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Decision to export and decision to innovate: Empirical evidence on firm behaviour in CEECs and SEECs

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Abstract

Globalisation of economic activity requires from firms to engage in international competition as well as to search for new more efficient modes of competition through innovations. The decisions of firms to export and to innovate can be associated with wide range of factors and forces belonging to firm behaviour, characteristics of firms and features of their environment. The objective of this paper is to explore the major determinants behind these decisions of firms in several Central and East European Countries (CEECs) as well as their counterparts from South East European Countries (SEECs). A framework of seemingly unrelated regressions (SUR) is applied to the 2009 series firm-level data from Business Environment and Enterprise Performance Survey (BEEPS). To this end, the research assesses the differences in firm behaviour during current economic crisis between SEECs and CEECs, two groups of countries whose transition paths diverged over past decades. Also, within group of CEECs it distinguishes between firms in countries that joined European Union in 2004, Bulgaria and Romania who were admitted in 2007 and Croatia, the next EU member. The findings may provide basis for development of policy recommendations for improvements in the performance of firms in these countries.

Keyword: exports, innovations, SEECs, CEECs, seemingly unrelated regressions

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1. Introduction

Recent literature on firm behaviour attaches sizeable importance to exporting and innovation activities of firms. Removal of trade barriers and internationalisation of economic activity require from firms to go beyond borders of domestic market while an increasing competitive pressure requires from them to continuously search for new and more efficient modes of competition. In this context, innovations are increasingly being seen as the key factor for creating and maintaining the competitiveness of firms. They enable pursuing of differentiation strategy and appropriation of above average returns. Decisions of firms to export and to innovate are closely related. Both are outcomes of lengthy processes of knowledge and skill building, acquisition of technology and information gathering. The outcomes of these decisions are often highly uncertain. This is the reason why the above described processes have characteristic of sunk costs and present significant barrier for many firms, particularly small and medium sized ones.

The importance of innovations for decision of firms to export has been for a long time recognised in empirical literature on firm behaviour (Wakelin, 1997; Aw, Roberts and Xu, 2008; Iacovone and Javorcik, 2008). Innovations provide base for differentiation of firms either through offering of products at lower prices or better quality which in turn increases their chances of success on international market (Girma, Gorg and Hanley, 2007). In parallel development, innovation literature has investigated the impact of ability to export, the so called learning by exporting effect, on the ability of firms to introduce new products and processes. The evidence about existence of this effect remains ambiguous (Salomon and Shaver, 2005; Harris and Li, 2005; Damijan and Kostevc, 2006; Aw, Roberts and Winston, 2007; Damijan et al., 2010). In general, the presence of learning by exporting has been reported for firms exporting from less into more developed economies (Girma, Gorg and Hanley, 2007). Furthermore, the ability of firms to exploit benefits of exporting has been associated with their absorptive capacity, particularly improvements of human capital.

Understanding of factors and forces behind decisions to export and to innovate is particularly important for firms from developing and transition economies such as Central and South East European Countries (CEECs and SEECs). The integration of these economies into European and global economic flows has opened doors of their markets to foreign, often more efficient, producers but also eased access of domestic producers to international market. Such setting acts as incentive for many producers to search for their business opportunities beyond domestic borders. However, for decades firms from CEECs and SEECs had reputation of producers of standardised low value added products. As such products are known to be highly elastic to changes in prices, technology and market trends they offer limited prospects for survival of firms. To this end, strengthening of innovation behaviour holds the key for the ability of firms in CEECs and SEECs to compete.

Transition paths of CEECs and SEECs have been somewhat different over past two decades. While former group integrated into European and global economic integrations at rapid pace, the countries in latter group have been less successful in pursuit of reforms. This divergence had also important implications for restructuring of their enterprises. The objective of this paper is to explore which factors and forces determine decisions of firms in two groups of countries to export and to innovate. A framework of seemingly unrelated regressions (SUR) is applied to the 2009 series firm-level data from Business Environment and Enterprise Performance Survey (BEEPS). The decision-making process of firms is modelled as function of several elements of firm behaviour as well as several firm characteristics. The findings provide basis for development of policy recommendations for improvements in the performance of firms in these

countries. Next section of paper provides overview of models of firm behaviour relating export performance and innovation activities as well as review of findings on determinants behind decisions to export and decision to innovate. Characteristics of firms in analysed groups of countries are presented in Section Three. The model and methodology will be introduced in Section Four followed with discussion of findings in Section Five. Finally, Section Six concludes.

2. The relationship between exporting and innovations

Traditional economic theory considered firm heterogeneity as short-run phenomenon that diminishes under the pressure of competitive forces. However, sizeable body of empirical studies points to persistence of inter-firm differences in various dimensions of their performance such as profitability or exporting. Two sets of explanations have been offered with respect to sources of this heterogeneity. In one set of models inter-firm heterogeneity originates through random distribution of efficiency across firms from some predetermined set of efficiencies (Jovanovic, 1982; Jovanovic and MacDonald, 1994). To this end, the consequent success of firms in competition is predetermined and cannot be influenced with consequent activities of entrepreneurs. Alternative view to these issues is offered in endogenous growth models (Aghion and Howitt, 1992; Grossman and Helpman, 1994). The ability of firms to compete is associated with their own activities, particularly innovations. It is being postulated that innovation activities enable firms to differentiate themselves from rivals, expand and survive on market.

Both types of models have been expanded to incorporate international trade. On one hand, the models in tradition of Melitz (2003) assume that success of firms on international market is determined with their productivity, randomly assigned to them. While assuming that most productive firms self-select themselves into exporting these models fall short to optimum when it comes to explaining the determinants of firm heterogeneity in terms of productivity. Furthermore, they do not provide explanation for reverse link going from participation on international market to subsequent improvements in the productivity of firms. On the other hand, in models originating from endogenous growth literature the sources of firm's productivity are looked for in characteristics and activities of firms. Constantini and Melitz (2007) demonstrate how the anticipation of trade liberalisation acts as impulse for firms to innovate in order to be able to participate on international market.

In addition to link from innovations to exporting, a vast body of literature has recognised the existence of reverse relationship, learning-by-exporting mechanism, going from participation on international market to introduction of new products and processes (Gorg and Greenaway, 2004; Greenaway and Kneller, 2007; Wagner et al., 2009). To this end, it has been suggested that participation on international market feeds back into better performance of firms through product and process innovations. By competing on international market firms learn through horizontal spillovers from their foreign rivals (Salomon and Shaver, 2005). Also, specific needs of individual foreign markets may act as incentive for firms to adjust existing or develop new products. Exporting increases size of market that firm serves thus leading to greater economies of scale. As Damijan and Kostevc (2010) note, such outcome enables improvements in technical efficiency, i.e. process innovations, through optimisation of production processes, modernization of organization or introduction of new technologies. Finally, it has been

postulated that the realisation of learning-by-exporting effect crucially depends on the absorptive capacity of firms. Hence, in order to absorb and assimilate knowledge and expertise obtained through exporting firms need to make necessary investments in human capital and technology all of which are likely to lead to better performance (Aw et al., 2005).

Both innovation and exporting have been associated with knowledge and technology transfer through outsourcing and FDI as well as with spillovers generated from foreign competition on domestic and foreign markets (Bertschek, 1995; Damijan and Kostevc, 2010). Also, Foster et al (2006) suggested that changes in demand have impact on innovation behaviour of firms which in turn has beneficial effect on productivity. Important determinant of both decisions to export and to innovate has been firm size. While on the one hand, it has been suggested that small firms are more responsive to changes in their environment and thus more likely to export and innovate, it has been suggested on the other hand that larger firms have more resources in order to undertake investment in sunk costs needed for entering in innovations and exporting. In this context, Esteve, Perez and Rodriguez (2011) suggest that older firms, on the basis of their experience, may easier overcome sunk costs of exporting and innovation.

When assessing the direction of causality between innovations and exporting, a distinction should be made between product and process innovations. It has been suggested that product innovations influence decision of firms to export while participation in international trade affects positively efficiency of firms and stimulates process innovations (Damijan et al., 2010; Esteve, Perez and Rodriguez, 2011). The distinction between two types of innovations has been also associated with characteristics of industry. To this end, it has been suggested that process innovations may be more relevant for industries of standardised products characterised with price competition while product innovations may be more important for survival of firms in sophisticated differentiated industries.

The above discussion points to simultaneous nature of relationship between decisions to export and to innovate. On the one hand, the innovations increase the ability of firms to compete and increase chances of their success on international market which may have beneficial impact on the decision of firms to export. On the other hand, exporting may act as impulse for firms to innovate. From there it follows that analysis of relationship between exporting and innovations should take into account their interdependency.

3. Data and descriptive statistics

3.1. Data source

The analysis in this paper is based on firm-level dataset drawn from the Business Environment and Enterprise Performance Survey (BEEPS) undertaken by European Bank for Reconstruction and Development (EBRD) and World Bank (WB). The survey was conducted between 2008 and 2009 and it covered almost 12000 companies in 29 countries. It covers establishments with at least five employees and it provides information on activities of enterprises, their characteristics and features of their environment. For the purpose of this paper the data for firms

in manufacturing sectors of 11 CEECs and that for 7 SEECs have been accessed.² In total there are 5472 observations of which 3821 in CEECs and 1651 in SEECs.

3.2. Exporting and innovation activity of analysed firms

Over past decades exporting has become important aspect of firm behaviour in many of analysed countries. Trade liberalisation that took place in these countries during 1990s opened the way to foreign competition which threatened to seize market shares of domestic companies. However, at the same time, opportunities emerged for local producers to expand their activities beyond domestic borders. The evidence from substantial body of literature suggests that for many years firms from both CEECs and SEECs competed on international market as producers of standardised price-competitive products (Havlik, 2005; Stojcic and Hashi, 2011). However, as noted by Lall (2000), such competitive profile is highly elastic to changes in market trends, technology and pressure of competition. Hence, innovations have emerged as precondition for survival of these firms.

Table 1: Exporting and innovation behaviour of firms in analysed countries (% of sample)

	Exporters	Non-exporters	Innovators	Non-innovators
CEEC	52	48	63	37
SEEC	38	62	58	42

Source: BEEPS Database

Table 1 displays the structure of analysed firms according to their participation in export and innovation activities. Hence, a firm is said to be exporter if it reported positive amount of sales revenues coming from exports. Furthermore, firm is classified as innovator if it introduced new products or services in three years prior to survey. When it comes to innovations, two groups of countries do not demonstrate any significant differences. More than half firms have been involved in innovation activities. However, there are significant differences with respect to exporting behaviour of firms. While in CEECs about 50% of sample participated on international market, in SEECs only about 40% of firms were involved in exporting.

3.3. Characteristics of analysed firms

Over past two decades innovation and exporting behaviour of firms in CEECs and SEECs was influenced with numerous determinants (Grosfeld and Roland, 1996; Djankov and Murrell, 2002). Among elements of firm behaviour existing literature has identified ownership, quality of management, investment in human capital and in technology as particularly important. Furthermore, the propensity of firms towards exporting and innovation activities has been associated with horizontal and vertical spillovers coming from agglomeration externalities, international trade and competition on domestic market. Finally, financial obstacles and quality of institutional environment have been found to influence decision of firms to engage in strategic activities such as innovations and exporting.

² CEECs include Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic and Slovenia. SEECs include Albania, Bosnia and Hercegovina, FYR Macedonia, Kosovo, Moldavia, Montenegro and Serbia.

Transition paths of two groups of countries have been to some extent different. While CEECs, particularly those that joined EU in 2004, have achieved remarkable progress over past two decades in terms of integration in regional, European and global economic associations, countries from SEEC group are still lagging behind. The institutional reforms pursued by individual countries had important role in their ability to attract foreign investment, an important source of knowledge and technology spillovers. Also, they had important implications for the market orientation of firms in these countries and their chances of exporting. To this end, one can expect differences in characteristics of firms in two groups of countries.

Table 2: Characteristics of firms in analysed countries

	CEEC	SEEC
Firm size (employees)*	118	75
Firm age*	19	15
Managerial experience (years in branch)*	17	16
Investment in training**	47	38
Predominantly foreign owned firms**	15	11
Predominantly domestic owned firms**	82	85
Firms predominantly owned with other types of ownership**	3	4
Firms licensing foreign technology**	19	33
Intensity of competition (more than two rivals in industry)**	64	58
Firms receiving subsidies**	23	12
Pressure of foreign competitors to innovate**	52	51
Pressure of domestic competitors to innovate**	37	41
Pressure of customers to innovate**	31	54
Financial obstacles**	21	26
Firms located in large urban areas**	29	41
Previous exporting experience**	55	40

Source: BEEPS Database

**mean value*

*** % of total sample*

Table 2 presents characteristics of firms in analysed sample. Several interesting findings emerge from there. Judging by average age of firms and average age of experience their managers have in sector in which firm operates, there are no differences between firms in two groups of countries. However, considerably larger proportion of firms invests in training of employees, which can be considered as proxy for quality upgrading of human capital, in CEECs than in SEECs. When it comes to ownership, analysed firms are in predominantly domestic private ownership which is being followed with predominantly foreign ownership. However, considerably larger proportion of firms in SEECs than in CEECs had licensed foreign technology. Also, firms in SEECs in making their decision to innovate attach greater importance to pressure of domestic competitor and pressure of customers than their counterparts in CEECs. Finally, the differences exist with respect to previous exporting experience with firms in CEECs having longer tradition of selling abroad.

4. Model specification and methodology

Theoretical models and the empirical evidence reviewed so far suggest that exporting and innovation may be determined with set of mutual factors. Furthermore, the two may be mutually reinforcing. As suggested earlier, previous innovation activities may reduce risk of failure on international market and thus exert positive effect on decision of firms to export. Furthermore, previous exporting experience may act as source of knowledge and technology spillovers which can provide impulse for firms to innovate. To this end, the two decisions of firms should be modelled jointly (Aw et al., 2005; Girma et al., 2007; Damijan et al., 2010). The methodology capable for such estimation is seemingly unrelated bivariate probit methodology. In simplest form the model can be expressed as:

$$Prob(Exp_t = 1) = f(Exp_{t-n}, Innov_{t-n}, X)$$

$$Prob(Innov_{t-n} = 1) = f(Exp_{t-n}, X)$$

The dependent variable in first equation is constructed on the basis of firm's value of exports over past year. Hence, all firms that reported positive value of exports are considered as exporters. The dependent variable of second equation is constructed on the basis of question whether firm introduced new product or service over three years prior to survey. Hence, firm is classified as innovator if it responded on this question affirmatively. Previous studies have modelled exporting and innovation experience with lagged values of dependent variables from above two equations. However, the dataset used in this paper does not provide such information. For this reason, it was necessary to come up with alternative solution. The variable representing previous exporting experience is categorical variable constructed on the basis of firm's answer on question about the year in which it started exporting (Exp_{t-n}). Hence, a firm is said to have exporting experience if it exported at least two years prior to survey. It is expected that such experience has positive impact on innovating and exporting decisions. The past innovation experience, entering right hand side of first equation, is measured with dependent variable from second equation ($Innov_{t-n}$). As explained earlier, this variable is constructed on the basis of response to question whether firm introduced new product or service three years prior to survey.

Both equations include several additional explanatory variables (represented with X). Hence, natural logarithm of the number of employees is included as measure of firm's size while experience of firm is modelled with natural logarithm of firm's age and natural logarithm of managerial years of experience in firm's industry. The quality of human capital is measured with two categorical variables. First takes value of 1 if firm offers training to its employees while second takes same value if firm considers education of employees as barrier to its activities. The model also includes three variables representing adjustments of firms in terms of their existing products. These variables take value of one if firm outsourced production of one of its products, decided to discontinue or upgrade one of its existing products respectively. It is expected that such activities release financial resources which can be used for development of new products and investment in sunk costs of exporting.

With respect to ownership of firms, the model distinguishes between predominantly privately foreign owned, predominantly privately domestic owned and enterprises predominantly owned by other type of ownership (base category). As noted earlier, some patterns of ownership, primarily foreign ownership, have been found to exert positive impact on decisions of firms to innovate and to export. The intensity of competition in industry is measured with categorical

variable which takes value of one if firm faces more than two rivals. Furthermore, the model includes variable controlling for agglomeration externalities which takes value of one if firm is located in large urban areas. Financial factors are proxied with two categorical variables. First takes value of one if firm receives government subsidies while the second takes same value if firm considers financial obstacles as barrier to its activities. In addition to these variables innovation equation includes three variables constructed on the basis of answers about importance of individual factors for the decision of firms to innovate. Hence, these variables take value of one if firm considers pressure of foreign rivals, pressure of domestic rivals or pressure of customers as highly important factors influencing its decision to innovate. This equation also includes categorical variable controlling for firms that have licensed foreign technology. Finally, to control for country specific factors both equations include categorical variable that takes the value of one if firm is located in SEEC group of countries.

5. Discussion of findings

The results of estimation are presented in Table 3. First two columns show results for innovation and exporting equations estimated on the whole sample while the results in third and fourth column refer to estimates undertaken on the sample of CEECs. As it can be seen, in both equations Wald test for correlation between error terms of two equations is rejected with high probability providing support to modelling approach adopted in this paper.

Table 3: Results of estimation

	Whole sample		CEECs	
	Innovation	Export	Innovation	Export
Decision to innovate	-	1.31***	-	1.49***
Export experience	0.25***	2.20***	0.35***	2.15***
Size	-0.01	0.13***	0.02	0.13***
Age	0.03	-0.20***	0.02	-0.22***
Managerial experience	-0.01	0.06	-0.04	0.09
Education of employees	0.07	0.05	0.05	0.01
Training	0.31***	-0.81	0.30***	-0.16
Outsourcing	0.15*	0.09	0.10	0.01
Discontinuation	0.51***	-0.08	0.44***	-0.07
Upgrading	1.06***	-0.23	1.14***	-0.41**
Foreign ownership	-0.21	0.52**	-0.21	0.62**
Domestic ownership	-0.13	0.01	-0.15	0.01
Competition	0.36***	-0.33***	0.30***	-0.33***
Subsidies	0.20**	-0.09	0.21**	-0.14
Financial obstacles	0.19**	-0.04	0.21**	-0.03
Location	0.02	-0.06	0.16*	-0.06
Licensing of foreign technology	0.16**	-	0.13	-
Pressure of foreign rivals to innovate	0.02	-	-0.01	-
Pressure of domestic rivals to innovate	-0.11	-	-0.13	-
Pressure of customers to innovate	0.19**	-	0.22**	-
SEEC	-0.01	-0.05	-	-
Cro	-	-	0.11	0.11
BgRo	-	-	-0.17	-0.06
Constant term	-1.27***	-1.80***	-1.24***	-1.70***

Number of observations	1784	1251
Wald test of rho=0 (chi2)	5.28	7.96
Prob>chi2	0.02**	0.00***

Source: Authors calculations

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% level respectively

5.1. Results for whole sample

As it can be seen from first two columns previous innovation activities increase propensity of firms towards exporting. This implies that ability to differentiate themselves from rivals reduces risk of failure on international market which in turn acts as impulse for firms to go beyond their borders. Same finding can be explained with thesis that most competitive firms self-select themselves into exporting. Furthermore, the results provide support to thesis about learning-by-exporting. The coefficient measuring this effect is statistically significant and positive in both innovation and exporting equations. On one hand, this finding signals that participation on international market provides firms with knowledge and skills which would otherwise be difficult to obtain and thus enables them to innovate. On the other hand, previous experience of competing abroad as well as established links or reputation on foreign markets may motivate firms to go beyond domestic borders.

Neither size nor previous experience influences the decision of firms to innovate. However, in exporting equation, size of firm is statistically significant and positive while age is significant and negative. The former finding can be associated with economies of scale and easier access to financial funds needed for investment in sunk costs of exporting. The latter may signal slower adjustment of older firms to changes in their environment. Among variables reflecting human capital, only investment in training of employees is statistically significant and positive in innovation equation. Hence, the development of skills and building of knowledge through on-the-job training are likely to enhance creativity of employees and thus motivate their firms to innovate. All three variables representing product restructuring, i.e. outsourcing, discontinuation and upgrading of existing products are statistically significant and positive in innovation equation. It is therefore likely that restructuring through termination of outdated products, improvements of those with market prospects as well as outsourcing of some activities release funds which can be used for development of new products and services.

The ownership of firm does not appear as significant variable in innovation equation but the coefficient for firms in predominantly private foreign ownership is statistically significant and positive in exporting equation. On one hand, such finding may be associated with intra-firm transfer of skills, knowledge and technology from foreign parent companies to their daughter firms on domestic market. On the other hand, it can also be understood in context of outsourcing which took place from West European market economies towards their counterparts in both CEECs and SEECs over past two decades. The coefficient on competition is statistically significant with positive sign in innovation equation but negative sign in exporting equation. This suggests that pressure of rivals motivates firms to search for new and better ways of doing things. However, it also signals that stronger rivalry at home requires investment of sizeable

resources in survival which could otherwise be employed in exporting. Furthermore, coefficients on both variables representing financial factors, access to subsidies and perception of financial obstacles, are statistically significant and positive. These findings are consistent with earlier findings reported for transition economies (Hashi and Stojcic, 2010). Accordingly, access to subsidies provides firms with finance needed for investment in innovations while financial obstacles require from them more efficient use of resources and search for new paths towards survival.

Agglomeration externalities do not have important role for decisions of analysed firms to export or innovate as variable controlling for location of firms in large urban areas is statistically insignificant. Licensing of foreign technology, however, increases probability of innovating. Among factors identified by firms as highly important determinants of their decision to innovate only pressure of customers is statistically significant and positive. This suggests that demand-side rather than supply-side factors act as driving force behind innovation behaviour of firms in analysed countries. Finally, variable controlling for differences between CEECs and SEECs is statistically insignificant.

5.2. Results for CEECs

Sizeable body of literature has documented that reforms in CEECs and SEECs took place at different pace across countries which had impact on restructuring of their enterprises. In this context, CEECs are usually labelled as group of countries that went furthest in pursuit of reforms. However, within this group of countries there are differences between those that joined European Union in 2004, Bulgaria and Romania who were admitted in 2007 and Croatia a country with highest prospects of becoming next EU member. To control for these differences the above model is estimated only for sample of CEECs whereby the variable controlling for difference between SEECs and CEECs has been replaced with two variables one controlling for Bulgaria and Romania and another controlling for Croatia. These results are presented in third and fourth column of Table 3.

Most of findings are identical to those obtained for the whole sample. Accordingly, there are evidence in support of both theses about self-selection and learning-by-exporting. However, in exporting equation, the coefficient for upgrading of existing products is statistically significant and negative which was not case in previous estimation. A likely explanation is that improvements in existing products enable firms to compete on domestic market and thus erode their incentives to export. Another difference concerns agglomeration externalities. Hence, firms located in large urban areas are more likely to innovate. This means that knowledge and skill transfer, cooperation among firms and between firms and scientific and professional institutions have important role for innovation behaviour of these firms. Finally, both variables for country specific effects are statistically insignificant suggesting that there are no significant differences in behaviour of firms that can be attributed to these effects.

6. Conclusion

The decisions of firms to export and to innovate are closely related. Over past decades sizeable body of knowledge has been produced studying the relationship between two. The general message coming from this literature is that most competitive firms can more easily differentiate themselves from their rivals and thus minimise risks of failure which increases their propensity

towards exporting. Furthermore, it has been postulated that participation on international market provides firms with skills, knowledge and technology that can ease their innovation activities. It is also being recognised that two decisions share number of common determinants as both require investment in specific resources which has characteristics of sunk costs.

The objective of this paper was to explore determinants of firms decisions to export and to innovate in CEECs and SEECs two groups of transition economies whose paths over past two decades have been to some extent different. The evidence from analysis provides support to both theses of self-selection and learning by exporting. Furthermore, pressure of competitors, demand side factors and financing determine decisions of firms to innovate while size, experience and ownership have impact on their propensity towards exporting. Such findings are consistent with earlier literature. Finally, there appears to be no significant difference in behaviour of firms across different countries.

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