that most of them showed high and increasing levels of external openness.

The results find some support for the export-led growth hypothesis only in the case of the Czech Republic, while no significant causality in any direction was found in the rest of cases. Therefore, only in the Czech case exports seem to have played some role in explaining GDP growth, unlike the other countries, for which some other alternative factors should be able to account for their growth processes along the post-communist years.

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Table 1
Rates of growth of GDP (% change on previous period)

	Czech Republic	Estonia	Latvia	Lithuania	Hungary	Poland	Slovenia	Slovakia
1996	4.0	5.7	3.6	5.2	1.0	6.2	3.6	6.9
1997	−0.7	11.7	8.3	7.5	4.3	7.1	4.9	4.4
1998	−0.8	6.7	4.8	7.6	5.2	5.0	3.6	4.4
1999	1.3	−0.3	3.3	−1.1	4.2	4.5	5.4	0.0
2000	3.6	10.0	6.9	3.3	4.9	4.3	4.4	1.4
2001	2.5	7.5	8.0	6.7	4.1	1.2	2.8	3.5
2002	1.9	7.9	6.5	6.9	4.4	1.4	4.0	4.6
2003	3.6	7.6	7.2	10.2	4.3	3.9	2.8	4.8
2004	4.5	7.2	8.7	7.4	4.9	5.3	4.3	5.0
2005	6.3	9.4	10.6	7.8	3.5	3.6	4.5	6.7
2006	6.8	10.0	12.2	7.8	4.0	6.2	5.8	8.5
2007	6.1	7.2	10.0	9.8	1.0	6.8	6.8	10.6
2008	2.5	−3.6	−4.6	2.8	0.6	5.0	3.5	6.2
2009	−4.2	−14.1	−18.0	−14.8	−6.3	1.7	−7.8	−4.7

Source: Eurostat.

Table 2
Exports of goods and services as percentage of GDP

	Czech Republic	Estonia	Latvia	Lithuania	Hungary	Poland	Slovenia	Slovakia
1996	48.9	61.9	46.2	50.1	48.2	22.3	50.2	53.3
1997	52.1	71.7	46.2	51.6	54.5	23.4	51.7	56.4
1998	54.2	74.6	46.6	45.1	60.6	26.0	51.4	59.2
1999	55.5	70.4	40.4	38.7	63.4	24.2	47.6	61.2
2000	63.4	84.6	41.6	44.7	73.1	27.1	53.9	70.5
2001	65.4	79.8	41.6	49.8	71.0	27.1	55.5	72.8
2002	60.2	70.9	40.9	52.7	62.8	28.6	55.2	71.2
2003	61.8	69.2	42.1	51.2	61.1	33.3	54.0	75.9
2004	70.1	73.1	44.0	52.1	62.9	37.5	58.0	74.6
2005	72.2	77.7	47.8	57.5	66.0	37.1	62.1	76.3
2006	76.4	80.1	44.9	59.1	77.2	40.4	66.5	84.4
2007	80.1	72.8	42.2	54.1	80.5	40.8	69.5	86.7
2008	77.1	75.6	41.7	60.2	82.1	40.0	67.7	83.0
2009	69.5	70.6	42.2	53.8	77.9	38.9	58.9	70.1

Source: Eurostat.

Table 3
Ng-Perron tests for unit roots

Czech Republic

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−10.67**	−2.23**
ΔY_t	−7.80***	−1.97***

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.90	0.89
Y_t	0.36	0.24

Estonia

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−3.76	−1.35
ΔY_t	−13.04**	−2.55**

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.56	0.68
Y_t	−0.15	−0.11

Latvia

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−27.63*	−3.68*
ΔY_t	−3.12	−1.25

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.18	0.14
Y_t	−1.35	−0.71

Lithuania

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−11.71**	−2.38**
ΔY_t	−15.47*	−2.78*

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.49	0.40
Y_t	0.29	0.26

Hungary

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−21.69*	−3.29*
ΔY_t	−2.26	−0.96

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.72	0.61
Y_t	−1.53	−0.72

Poland

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−30.28*	−3.89*
ΔY_t	−8.38**	−2.04**

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.29	0.19
Y_t	1.40	1.21

Slovenia

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−21.69*	−3.29*
ΔY_t	−11.44**	−2.38**

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.22	0.17
Y_t	0.59	0.59

Slovakia

I(2) vs. I(1)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
ΔX_t	−16.57*	−2.85*
ΔY_t	−9.05**	−2.12**

I(1) vs. I(0)

	$\overline{MZ}_\alpha$	$\overline{MZ}_t$
X_t	0.81	0.84
Y_t	0.68	0.43

Note: *, **, and *** denote significance at the 1%, 5%, and 10% levels, respectively. The critical values (taken from Ng and Perron, 2001) are −13.8, −8.1, and −5.7 (at the 1%, 5%, and 10% levels) for $\overline{MZ}_\alpha$; and −2.58, −1.98, and −1.62 (at the 1%, 5%, and 10% levels) for $\overline{MZ}_t$.

Table 4
Johansen cointegration tests

	Critical values 5%	Critical values 1%	Czech Republic	Estonia	Latvia	Lithuania	Hungary	Poland	Slovenia	Slovakia
Trace										
$r = 0$	15.41	20.04	12.08	10.48	9.96	6.00	11.78	5.10	13.74	6.61
$r \leq 0$	3.76	6.65	0.42	3.27	3.00	1.71	1.00	0.06	2.23	1.16
λ ***max***										
$r = 0$	14.07	18.63	11.66	7.20	6.96	4.29	10.77	5.04	11.50	5.45
$r \leq 0$	3.76	6.65	0.42	3.27	3.00	1.71	1.00	0.06	2.24	1.16

Notes:

(i) *Trace* and λ *max* denote, respectively, the trace and maximum eigenvalue likelihood ratio statistics for the number of cointegrating vectors; and r is the number of cointegrating vectors (null hypothesis).

(ii) None of the test statistics is significant at the conventional levels. The critical values are taken from Osterwald-Lenum (1992).

Table 5
Granger-causality tests

Czech Republic

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	0.73	0.58
ΔX_t does not Granger-cause ΔY_t	3.18	0.02

Estonia

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	0.63	0.64
ΔX_t does not Granger-cause ΔY_t	0.98	0.43

Latvia

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	0.76	0.56
ΔX_t does not Granger-cause ΔY_t	0.55	0.70

Lithuania

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	0.55	0.70
ΔX_t does not Granger-cause ΔY_t	1.75	0.16

Hungary

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	1.38	0.26
ΔX_t does not Granger-cause ΔY_t	1.34	0.27

Poland

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	1.16	0.34
ΔX_t does not Granger-cause ΔY_t	1.01	0.42

Slovenia

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	0.13	0.97
ΔX_t does not Granger-cause ΔY_t	1.79	0.15

Slovakia

Null hypothesis:	F-statistic	Probability
ΔY_t does not Granger-cause ΔX_t	0.34	0.85
ΔX_t does not Granger-cause ΔY_t	1.64	0.18