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Tie or Try: Intra-Eu Trade in Times of Economic Crisis

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Abstract

International competitiveness and extraversion is a fundamental prerequisite for the perspectives of countries and enterprise; yet, the synchronization of crisis in other regions as well reduces the prospects of this way-out. We used panel-data for 19 EU-member states in the period 2002-2012, in order to estimate the significance and the sign of these impacts. Our main contribution came out of the country specific time dummies we used with respect to intra-EU exporting activity. In a globalized but still eminently imperfect world market, where international oligopolies and scale-benefits of large states dominate and shape the balances, the choice of small, medium-sized and emerging economies is the following: to bind to strong (trade-) partners and/or to be able to devaluate.

Key words: Extraversion, Economic Crisis, Eurozone.

1. Introduction

Acting beyond the national borders is both, promising but also fundamental for the perspectives of any enterprise, as well as the economy as a whole – especially in times of financial, systemic crises as in our days. Extraversion and the increase of net exports provide an alternative for economies that experience a deep deterioration of domestic aggregate demand, while exporters respond generally more efficiently to changes taking place. On the other hand, the synchronization of crisis in other countries as well reduces the prospects of this way-out.

According to Rao et.al. (1990), firms respond to the downturns in domestic markets by intensifying their efforts to sell abroad. Nonetheless, an exhaustive literature reveals various determinants referring to the macro- and microeconomic environment (van Michiel, 2002 and Love, 1982), being either internal or external, which affect the exports of a country. Investment for instance is a basic factor leading to productivity gains and improvements of products' quality (De Long and Summers, 1991). Especially with respect to foreign direct investments (FDI), despite the mixed effects that may arise (Zarotiadis, 2008), "reverse

importing" and the usage of the region as an "export-platform" are additional reasons for strengthening extraversion (Prasanna, 2010, Haddad and Harrison, 1993, Leichenko and Erickson, 1997, UNCTAD, 1998, 1999 and 2012).

Research and Development (R&D) expenses are also a special parameter, either in terms of procedures, or of products (Cortright, 2001). Except studies that focus on small and medium-sized firms or at the negative spillovers for less developed countries (LDCs) (see for instance Sriram, 1989 and Lall, 1981), competitive advantages arise in the form of uniqueness (Cooper and Kleinschmidt, 1985), advanced technology and number of patents (Wagner, 1995). Sofikitis and Manolopoulos (2012) also point out the importance of offering highly innovative products. Similar is the reasoning justifying the importance of skilled labor force, being another source of effectiveness in terms of costs and qualitative response. Wagner (2001) and Wakelin (1998) find that human capital is significantly positive correlated to net exports. Yet, there are also negative evidences, like the studies of Willmore (1992) and Ramstetter (1999). They both argue that countries with (relative) abundance of unskilled employees anticipate skilled persons as fearfulness and expensive factor.

The size of the domestic market does also matter, due to world (and local as well) markets' imperfectness. The greater GDP is, the larger are local firms and also the wider is the development of different, mutually serving branches. This speaks for the emergence of both firm- and also branch-level economies of scale, which strengthens the cost-efficiency, reputation and credibility of domestic producers. Nevertheless, also with respect to this question, we have some contradictory conclusions: for instance, the empirical study of Marco Fugazza (2004) shows that, larger countries are less open and extroverted.

Beside to the size of the country, other domestic specificities have to be taken into account as well. For instance, the level of taxation, the efficiency of public sector and the "quality" of local governance affect costs and profitability of existing producers and provide disincentives for investments. On the other hand, local economic adversities may have positive effects on extraversion, following the "urge to survive" argument: lower sales and lower profits force domestic producers to increase their exports and to search for new, foreign markets (see for instance Rao, Erramilli and Ganesh 1989 and 1990, Pavord and Bogart, 1975, Rao, Kreighbaum and Hawes, 1983).

In the following, in order to provide evidence on the way how crises, among other controlling variables, affect net exports, we apply a model focusing on intra-EU exporting activities of EU-member states in the last decade. Thereby, we wish to make use of the almost completed integration of European markets and the degradation of cross-national disparities, but also to avoid the distortions of EU protective policy and currency fluctuations. Moreover, by choosing the specific period we try to cover the pre- and post-crisis era. We start with presenting the data and our methodology. In the third section we provide the estimations of both equations, once for exports and then for imports. Finally we conclude and discuss relevant policy implications.

2. Data & Methodology

We use the database of EUROSTAT. Our sample consists of 19 of the 27 EU-member countries[1], due to limited availability of necessary data. We use annual data covering the period 2002-2012 and we proceed with panel data, fixed effects regression.

As already mentioned, our aim is to study the way how crises, among other controlling variables, affect intra-EU net exports. In order to have a precise view of the underlying relationships, we estimate two, similar empirical models with different dependent variables. Equation (1) searches for the effects on export share (ratio of country's exports over GDP) and (2) does the same but this time for import share (ratio of imports over GDP).

$$(x_{EU})_{i,t} = a_o+a_1\omega_{i,t-1}+a_2\omega_{EUrest,t-1}+a_3L_{i,t-1}+a_4I_{i,t-1}+a_5T_{i,t-1}+a_6R_{,t-1}+a_7H_{i,t-1}+a_{8i}Di+e \quad (\boldsymbol{1})$$

In the above equation, $(x_{EU})_{i,t}$ stands for the ratio of country's i intra-EU exports over that country's GDP in period t. As explanatories we use the growth rate of GDP per capita of the exporting country (ω_i) and the same growth rate, yet this time for the rest of the EU, taking out the exporting country i (ω_{EUrest}). Growth rates are being used in order to capture the effects derived out of domestic and foreign demand deteriorations respectively. Next, we include the change rate of real unit labor cost for each country (L_i), net investments (I_i), income taxes charged to i's residents (T_i), R&D expenditures (R_i), the number of people that have tertiary education (H_i) and finally a vector of i different time dummies (Di), where a_{8i} is the analogue vector of the respective coefficients. Note that I, T, and R are expressed as percentages of GDP, while H is expressed as percentage of total population. Finally, we use a one year lag in all explanatories, in order to capture the necessary delay of the consequences.
The time dummies we used deserve also special attention: Di takes the value 1 only in case we have export intensity of that specific county in the problematic period 2009-2012. Essentially, we use 19 dummies that capture the effect of systemic crisis on each country of our sample separately.

Similar is the equation for imports. As we pointed already, the only difference is that instead of export, this time we use imports share $(m_{EU})_{i,t}$ as dependent variable (ratio of each country's imports from the other EU-economies over that country's GDP). With respect to the rest, equation (2) simply duplicates the first one:

$$(m_{EU})_{i,t} = b_o+b_1\omega_{i,t-1}+b_2\omega_{EUrest,t-1}+b_3L_{i,t-1}+b_4I_{i,t-1}+b_5T_{i,t-1}+b_6R_{i,t-1}+b_7H_{i,t-1}+b_{8i}Di+e \quad (\boldsymbol{2})$$

3. Estimations

Starting from equation (1), **table 1** presents the estimated coefficients (left side) along with

[1] Belgium, Czech Republic, Denmark, Germany, Estonia, Spain, France, Italy, Cyprus, Latvia, Lithuania, Hungary, Malta, Netherlands, Poland, Portugal, Slovakia, Sweden, United Kingdom

the various testing and control statistics for the quality of the estimation (right side of the table). Adjusted R^2 is exceptionally high, which, besides to the good fitting of the equation in general, is an additional way to confirm the appropriateness of our approach. Moreover, Durbin-Watson statistic deny the existence of autocorrelation and the cross-correlations among the explanatories show that there is no evidence of multicollinearity (in both estimations, the one of export- but also the following of import-shares) (Wooldridge, 1999).

Table 1. Estimation of intra-EU export-share determinants (fixed-effects panel-data; reliable standards errors HAC)

	Coefficient	*Std. Error*	Estimation Statistics	
constant	15,93	9,00*	Control fixed effects	Variation of residues = 12,63 F(18, 164) = 127,78; p-value = 1,43e-86 Breusch-Pagan statistic: LM = 280,92; p-value = 4,72e-63
ω	0,03	0,10		
ω_{EUrest}	0,04	0,13		
I	-0,04	0,06		
L	-0,32	0,13**		
T	-0,96	0,65		
R	2,01	3,37		
H	1,35	0,35***		
D_{Be}	-6,82	1,62***		
D_{CR}	-3,62	2,26		
D_{De}	-4,88	2,30**	Determination Coefficient	R^2 = 0,96 R^2 adjusted = 0,95
D_{Ge}	-0,09	1,76		
D_{Es}	-1,21	3,23		
D_{Sp}	-6,93	2,86**	Cross-Correlations (Pearson)	I L T R H ω_{EUrest} ω -0,10 -0,22 -0,21 -0,22 -0,09 0,02 ω 0,05 0,41 0,36 0,14 -0,02 I 0,11 0,04 -0,02 -0,00 L 0,68 0,37 -0,04 T 0,47 0,03 R 0,14 H
D_{Fr}	-7,44	1,91***		
D_{It}	-3,19	0,98***		
D_{Cy}	-13,19	3,61***		
D_{La}	-4,77	2,74*		
D_{Li}	-3,11	3,06		
D_{Hu}	6,49	2,32***		
D_{Ma}	3,52	1,40**	Autocorrelation control	Durbin-Watson statistic = 1,041 p-value = 3,92e-16
D_{Ne}	2,10	1,59		
D_{Pol}	-2,92	2,52		
D_{Por}	-4,74	2,46*		
D_{Sl}	4,13	2,95		

D_{Sw}	-7,63	2,28***
D_{UK}	-4,37	1,22***

Moving to the actual interest of **table** 1, intra-EU export shares are significantly affected by the change rate of domestic real unit labor costs (L_i) and the share of people having tertiary education (H_i). As expected, L_i affects negatively and noteworthy exports; specifically, an increase of unit labor costs by one percent, either due to costs- or due productivity-deterioration, causes a fall in exports share by 0,32%. Recall that, beside to the obvious competitiveness disadvantage in the final prices, any increase in L_i has also indirect adverse effects as it reduces the availability of resources for export promotion (Felipe and Kumar, 2011). Similarly logical is also the second significant effect, namely that higher education levels and skills' improvement cause gains in competitiveness and innovation, which contribute to the increase of extraversion.

In contrast, investments, R&D expenditures and tax-levels have not proven to be significant. A thinkable explanation is that we are dealing with intra-EU trade flows and the advancements in the integration process of the European economies may overwhelm the potential impacts.

Similarly insignificant appears to be the growth rate of domestic and foreign economies (ω_i and ω_{EUrest}). Yet, the reason is different: as we are dealing with a period of a synchronized substantial crisis, the effect is being mainly captured by the 19 country-specific time dummies. In twelve cases export share is significantly different in the problematic period 2009-2012. Indeed, in ten of them, the impact is significantly negative, as would be expected (Barry and Adele, 2010 and Frankena, 1975 provide similar results, at least for the first years of a crisis): Belgium, Denmark, Spain, France, Italy, Cyprus, Latvia, Portugal, Sweden and the United Kingdom saw their export share falling, despite the general weakening of their own GDP, which, in some of the cases, experienced considerable cutbacks.

Quite opposite is the picture we get from Hungary and Malta: for different reasons, both seem to benefit from the frustration in the European economies. Hungary, one of the first emerging economies, received emergency financial support of $25 billion (mainly from IMF) already in October 2008. The efficient use of this capital inflow and the accompanying reforms, but also the fact that the country has not joined Eurozone and was able to devalued rapidly its exchange rate (forint reached its lower level in 2009) resulted into substantial gains in competitiveness (IMF Survey, 2009).

Different is the case of Malta, which shows a solid financial base and low risk of toxic assets. Exports are mainly coming from electronic and pharmaceutical industries, 75% of total outflow. Yet the actual secret of its success is the fact that Maltese exports were grown out of the intensified commercial relations to Germany, being either final or, mainly, intermediate products.

In addition, Germany is one of the 7 countries, where the period 2009-2012 does not seem to have any impact at all on the share of their intra-EU exports. The other three, Czech Republic, Slovakia and Netherlands, despite their specific strengths, they seem to be safeguarded by the fact that Germany is the major destination of their exports (Zaborowski et.al. 2013, Czech Statistical Office, 2014 and Lazaridou Sofia, 2012). Also for Estonia and Lithuania the argument is similar: after being integrated in European networks their trade transactions were mainly with Scandinavia (recovered quickly) and Poland (Kattel and Raudla, 2012). On the other hand, Poland, also a Eurozone-outsider, followed a strategy of gradually devaluing zloty in order to support exports and to neutralize the global inconveniences (Zaborowski et.al. 2013).

Following, we proceed with the estimation of equation (2) presented in **table 2**. Also here adjusted R^2 is exceptionally high and there is no evidence of autocorrelation or multicollinearity. Looking at the left side with the estimated coefficients, average tax-level (T_i), expenditures on R&D (R_i) have proven this time to be significant, along with the share of people having tertiary education (H_i).

Table 2. Estimation of intra-EU import-share determinants (fixed-effects panel-data; reliable standards errors HAC)

	Coefficient	*Std. Error*	Estimation Statistics	
constant	7,85	7,77	Control fixed effects	Variation of residues = 10,48 F(18, 164) = 120,33; p-value = 1,36e-84 Breusch-Pagan statistic: LM = 245,77; p-value = 2,17e-55
ω	0,13	0,09		
ω_{EUrest}	0,19	0,13		
I	-0,013	0,05		
L	-0,26	0,16		
T	-1,00	0,52*		
R	5,95	2,86**		
H	1,47	0,31***		
D_{Be}	-3,54	1,65**		
D_{CR}	-7,61	1,78***		
D_{De}	-5,20	1,80***	Determination Coefficient	R^2 = 0,97 R^2 adjusted = 0,96
D_{Ge}	-1,27	1,50		
D_{Es}	-6,43	2,57**		
D_{Sp}	-9,98	2,28***	Cross-Correlations (Pearson) (*the same like in table 1*)	I L T R H ω_{EUrest} ω -0,10 -0,22 -0,21 -0,22 -0,09 0,02 0,05 0,41 0,36 0,14 -0,02 I 0,11 0,04 -0,02 -0,00 L 0,6 0,3 -0,0 T
D_{Fr}	-5,94	1,51***		
D_{It}	-2,83	0,82***		
D_{Cy}	-9,03	2,97***		
D_{La}	-11,06	2,56***		
D_{Li}	-9,64	2,62***		
D_{Hu}	2,28	1,91		

				8 7 4 0,4 0,03 R 7 0,14 H
D_{Ma}	0,28	1,21	Autocorrelation control	Durbin-Watson statistic = 1,068 p-value = 2,76e-16
D_{Ne}	-0,23	1,90		
D_{Pol}	-5,60	1,97***		
D_{Por}	-8,86	2,12***		
D_{Sl}	-2,68	2,42		
D_{Sw}	-6,27	2,17***		
D_{UK}	-4,84	1,20***		

Curiously, all three control variables of significant importance generate a strange effect. First, countries with comparably higher levels of taxation appear to have lower import shares. A thinkable explanation could rely on the assumption that imports refer mainly to intermediates that were to be used in domestic production. Imposed taxation deteriorates the profitability and the viability, provide difficulties for production process and hence reduce imports of local enterprises. Being more precise, Goode, Lent and Ojha (1966) argued that high tax rates on corporations' profits don't leave available financial resources to materialize imports.

Even more unusual is the case of R&D expenses and human capital, both affecting import shares positively. Also here, theoretical justification arises through "outsourcing": according to Aggarwal (1999), the more skilled and well educated labor force is and/or the higher R&D-expenditures are, the stronger will be the boost to imports of technologically advanced semi-finished products, not easy to be found in the domestic market. Nevertheless, this is an argument that refers primarily to less-developed countries. A similar line of reasoning that fits better to the characteristics of the EU is the following: along with technology, labor sharing and specialization is getting also deeper, meaning that intermediates are stronger demanded, from all over the Union. Moreover, in our case, additional justification may also come from the demand-side: the better educated and skilled people are, the more they choose to broader their spectrum of consumption, showing preference for various foreign varieties.

Quite contrary, in the second estimation the country specific time dummies operate uniformly and reasonable: in all 14 cases (except Germany, Malta, Slovakia, Hungary and Netherlands) with significantly estimated coefficients the sign is negative showing that the emergence of economic crisis weakens imports, following the course of all other aspects of the economy (Rao et.al., 1990).

4. Conclusions

In a continuously globalizing socioeconomic environment, international competitiveness and extraversion is a fundamental prerequisite for the perspectives of countries and enterprises. On the other hand, the synchronization of crisis in other countries as well reduces the

prospects of this way-out. Beside to the impact of various parameters that have been exhaustively discussed in the relevant literature – home and foreign investments, R&D and human capital, policy related and administrative issues, as well as the size of the country itself – the present paper focuses on the net trade effect in periods of deep, global systemic downturns.

We used panel-data for 19 EU-member states in the period 2002-2012 in order to estimate the significance and the sign of these impacts in intra-EU export- and import-shares. As expected, domestic real unit labor costs and the share of people having tertiary education, a proxy for human capital, proved to be significant for the competitiveness of domestic production in the rest European markets.

On the other hand, imports were significantly affected by domestic tax level, R&D and also the proxy for human capital, yet in a curiously strange way: first, higher levels of taxation appeared to lower imports; second, R&D expenses and human capital affect import shares positively. All of these estimations lead to an "outsourcing"-justification: along with technology, labor sharing and specialization is getting also deeper, meaning that intermediates are stronger demanded, from all over the Union.

The main contribution of our analysis came out of the country specific time dummies we used, especially with respect to inra-EU exporting activity. Twelve of the 19 countries in our sample experienced a significantly different export-share in the problematic period 2009-2012. In ten of them, the impact was significantly negative, as expected. Yet, Hungary and Malta, both seem to benefit from the frustration in the European economies; the first because of the ability to devalued rapidly forint and the second mainly due to the fact that Maltese exports were grown out of the intensified commercial relations to Germany, being either final or, mainly, intermediate products.

Similar is the picture we get from the other group of 7 countries, where export share did not change substantially. Czech Republic, Slovakia and Netherlands, beside to their specific strengths, they seem to be also safeguarded by the fact that Germany is also the major destination of their exports. For Estonia and Lithuania the argument is similar, as their trade transactions were mainly with Scandinavia. Last, Poland, also a Eurozone-outsider that followed a strategy of gradually devaluing zloty, is comparable with the case of Hungary.

The policy implications of the above are straightforward: in a globalized but still eminently imperfect world market, where international oligopolies and scale-benefits of large states dominate and shape the balances, the choice of small, medium-sized and emerging economies is the following: to bind to strong (trade-) partners and/or to be able to devaluate. Sustaining or even strengthening the country's extraversion along with efficient and stable domestic sociopolitical patterns is a way to attract capital inflows, which, by the way, need to be used efficiently and productively; especially, in times of deep systemic crisis.

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