WHAT FIRMS ARE REWARDED AFTER GLOBAL FINANCIAL CRISIS? THE ROLE OF INNOVATION AND GLOBALIZATION STRATEGIES IN RECOVERY

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ABSTRACT

The aim of the research is to conduct an empirical investigation and reveal what types of globalization and innovation strategies in turbulent and unfavorable regional institutional environment are most likely to be associated with different trajectories of Russian manufacturing firms' performance in 2007-2012. We employ the results of empirical survey of 1000 medium and large enterprises in manufacturing (2009) linked to financial data from Amadeus database and the data on the regional institutional environment. We test that (1) introduction of innovations before the crisis ceteris paribus helped the firms to successfully pass the crisis and recover. We expect that (2) companies that became globalized before the crisis (via importing of intermediate and capital goods; exporting; FDI; establishment of partner linkages with foreign firms) ceteris paribus are more likely to successfully pass the crisis and grow. And (3) propose the positive effect of synergy of innovation efforts and globalization strategy of the firm. We expect that the abovementioned factors are complimentary and reinforce the ability of the firm to recover after crisis shock. We found strong support for the hypothesis that firms financing introduction of new products before the crisis and simultaneously managed to promote and sell them on the global market were rewarded by quick return to the growing path after global crisis. Other strategies, i.e. solely innovations without exporting play insignificant role while exporting without attempts to introduce new products contribute even negatively to post-crisis recover. Institutional environment also matters: in the regions with less level of corruption firms were more likely to grow after the crisis.

Keywords: *firm performance; globalization; innovation; manufacturing firms; strategy*

1. INTRODUCTION

While studies of determinants of firms' growth always have been in the focus of both theoretical and empirical research, the Economic Crisis of 2008-2009 being a major shock to most of the countries has motivated studies aimed at revealing factors of sustainability of firms' performance. For Russian economy assessment of sustainability is specifically interesting as for quite a long time Russia enjoyed almost a decade (1999-2008) of high and stable rates of growth. Favorable macroeconomic conditions on one hand provided

opportunities for growth and modernization for Russian firms. In particular, during the period of growth a lot of Russian firms became more open to the World, increased participation in the foreign trade, acquired foreign co-owners, build up their international partnerships, etc. Though, on the other hand, high rates of economic growth, relatively easy access to external financing, etc. softened up budget constraints and slowed down the processes of "constructive destruction", i.e. crowding out of less efficient firms by more efficient. Thus, the relatively high level of heterogeneity in terms of productivity and other performance indicators, in particular in Russian manufacturing persisted (Gonzalez et al, 2013).

Russian manufacturing has been strongly hit by the crisis of 2008-2009 and manufacturing has been hit harder than other industries. During the acute phase of the crisis (in Russia it continued since the last quarter of 2008 till the second quarter of 2009) the drop of production in manufacturing was about 16%, comparing, for example, to about 5% in agriculture and trade. The recovery measured at macroeconomic level was comparatively quick and the industrial production reached the pre-crisis level. Still, after 2010 the growth rates in manufacturing began to decline and by the end of 2013 fell to near zero level.

This paper mostly focuses on the consequences of the crisis for more globalized firms, which has been prior to the crisis more active in different international activities. We are interested in verifying the hypothesis that active globalization at a firm level facilitates the performance during the crisis and post-crisis recovery period using the integrated database of the survey data and objective statistics.

2. DATA, METHODOLOGY AND EMPIRICAL STRATEGY

We use several data sources for our research. The main source of empirical data comes from results of large-scale empirical survey about of 1000 medium and large enterprises in 8 two-digit manufacturing industries (by NACE code) conducted by face-to face interviews with top-managers in more than 40 Russian regions in 2009 (for detailed description of the database see Kuznetsov *et al.* 2011). The questionnaire covers a variety of issues on competitiveness and behavior patterns of firms, including their internationalization and innovation activities in pre-crisis period of 2006-2008, i.e. – export propensity and geographical structure of exports, importing of intermediaries and equipment, availability of foreign strategic partners, financing of new product development in 2008. The initial survey data were linked to RUSLANA/Amadeus data on firms' sales. As only the firms with reported data for all years in 2007-2012 time period were included into the analysis the initial sample reduced to 670 observations.

As a measure of firms' growth we use an indicator of sales in 2007-2012 deflated by price indexes for the selected 2-digit industries in order to capture price-shocks due to global crisis. In our previous research using the procedure of hierarchical cluster analysis applied to the general population of Russian medium and large manufacturing firms as well as to our sample we revealed four stable clusters describing different trajectories of firms' growth in 2007-2012 (Ermilova et al, 2015).The sales for each firm are standardized using Z-scores (Z-values) in relation to the average sales amount for the specific companies for the total period of 2007-2012. As a result of the clustering procedure four stable clusters of crisis and post-crisis trajectories of the standardized output have been selected. Among them 92% of firms got into two large clusters. First cluster consists of firms with a classical V-type growth trajectory - decline in the crisis year of 2009 and then quick recovery and return to the growth path. Second cluster consists of firms which after the fall of sales in crisis have not managed to

recover to pre-crisis levels (L-type trajectory). In the sample these two clusters cover 32% and 60% of firms, correspondingly, and they are the objects of our research.

In this paper we, first, test our hypotheses on the effects of firms' internationalization strategies before the beginning of the global crisis of 2008-2009 on the probability of quick recovery and post-crisis sustainable growth. We explore a variety of internationalization strategies which the firm could follow: exporting, importing of intermediaries or equipment, establishment of strategic partnerships with foreign partners or FDI of foreign co-owner. We take in to consideration several important characteristics of exporting: the possibility of its non-linear effect of firms' growth during recession, the impact of geographical destination (CIS countries vs non-CIS countries) and the product scope of exporting, i.e. weather the firm had financed introduction of new products to the market in pre-crisis period. We treat this fact as a proxy for possibility to export advanced products for more demanding customers. We also took into consideration the location of the enterprise in terms of socio-economic and institutional diversity of Russian regions and urban settlements. Both characteristics reflect different possibilities of recovery: inter-regional differences in structural diversity of Russian regional economy, the great inequality in per capita domestic product provide unequal opportunities for post-crisis growth of the economy. The location of firms taken into consideration: according to estimations of economic geographers (Nefedova et al, 2010) only cities with population of 250, 000 and above (majority of oblast-level regional centers) were well positioned to meet the challengers of crisis. An importance of heterogeneity in the regional institutional environment in Russia due to the variation of local regulation, different economic policies pursued by local authorities, the quality of institutions (e.g. the level of corruption), etc. also is taken into consideration. The strong negative influence of corruption on both innovation capacity and performance of Russian firms was highlighted in the literature (Chadee and Roxas, 2013).

In this paper we test three main hypotheses. Our first hypothesis links the dynamics of sales growth with innovation activity which the literature in line with Shumpeterian view suggest to be one of the main determinants of firm's growth (Aghion et al, 2015; Coad, 2009; Geroski and Machin, 1992; Geroski and Toker, 1996; Hall and Mairesse, 2006 . Though the economic crisis had a significant negative impact on innovation activity of Russian firms this impact was less pronounced for the firms pursuing the strategy of new product development in contrast to the firms involved in gradual improvement of products and processes (Kuznetsov & Simachev, 2010). So, we expect that:

H1: Financing of new product development before the crisis ceteris paribus helped the firms to successfully pass the crisis and recover.

Our second hypothesis propose that internationalization activities of the enterprises in pre-crisis period (exporting, importing of intermediaries and equipment, establishing of strategic partnerships with foreign partners and availability of foreign co-owner) matter for the speed of recovery. Internationalization strategies of We presume that according to self-selection of better performing firms to exporting and importing driven by the costs of internationalization (Melitz, 2003; Melitz and Redding, 2012), they could be more successful than locally oriented firms in coping with crisis and exhibit faster recovery.

Keeping in mind that foreigners initially bought more efficient firms (Sabirianova et al, 2012; Fons-Rosen *et al.* 2014) and that foreign-owned firms and local internationalized firms are, in general, more productive (Helpman et al, 2003), manufacturing firms with foreign ownership on the average were found to be more successful in overcoming the crisis (Alfaro and Chen 2012, Kolasa *et al.* 2010, Varum and Rocha 2011).

However, these potential advantages could disappear due to global character of the crisis and in case the main firm's markets suffered more than others internationalization could become a disadvantage (Burger et al, 2014), especially if a large share of sales goes to the global market.

H2: companies that became globalized before the crisis (via importing of intermediate and capital goods; exporting; FDI; establishment of partner linkages with foreign firms) ceteris paribus are more likely to successfully pass the crisis and grow.

Our third hypothesis proposes the positive effect of synergy of innovation efforts and globalization strategy of the firm. High-productivity plants were found to be more likely to self-select into both R&D and exporting (Aw et al, 2011) while the direction of this link is not clear: there is an evidence that both exporting and importing induce innovations in developed and transition countries (Gorodnichenko et al, 2009; Altomonte et al, 2013; Golikova et al, 2012; Gonchar and Kuznetsov, 2015) and that product and process innovation might drive exports at firm level (Cassiman and Golovko 2011). The effect of synergy between exporting and innovation was found to be significant in terms of future productivity and survival of firms (Castellani and Zanfei, 2007; Aw et al, 2011; Ito and Lechevalier, 2010) and we expect it to be positively correlated with growth opportunities of firms as well:

H3: companies involved in product innovation and exporting before the crisis are ceteris paribus more likely to follow V-type trajectory of growth.

Descriptive statistics for V-type and L-type clusters of firms is presented in Table 1.

(Table following on the next page)

Table 1: Descriptive statistics

Indicator	"V"-cluster	"L"-cluster
Internationalization factors		
Share of export in revenues in 2008, %	7.63	8.36
Share of imported raw materials/components in total materials/components purchase in 2008,%	17.26	16.17
Imported equipment in total purchased equipment in 2008	64.2	56.5
New foreign strategic partners	24.5	18.5
Geographical structure of firm exports		
No export	50.9	51.5
More than 90% of export to CIS	29.7	30.8
More than 90% to non CIS	5.7	4.0
Both CIS and non-CIS destinations	13.7	13.8
Innovation factors		
Financed new product development in 2008	58.0	48.3
Productivity		
Sales per employee to industry's median value ratio	1.68	1.56
Ownership		
Foreign co-owned	0.150	0.083
State-co-owned enterprise	0.053	0.039
Regional economy		
Gross Regional Product per capita, 2008, thous. Rub.	25.3	24.9
Share of manufacturing in GRP, %	0.311	0.299
Regional institutional environment		
Bribery in the region (the component of everyday corruption index)	0.474	0.491
Number of employees in 2007	623.1	586.6
Observations	212	400

Source: Authors' calculations based on survey data, Rosstat regional statistics (Rosstat, 2009; Petrov and Titkov (2013), POF (2011).

3. THE ECONOMETRIC MODEL AND ESTIMATION RESULTS

In all specifications the dependent variable that is the probability for a firm to find itself in V-type cluster, described in the previous section (i.e. the probability for a firm to successfully overcome the crisis and to return quickly to the growing path). This dummy variable takes value "1" for enterprises, that are classified as firms that recovered quickly (V-type cluster) and value "0" for companies with L-type dynamics of sales.

The regression equation takes the following form:

$$Pr\,(Crisis\_success) = \alpha * Xi + \beta * Individ\_controls + \gamma * Sectoral\_controls + \delta * Regional\_controls + \mu * Location\_controls + \eta * Institutional\_controls + \varepsilon$$

where *Xi* is a set of key explanatory variables (dummy for financing of product innovation before crisis and a set of internationalization indicators), dummy variables for characteristics of ownership to verify the role of foreign ownership);

Individ_controls represents the set of firm-level control variables (participation in the business group; firm's size groups and labor productivity in 2007 measured as logarithm ratio of individual level to sample industry median level).

Sectoral_controls represents 2-digit industry dummies, Location_controls – is a dummy variable for regional capitals (including Moscow and St.Petersburg).

Regional_controls represents the set of regional control variables, such as regional fixed effects, the logarithm of Gross Regional Product (GRP) per capita, region size or structure of the regional economy evaluated as the share of manufacturing industries in GRP in 2008.

Institutional_controls represents the regional level of corruption measured as level of bribery -a subcomponent of everyday corruption index (Petrov and Titkov, 2013; POF, 2011).

The coefficients of the equations were estimated by binary probit regressions with robust standard errors clustered by regions. For robustness checks we incorporated the age of the firm grouped at categories before 1991; 1992-1998 and after 1999 as this characteristic is treated to be significant in the empirical analysis of firm's growth determinants (Burger et al, 2014; Geroski and Gugler, 2004; Coad et al, 2012; Navaretti et al, 2012).

(Table following on the next page)

Table 2: Results of the Estimation of Firm Internationalization's Effect on the "V"-type growth trajectory

Dependant variable: "V"-type cluster	(1)	(2)	(3)	(4)
VARIABLES				
NEW_PRODUCT08	0.331***(0.091)	0.129 (0.143)	0.125 (0.142)	0.069 (0.160)
EXPORT_SHARE08	-0.793 (0.523)	-7.894***(1.583)	-7.906***(1.576)	-6.496***(1.580)
_INEWXEXPOR_1		5.696***(2.012)	5.699***(1.987)	4.809**(2.018)
EXPORT_SHARE_SQ08		10.77***(2.545)	10.76***(2.488)	8.465***(2.333)
_INEWXEXPORa1		-8.410***(3.226)	-8.381***(3.152)	-6.761**(3.162)
SHARE_IMP_RAW08	0.100 (0.256)	-0.276 (0.582)	-0.185 (0.584)	0.018 (0.785)
SHARE_IMP_RAW_SQ		0.574 (0.786)	0.513 (0.778)	0.007 (0.988)
SHARE_IMP_EQ08	0.128 (0.150)	0.132 (0.161)	0.133 (0.160)	0.057 (0.228)
_IEXP_BY_DE_1	0.002 (0.167)	0.267 (0.199)	0.260 (0.198)	0.277 (0.224)
_IEXP_BY_DE_2	0.429 (0.354)	0.642* (0.345)	0.647* (0.348)	0.817**(0.387)
_IEXP_BY_DE_3	4.68e-05 (0.221)	0.331 (0.253)	0.330 (0.253)	0.272 (0.326)
NEW_FOR_STRAT_PART	0.257* (0.145)	0.276* (0.150)	0.281* (0.155)	0.276*(0.162)
HOLDING	0.159 (0.174)	0.130 (0.178)	0.121 (0.182)	0.070 (0.188)
FOREIGN_OWN08	0.271 (0.228)	0.229 (0.241)	0.222 (0.236)	0.240 (0.247)
STATE_OWN08	-0.051 (0.281)	-0.031 (0.290)	-0.053 (0.293)	-0.023 (0.273)
LOG_SALES_MED_RATIO07	0.102 (0.079)	0.081 (0.081)	0.090 (0.090)	0.024 (0.093)
_IGR_SIZE07_1	0.044 (0.274)	0.071 (0.282)	0.074 (0.280)	-0.274 (0.288)
_IGR_SIZE07_2	0.051 (0.281)	0.119 (0.293)	0.106 (0.287)	-0.199 (0.308)
_IGR_SIZE07_3	-0.040 (0.293)	0.003 (0.303)	-0.011 (0.293)	-0.383 (0.301)
_IGR_SIZE07_4	-0.199 (0.299)	-0.143 (0.292)	-0.172 (0.291)	-0.504 (0.329)
BRIBES_A	-0.0172** (0.007)	-0.0172** (0.007)	-0.0168**(0.007)	-0.0196**(0.008)
REG_GRP_PC	0.000687 (0.00493)	0.002 (0.005)	0.002 (0.005)	0.003(0.005)
REG_MANUF_SHARE	0.001(0.007)	0.003 (0.007)	0.003 (0.007)	0.002 (0.007)
REG_CAPITAL_A	0.091 (0.143)	0.078 (0.144)	0.089 (0.147)	0.125 (0.141)
_Iage_3cat_2			-0.185 (0.237)	-0.154 (0.229)
_Iage_3cat_3			-0.006 (0.205)	0.082 (0.257)
INVEST_08_LOW_A				0.015 (0.178)
INVEST_08_HIGH_A				0.401*(0.211)
RESTR_BUSINESS_PROC				0.306**(0.149)
JOB_CREATOR				0.368**(0.150)
Industries controlled				
Constant	0.0350 (0.521)	0.038 (0.529)	0.049 (0.531)	0.112 (0.612)
Pseudo Rsq	0.0643	0.082	0.084	0.127
Observations	507	507	507	454

*** - p<0.01; **- p<0.05; * p<0.1 Robust standard errors in parentheses

Source: Authors' calculations based on survey data

The results for different model specifications in Table 2 allows for several conclusions. First, we see that a straightforward attempt (Model 1) at catching the effect of different globalization indicators on the probability for a firm to have a V-type trajectory (i.e. fast post-crisis recovery) fails. The scale of participation in international trade (either by export or by importing raw materials/components) seems not to have any impact on the type of the trajectory. The existence of foreign investor (co-owner) also does not increase the chances for quick recovery. Only the acquirement of foreign strategic partner is important. Though, as

further analysis shows, this ”no globalization effect” result is due to non-linear relationship between the participation in foreign trade (in particular, export) and chances for quick recovery trajectory. In all other specifications (Models 2-4) we find strong evidence of that non-linearity. If the share of export revenues is not high the larger share of export lower down chances for the recovery, while starting from certain value the increase of export revenues share lead to higher probability for a firm to belong to V-type cluster. This non-linear effect may be due to different type of products firm produces and/or to difference in geography of export: a firm producing more innovative products and selling to more developed (and, thus, more demanding) markets should have comparative advantage during the crisis. And the results of Model 2 supports this presumption: the coefficient at cross-term between innovation dummy and the share of export revenues is positive and highly significant statistically. As well as “far abroad” export destination: the coefficient at the dummy for group of companies selling predominantly to non-CIS countries is positive and significant though the significance is not very high. Models 3 shows that the abovementioned results are robust as the inclusion of additional variable of firms age (in some cases there may be a distinct difference between old “Soviet” enterprises, forms created during the privatization of the 90-ies and young firms) does not change the main findings. In Model 4 we control our results on possible “self-selection” effect for firms which were active in restructuring and modernization prior to the crisis (this effect has been found in our previous research). We see that while active modernization do increase the chances for a firm to get into V-type trajectory cluster this does not change other results: non-linear relation with share of export revenues, positive impact of being an innovator and positive impact of selling to more advanced markets (i.e. to non-CIS countries).

4. CONCLUSION

We found a strong support for the hypothesis that firms that introduced new products before the crisis and simultaneously managed to promote and sell them on the global market were rewarded by quick return to the growing path after global crisis. Other strategies, i.e. solely innovations without exporting play insignificant role while exporting without attempts to introduce new products contribute even negatively to post-crisis recover. Institutional environment also matters: in the regions with less level of corruption firms were more likely to grow after the crisis.

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