



NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

Victoria Golikova, Ksenia Gonchar, Boris Kuznetsov

**ENTRY INTO EXPORT MARKETS AS
AN INCENTIVE TO INNOVATE.
EVIDENCE FROM THE RUSSIAN
MANUFACTURING INDUSTRY
SURVEY**

BASIC RESEARCH PROGRAM

WORKING PAPERS

SERIES: ECONOMICS
WP BRP 11/EC/2011

Victoria Golikova, Ksenia Gonchar, Boris Kuznetsov¹

ENTRY INTO EXPORT MARKETS AS AN INCENTIVE TO INNOVATE. EVIDENCE FROM THE RUSSIAN MANUFACTURING INDUSTRY SURVEY

This paper examines how export and export destination stimulates innovation by Russian manufacturing firms. The discussion is guided by the theoretical models for heterogeneous firms engaged in international trade which predict that, because more productive firms generate higher profit gains, they are able to afford high entry costs, and trade liberalization encourages the use of more progressive technologies and brings higher returns from R&D investments. We will test the theory using a panel of Russian manufacturing firms surveyed in 2004 and 2009, and use export entry and export destinations to identify the causal effects on various direct measures of technologies, skill and management innovations. We find evidence on exporters' higher R&D financing, better management and technological upgrades. Exporters, most noticeably long-time and continuous exporters, are more active in monitoring their competitors, both domestically and internationally, and more frequently employ highly qualified managers. Exporters are more active in IT implementation. When it comes to export destination, we find that non-CIS exporters are more prone to learning. However, we cannot identify that government or foreign ownership shows any impact on learning-by-exporting effects.

Key words: innovation, export, export destination, learning effects.
JEL classification: F14, O31, O33, P23.

¹ All authors work in the Institute for Industrial and Markets Studies under the Higher School of Economics, hold degree in economics. Victoria Golikova, senior research fellow, victoria@hse.ru; Ksenia Gonchar, leading research fellow, kgonchar@hse.ru, Boris Kuznetsov, leading research fellow, bkuz@bk.ru.

1. Introduction

Russia's WTO accession, when the process is completed, will drastically change the trade and competitive environments for Russian producers, in both the domestic and international markets. The benefits of trade liberalization are apparent for the resource and other primary sectors, but it is unclear how these changes may impact Russia's manufacturing industries. Reasonable concerns have been raised about the low competitiveness of many firms in this sector with respect to costs and product quality, and on their capacity to embrace modern management and process technologies, punctuated by their inadequate skills in building effective client and supplier relationships. It is not yet clear how these firms would respond to soaring competitive pressures, and whether they have access to the instruments and resources that would allow them to address new challenges through management enhancements and the effective adoption of new technologies, managerial practices, expertise and knowledge. In other words, will these firms be able to take advantage of trade liberalization and learn lessons from globalization? If so, what would the transmitting mechanisms be? What types of firms benefit the most from trade incentives? In what aspects are learning-by-exporting effects most pronounced? Does export destination matter? How much do Russian companies differ in their abilities to learn from exporting by their counterparts in other transition economies that are more globally integrated and involved?

Learning-by-exporting effects are extensively discussed in the economic literature. However, the most quoted papers seem to have a somewhat different focus from ours: is there any evidence at all to support the existence of learning-by-exporting effects per se? Many authors argue that we may be wrong to make conclusions about the nature of such effects when we discuss general regularities observable across the world; specifically, that exporters tend to be more productive, more inclined to innovate, better organized and managed than firms with only domestic, or, all the more so, local orientations. It is argued that in most cases exporters possessed all of these qualities before they entered global markets, and that their high performance and propensity to innovate induced them to enter export markets rather than the other way around [see Greenaway, D. and Kneller, R., 2004 for a review of the literature]. In another paper, we joined this discussion and found self-selection effects, i.e., when the most productive firms self select into export markets, in Russia's manufacturing sector [Golikova, Gonchar, Kuznetsov, forthcoming]. However, in this paper we proceed from an understanding that once a Russian manufacturing firm has entered an export market, it is essential for it to learn through a process of global engagement if it wants to retain this newly gained market niche. Faced with tense competition, choosy customers, and a more advanced business culture, the firm

has to improve more quickly and to a greater extent than other market participants that are still guided by the perception that weak domestic competition and access to administrative resources can make up for their languid performance in the market. Moreover, due to the nature of innovations in the Russian manufacturing sector, the highest returns come from organizational and managerial rather than product or technology innovations. Arguably, it is easier to “learn” the latter from one’s foreign partners than to embrace a capacity to generate full cycle innovations at the technology frontier. We attempt an empirical assessment of learning-by-exporting effects, as we interpret learning as post-entry changes, including organizational innovations, in firm innovative behavior following its entry into global markets.

The paper is organized as follows. First, we survey the overall setting of the Russian manufacturing sector from the perspective of its exporting potential and possible learning-by-exporting effects. Then we review the global theoretical and empirical literature predicting and testing key regularities related to our subject. We describe the dataset used in the study, elaborate the model, formulate our hypotheses and present the descriptive statistics for the variables we use to test our hypotheses. In the conclusion, we report and interpret the estimation results.

2. Exporting in Russian manufacturing

Macrodata suggest that the export base in manufacturing is shrinking relative to other sectors, while trade competitiveness, measured by RCA (revealed comparative advantage), is also deteriorating. Meanwhile, the share of Russian companies in global manufacturing markets is already so small that there hardly seems any room for further contraction.

The modest shares of Russian non-resource exports are most often described as a catch-22 situation: on the one hand, Russian manufacturing goods cannot compete on costs with goods from low-cost economies, while, on the other hand, they are undercut on quality in the high-cost segment. Additionally, Russian companies are not yet widely engaged in global value chains controlled by multinationals; therefore, this mechanism to expand manufacturing exports that is widely utilized by our East European counterparts is not yet fully operational. As a result, the export product structure is dominated by obsolete products and targets shrinking traditional markets. A decomposition of the sources of the growth in Russian exports from 2000–2008 shows that during this period, firms mostly tended to expand their traditional exports to traditional markets, or at most penetrated new markets with their old products; offering new products, either to traditional and/or new markets, was insignificant [Correa, 2011].

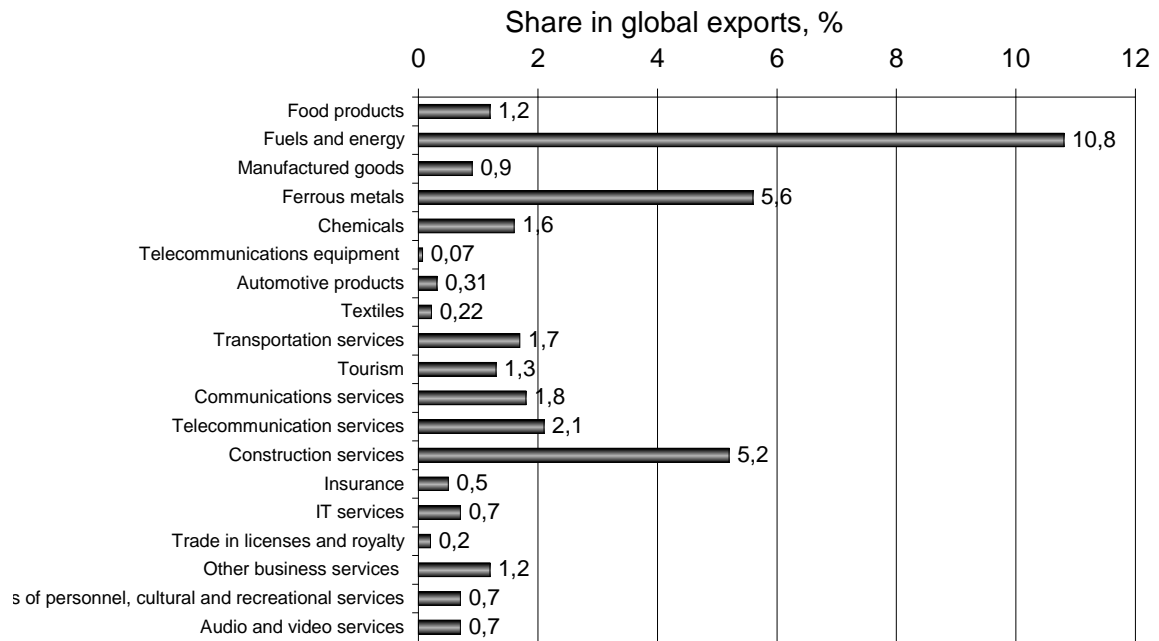


Fig 1. Russia's share in global exports in selected product markets in 2008, %

Note: data for the services sector come from 15 economies, with the 27 EU economies seen as one economy

Source: World Trade Organization. *International Trade Statistics 2009*

http://www.wto.org/english/res_e/statis_e/its2009_e/its09_trade_category_e.htm

However, in the Russian case, relative indicators may be misleading because the current prices for Russian resource and commodity products are so high that their momentum obscures changes in exporting activities by non-resource companies. Even given the current (viewed as humiliating for an industrially developed country) product composition of trade demonstrated by Russian industry, it should be acknowledged that absolute export volumes surged in all of the manufacturing industries (excluding textiles) in the 2000s (Tab. 1). Admittedly, imports exceed exports in all markets, except for the metal and timber industries. Indeed, even in the latter case, the exports are hardly more than resources in the value chain. However, the overall manufacturing export expansion, from US\$ 46 bn in 2000 to almost US\$120 bn in 2007 (over 2.5 times in current prices), indicates significant changes in the profiles and behaviors of Russian manufacturing companies.

Tab. 1 Changes in absolute volumes of exports and imports in selected manufacturing industries, in US\$ bn, actual prices

	1995		2000		2005		2007	
	Exp orts	Imp orts	Exp orts	Imp orts	Exp orts	Imp orts	Exp orts	Imp orts
Metals, precious stones, fabricated goods	20.9	4	22.4	2.8	40.6	7.7	56.9	16.4
Chemicals	7.8	5.1	7.4	6.1	14.4	16.3	20.8	27.5
Machines, equipment, transport vehicles	8	15.7	9.1	10.5	13.5	43.4	19.7	102
Timber and woodworking	4.4	1.1	4.5	1.3	8.3	3.3	12.3	5.3
Agriculture and food products	1.4	13.2	1.6	7.4	4.5	17.4	9.1	27.6
Textiles, clothing and footwear	1.2	2.6	0.8	2.0	1	3.6	0.9	8.6

Source: Rosstat 2011

How sizable is exporting in Russian manufacturing? In other words, what share of all Russian firms are engaged in exporting? Official statistics offer no data on the total number of exporters in the manufacturing industries. According to the RUSLANA database register, 12,630 enterprises reported exporting in 2009, which accounts for about 3 percent of the total population of enterprises. However, there is reason to believe that the register includes export quitters and shell companies; therefore, the real share of exporters is most likely underestimated. If the population included only those enterprises that reported annual sales equal or exceeding 1 million rubles at least once in the last three years, the manufacturing register would have about 95,000 such enterprises. Of these, 9,597 enterprises were engaged in exporting in 2009. Therefore, we can suppose with some caution that about 10 percent of manufacturing firms export. By international measures, this is substandard for a large economy with developed manufacturing: for example, in Japan's manufacturing sector, exporters account for 31 percent of the total population (adjusted for firms with n/a data), according to 2003 data [Ito, Lechevalier, 2010]. However, given the high concentration of exports in selected segments of tradable goods and the group of large and medium-sized enterprises, there are grounds to suggest there is a sizable group of exporters in Russian manufacturing. Moreover, exporters appear to be key influences on the modern shape of Russian industry because, according to the RUSLANA database, the top 10 percent of firms produce over 60 percent of total manufacturing output.

Microdata confirm with some degree of certainty that Russian manufacturing firms are gradually opening up to the world – not only through their exporting, but via other globalization channels, including resource and intermediate imports, FDIs, international joint ventures, strategic alliances. Indeed, judging by the two surveys of medium-sized and large manufacturing

firms conducted by the Higher School of Economics (HSE) in 2005 and 2009, the share of firms with no international involvement among large and mid sized enterprises — via exports, imports, or foreign ownership — declined from 24 percent to 17 percent of total respondents. Therefore, if a considerable number of Russian manufacturing firms are, one way or another, involved in international markets, and this involvement is substantial in value terms, there is every reason to look for learning effects.

Do official statistics provide any evidence of learning-by-exporting effects, i.e., of any correlation between a firm’s international engagement and, e.g., its innovative activities? Basically, Rosstat business surveys should contain data on exports and total output broken down by types of economic activities. Our calculations based on these statistics for 2008 suggest that, except for textiles, technology innovators in manufacturing have a much larger share of exports in total sales than the average in their respective sectors (Tab. 2). The widest gap (potentially representing a premium for exports or for innovations) is observed in the pulp and paper, machine-building and food industries.

Tab. 2. Exports as a share of sales of firms reporting technological innovations vs. sector averages, 2008

	Group of enterprises reporting technological innovations		Total respondents to Form 4 <i>Innovations</i>	
	Share of exports in sales, %	Number of surveyed enterprises	Share of exports in sales, %	Number of enterprises
Total manufacturing firms, including	32.4	2114	21.5	17819
Food	6.5	360	3.1	3651
Textiles and clothing	2.4	28	3.8	851
Timber and wood processing	26.7	31	25.5	676
Pulp and paper	34.7	101	17.7	3374
Chemicals	45.8	146	33.1	645
Metals	39.3	81	36.0	353
Machine-building	13.1	275	7.2	1624
Electric engineering, electronics and optics	5.7	421	4.0	1633
Transport vehicles	11.3	204	8.0	886

Source: Authors’ calculations based on CSRS (Center for Science Research and Statistics) and Rosstat data, 2009

Rosstat survey data on innovative products in manufacturing exports show that this share is larger than is generally believed. However, it varies widely across sectors, from virtually no new products in textile and garment exports, to almost all products being innovative in food exports (Fig. 2). Admittedly, the latter may not be so much a sign of the innovative nature of this industry, as the result of excessively lax criteria for branding products as innovative.

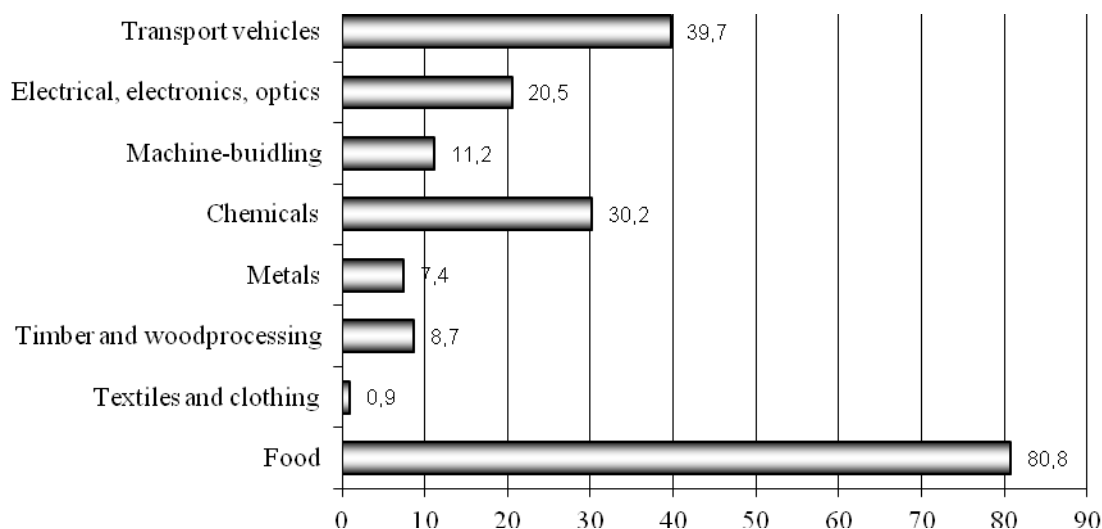


Figure 2. Share of innovative products in manufacturing exports

Source: Authors' calculations based on 2009 business reports according to Rosstat

To summarize, a comparison of the averages available in the official statistics suggests a relationship between exporting and the innovative activities of firms. Admittedly, we cannot make conclusions about the causal direction of this relationship, nor can we control for the effect of other characteristics of a firm on its innovative activities. Moreover, official data do not allow for a comparison between “old”, incumbent exporters traditionally engaged in exporting and “new”, relatively recent export market entrants. In this context, it is unclear whether global market entry is what impacts the innovative behavior of firms or, vice versa, that firms are innovative prior to exporting. In fact, this paper aims to find answers to these questions.

3. Economic literature on the links between exports and innovations

As mentioned above, self-selection effects — i.e., when more productive firms self-select into export markets - have been hypothesized, simulated and supported by extensive empirical evidence. The learning-by-exporting effects are more controversial, with less conclusive evidence and more diverging views. It may be of note that innovations in the context of exporting are usually discussed as mechanisms or links that generate productivity enhancements as a result of exposure to export markets [Aw et al., 2009; Castellani and Zanfei, 2007]. Moreover, convincing evidence is available that interactions between investments in exporting strategies and innovations make such firms more competitive on a sustainable basis [Ito, Lechevalier, 2010]. Therefore, innovations may be interpreted as a condition for productivity gains that result from the firm’s entry into export markets.

The underlying theoretical model used to explore learning-by-exporting effects is the Melitz and Bernard model for heterogeneous firms engaged in international trade [Melitz, 2003,

Bernard et al., 1999], which predicts that because more productive firms generate higher profit gains they are able to afford high entry costs. This would lead to inter-firm reallocations toward more productive firms, resulting in aggregate industry productivity growth. In a more recent paper, [Helpman, Melitz, and Yeaple, 2004] provide a ranking of firms based on their engagement in globalization; these authors predict that the most productive firms choose to engage in FDI, the less productive are active in the domestic market as well as in foreign markets, still less productive firms choose to serve only the domestic market, while the least productive have to exit altogether.

We are interested in the extensions of Melitz's model that postulate technological choice and predict productivity growth in the economy, not only as a result of driving non-productive firms out, but also because trade liberalization encourages the use of more progressive technologies and brings higher returns from R&D investments. In their new model, [Constantini and Melitz, 2008] show how market size may affect a firm's choice in favor of exports or innovations, and prove that a firm's productivity growth is endogenous and influenced by its decision to innovate. Meanwhile, the firm's performance in foreign markets is determined by its new competences and technological advancement, yet irrelevant for the domestic market. [Hallak and Sivadasan, 2009] use their theoretical model to show that exporters are more likely to sell higher quality products at higher prices than non-exporters.

Therefore, the theoretical work has proven that export status and innovations are at least complementary (if not that there are direct learning-by-exporting effects), when one investment decision (to export) becomes a condition for another investment decision (to innovate), and vice versa. Complementarities are largely achieved because both exports and innovations provide potential opportunities for new knowledge [Aw et al., 2005; Castellani and Zanfei, 2007], and because of possible links between product and process innovations [Damijan et al., 2008]. Quite often, a firm's decision to introduce a new product would precede its decision to engage in exporting, while subsequent export proceeds allow the firm to start more expensive process innovations, leading to an increase in productivity. [Sutton, 2007] predicted learning-by-exporting-effects for exporters in transition economies via vertical knowledge transmission in multinational value chains.

Complementarities between exporting and innovations make it possible to establish a performance ranking, with the exporting and innovative firms being the best-performing, followed by the innovative firms, exporting firms, and then firms that do not participate in either activity [Ito, Lechevalier, 2010]. Admittedly, some works argue against complementarities in a situation of heavy resource constraints, when the firm has to choose between exporting and innovations, and these decisions would be more competitive (replacement effect) than

complementary. Specifically, [Wakelin, 1998], found that innovative firms are less likely to export than non-innovative firms, while large, innovative firms are more likely to be exporters than small innovative firms. The author accounts for the above replacement effect by arguing that resource constraints do not allow for simultaneous investments in innovations and in exporting.

Empirical tests of the interaction between exporting and innovations produce mixed results. [Wagner, 2007], the author of the most exhausting review of works in this area, indicates that the empirical literature provides a great deal of evidence supporting the self-selection hypothesis, while research substantiating the learning-by-exporting hypothesis is virtually absent. However, empirical studies utilizing data from emerging and transition economies seem to stand out, as they show that global engagement tends to intensify the innovative activities of firms. Thus, [Bustos, 2011], in her study of the implications of Brazil-Argentina bilateral trade liberalization, provides convincing evidence that exporting increases the firm's revenues and its propensity to invest in technology upgrading. Therefore, on the national scale, benefits from trade liberalization tend to exceed entry costs because more firms would attempt to invest in advanced technologies.

[Gorodnichenko et al., 2010], using data from 27 emerging market economies, provide evidence that exports, imports and involvement in the supply chains of multinational corporations result in intensified innovative activities. Moreover, the stronger a firm's market position, the stronger the learning-by-globalization effects would be.

However, globalization provides a chance, but in no way a guarantee, of overcoming a technology gap. The question of who has better chances – firms lagging the furthest behind or those closer to the leaders – receives a variety of answers in the literature. Some authors believe that the bigger the gap the better the firm's chances for learning-by-exporting and for catching up with the leader [Gershenkron, 1962, Fagerberg, 1994, Julian Dua et al, 2010]. Other authors, building on the empirical evidence from East European transformations, argue that the learning-by-exporting effects are likely to be stronger for firms closer to the technology frontier [Aghion, Bessonova, 2006].

Our primary focus in this study is to discover how international trade impacts innovations. The literature most often refers to such export-related incentives for innovation as competition and knowledge transfer from importers to exporters. Specifically, in their overview, [Greenaway and Kneller, 2007] identify three types of mechanisms to encourage innovative behavior in the context of international trade: interaction with foreign competitors, greater economies of scale and enhanced competition. Human capital enhancements are also often mentioned, due to increased requirements for product quality in international markets. Below we

discuss papers exploring these transmission channels between exporting and technology and business innovations.

The most simple mechanism is based on the complementarities between exports and innovations. I.e. the accumulation of export revenues provides funds for innovations, while the latter, in their turn, provide a basis for export changes and help to drop the no-win strategy of price competition. For example, [Kandogan, 2004] explores the drivers behind the growing role played by transition economies in global trade between 1992 and 1998. The author demonstrates that most of the countries in the panel began exporting with low-price products of relatively substandard quality. However, as export revenues accumulated and enterprises restructured, products improved as a result of upgraded production technologies. It is of note that the Central European countries improved 40 percent of their exports between 1992 and 1998, while the performances of the Baltic States, Russia, Belarus and Ukraine were somewhat less impressive. [Fabrizio, Igan, and Mody, 2007], found similar results and showed that the key drivers behind the increased shares of global trade held by transition economies were improved quality of exports and switching from price competition to quality competition.

Another relatively unsophisticated mechanism for exporting to impact innovations is via direct borrowing of new knowledge, technologies and business models. As exporters interact with their foreign clients, they obtain know-how, embrace better management practices and gradually increase their productivity. Foreign buyers frequently transfer the so-called informal knowledge to their suppliers, ensuring goods of acceptable quality. [Grossman and Helpman, 1991], in particular, showed that more advanced importers often transfer finished production models to exporters ready for replication, and provide advisory and engineering services. [Greenaway and Kneller, 2004] argue that export entry changes the innovative behavior of firms. Even if exporters were initially more innovative than domestic firms, their international engagement modifies the nature of their innovative activities, making them opt for the most cutting-edge technologies, including foreign design and developments.

Still another mechanism of boosting innovations via increased market power of exporters is derived from the Shumpeterian model, which predicts that larger firms with resources available for innovative activities are more likely to innovate. Exporting helps the firm to increase its market share and returns to scale, which, in turn, would reduce R&D unit costs and other innovation expenses.

The issue of the degree to which innovations are induced by increased competitive pressures on an export starter may be more ambiguous. This issue is addressed in the literature exploring the effects of competition on firms' innovative behavior. These papers argue that competition generally serves as an incentive to innovate [Arrow, 1962]. However, large

companies in concentrated markets may use their monopoly rents to generate innovations (the Shumpeterian School), while firm responses to increased competition pressures would at a minimum be heterogeneous, depending on their initial distance to the technological frontier (Shumpeter's theory as developed in works by [Aghion et al., 2004, 2005]). Therefore, we may argue (with some caution) that increased exposure to competition as a result of export market entry may spur innovation, especially for firms with enough market power that are initially closer to the technology frontier.

Finally, we should discuss the limitations of learning by exporting effects. The authors note varying, sector-specific firm responses. For example, [Julan Dua et al., 2010], using a dataset from China's manufacturing industries, prove that exporting has virtually no effect on firm behavior in mature, low-technology sectors (food, textiles, and garments), while learning-by-exporting effects are more pronounced in medium- and high-technology industries (electronics, telecommunication equipment and pharmaceuticals). Moreover, the adoption of cutting-edge technologies takes time and special effort; therefore, learning effects may not be seen immediately, but rather with a lag.

Many studies find that the probability of innovative learning-by-exporting depends on export destinations. Thus, exports directed to high-income countries require a higher quality workforce and encourage the exporter to develop business models involving fringe distribution, transportation and publicity services. The latter, in turn, also need higher quality human resources, further inducing firms to innovate [Verhoogen, 2008, Matsuyama, 2007]. Using data from Argentina, [Brambilla, Lederman, and Porto, 2010], show that it is not exporting per se, but export destinations that impact the quality of human capital and average wages at the firm level.

In the Russian case, learning-by-exporting effects, including the impact of export destinations (CIS and OECD), were explored by [Wilhelmsson, Kozlov, 2007]. However, it should be noted that the authors focus more on the learning outcomes, i.e., the increased productivity of exporters. The study finds that in this sense of "learning", exporting to developed countries has a more pronounced effect for export starters. However, subsequently, the differences between CIS exporters, non-exporters and OECD exporters tend to fade out, which does not allow for decisive conclusions about the impact of export destination on productivity growth.

In sum, a review of the literature suggests that it is reasonable to postulate that exporting boosts firm innovative activities for Russian manufacturing firms. We recognize, of course, that exporting is not the only incentive to innovate, and may not be the primary one. However, exports and innovations combined are very likely to affect a firm's competitiveness. Therefore, an investigation of the linkages between exporting and innovation may at least aid in the

construction of a meaningful model for increased competitiveness in the Russian manufacturing industry. Moreover, such a model linking investments in exporting and innovation will be costly and, therefore, only affordable for more powerful firms.

4. Key Hypotheses

This paper attempts to look into several issues related to the correlation between a firm's export status and its innovative behavior. Our primary interest is to find out whether exporting impacts a firm's propensity to adopt technological and managerial innovations. In our analysis, we first attempt to avoid the direction of causality issue (whether causality runs from exporting to innovations or the other way around) by using lagged export values and other firm characteristics as determinants of the firm's current innovative activities. Second, instead of absolute measures, we estimate their changes over time. In other words, using data from the two rounds of a manufacturing survey (2005 and 2009), we seek to prove that a firm's presence (entry) in export markets encourages it to pursue innovations. Therefore, our first hypothesis reads as follows:

Hypothesis 1. Exporters tend to be more innovative than non-exporters, as they introduce new technologies and new products, undertake/contract R&D, promote new managerial technologies and retrain and upgrade their managerial staffs.

Another issue we would like to research is whether the length of a firm's presence in export markets impacts the intensity of its learning and innovative behavior. Is the learning effect of a one-off nature or is it prolonged over time? Put differently, does an export starter quickly learn the basics of competition and make appropriate innovative adjustments to its behavior, or does it take time for exporting to have an effect? For the purpose of this study and with regard to the available data, our second prediction reads as follows:

Hypothesis 2. A long presence in export markets tends to enhance learning effects. In other words, incumbent exporters learn more quickly than export starters.

Finally, we plan to test the degree to which export destinations (in our case, CIS and non-CIS) impact learning effects. We shall try to find evidence in support of our prediction that exporting to more developed (presumably more competitive) markets will have stronger learning effects than exporting to former USSR countries.

Hypothesis 3. Learning effects depend on types of export markets. In our case, exporters exporting exclusively to CIS markets show weaker learning effects than exporters to non-CIS markets.

5. Data and empirical statistics

Data for the empirical analysis in this study come from two rounds of manufacturing competitiveness monitoring conducted by the National Research University – Higher School of Economics in 2005 and 2009.

The stratified sample of manufacturing enterprises from 8 aggregate types of economic activity is representative for a population of enterprises employing between 100 and 10,000 people. However, it is biased toward better performers due to the time of the survey — right in the midst of the financial and economic crisis of 2009. Accordingly, our sample excludes non-viable firms that failed to survive through the peak of the crisis. The panel includes 499 observations, with the panel structure adequately reflecting the structure of the population (Tab.3).

Tab. 3. Descriptive statistics of firms surveyed in two monitoring rounds, % of total respondents

	2005	2009	Panel
Sample structure by types of economic activity			
Food	24.8	24.6	21.8
Textiles and clothing	9.2	9.3	10.6
Timber and woodworking	8.4	8.5	9.0
Chemicals	8.8	9.2	10.2
Metals and metal-working	10.3	10.2	8.4
Electrical equipment	14.2	12.2	13.8
Transport equipment	9.0	9.0	10.2
Machines and equipment	15.5	17.0	15.8
TOTAL	100	100	100
Sample structure by firm size			
Under 250 employees	43.8	45.0	47.7
251–500	25.6	24.1	22.0
501–1000	15.9	16.5	15.4
Over 1000 employees	14.7	14.4	14.8
TOTAL	100	100	100
Number of observations	1002	957	499

Source: data from two rounds of a manufacturing business survey conducted by the Higher School of Economics Institute for Industrial and Market Studies (IIMS)

The survey questionnaire allows export products to be described in terms of their presence (export status), scale (share of total firm sales), composition (raw materials, semi-finished goods, finished goods, services) and destination (CIS and non-CIS). We are only looking at two dimensions: export status during 2002–2004 and 2005–2008, irrespective of export volumes and destinations.

Descriptive statistics by export status are presented in Tab. 4. It is apparent that incumbent exporters are considerably larger than new export entrants and exits, as well as non-exporters. Differences among groups (statistically significant at 5 percent level) are primarily

observable in the firms' ownership structures. Thus, in 2005, foreign ownership was a feature of both old and new exporters, while non-exporters and export quitters had practically no foreign owners at all. Variations in the intensity of ownership redistribution observed in these groups in 2002–2004 may be an indication of changes in firm strategies and priorities. Therefore, we need to control for any ownership change in the previous period. Cross-sector differences are also highly significant (at 1 percent): in the group of incumbent exporters, machine and equipment producers account for the largest share (21.6 percent), while food enterprises have the smallest share (6.3 percent). Meanwhile, in the group of new exporters, the latter dominate in 2004–2008.

Tab. 4 Descriptive statistics of the panel structure by export status of enterprises throughout the two rounds

	No exports in 2005 and in 2009	“Old” exporters	“New” exporters	Ex-exporters	Statistical significance *
Number of employees in 2005	275 (17)	937 (80)	470 (72)	573 (110)	0.000
Members of integrated business groups in 2005,%	28.2	32.0	27.8	9.7	0.082
Foreign ownership in 2005,%	1.7	9.5	6.9	0.0	0.005
Government ownership in 2005,%	10.3	12.2	8.3	6.5	0.674
Firm established before 1992,%	77.6	75.2	69.4	71.0	0.557
Change in major ownership in 2005–2008	17.1	24.9	21.7	42.9	0.020
Food industry	43.1	6.3	20.8	16.1	0.000
Textiles and light industry	13.8	7.2	12.5	12.9	
Timber and woodworking	7.5	10.8	5.6	12.9	
Chemicals	3.4	14.9	12.5	9.7	
Metals and metal-working	4.6	13.5	5.6	0.0	
Electrical equipment	12.6	12.6	12.5	32.3	
Transport equipment	5.2	13.1	15.3	6.5	
Machines and equipment	9.8	21.6	15.3	9.7	
Number of observations	174	222	72	31	

Note: standard errors in parenthesis.

To estimate the significance of the variance we used Pearson's chi-squared test and the Kruskal-Wallis test to compare the averages

To assess learning-by-exporting effects, we used data on various managerial, product and technological innovations, including R&D costs. Both rounds of the survey asked identical questions. As a sign of organizational innovations, the presence or absence of benchmarking was assessed depending on the firm's response to the following question: “Will you please assess how the competitiveness of your enterprise changed in 2005–2008 versus industry leaders: 1) domestic leaders; 2) foreign/international leaders, including those operating in Russia.” Respondents who found it difficult or declined to respond were classified into a group of enterprises that do not practice regular benchmarking. Differences among export-related groups in the scale of innovations are statistically significant at 5 percent level (Tab. 5), with the only exception being new product introduction in 2005. “Old” exporters in all industries maintain their leadership in the scale of innovative activities in both survey years. New exporters innovate

on a smaller scale, but show positive developments in ISO certification, engagement of skilled managers, and implementation of new technologies, benchmarking and outsourcing. Both groups of active exporters, notwithstanding the crisis of 2008–2009, increased their engagement in product and technology innovations, while the group of non-exporters and ex-exporters decreased their engagement, with the deepest disengagement from innovations being observable in the group of ex-exporters.

Tab. 5. Share of organizational and managerial innovators in export status groups in 2005–2009, %

	No exports in both periods	“Old” exporters	“New” exporters	Ex-exporters	Statistical significance *
Formal IT division					
- in 2005	24.9	58.1	50.7	43.3	0.000
- in 2009	15.5	46.4	38.9	19.4	0.000
ISO certification					
- in 2005	28.5	52.0	40.0	30.0	0.000
- in 2009	32.2	64.9	47.2	32.3	0.000
R&D spending					
- in 2005	43.1	76.5	53.1	67.9	0.000
- in 2009	17.8	53.2	38.9	32.3	0.000
Managers holding MBA, etc.					
- in 2005	12.6	22.1	13.9	9.7	0.044
- in 2009	15.9	30.8	25.7	3.8	0.000
Introduction of a new product					
- in 2005	43.1	54.5	50.0	41.9	0.124
- in 2009	39.7	58.1	48.6	32.3	0.001
Introduction of a new technology					
- in 2005	28.2	42.8	23.6	38.7	0.003
- in 2009	25.3	47.3	34.7	25.8	0.000
Domestic benchmarking					
- in 2005	87.9	92.8	81.9	80.6	0.027
- in 2009	87.4	94.6	88.9	90.3	0.081
International benchmarking					
- in 2005	25.3	59.9	41.7	45.2	0.000
- in 2009	33.3	77.9	63.9	48.4	0.000
Partial outsourcing					
- in 2005	4.6	12.2	4.2	12.9	0.020
- in 2009	9.2	23.9	19.4	12.9	0.002
A design division					
- in 2005	40.8	65.3	55.6	61.3	0.000
- in 2009	37.4	61.3	52.8	35.5	0.000
A marketing division					
- in 2005	53.4	70.7	59.7	61.3	0.005
- in 2009	40.8	55.0	41.7	41.9	0.024
An after-sales division					
- in 2005	24.1	45.0	37.5	38.7	0.000
- in 2009	24.7	40.5	36.1	32.3	0.011

Note: Based on Pearson’s chi-squared test

During the crisis, as evidenced by numerous studies, the overwhelming majority of companies cut their R&D, training and marketing budgets, as they tried to streamline their organizational structures and adapt them to the corporate development strategies. All of the

groups under analysis shared common trends in 2005–2009: on the one hand reducing the number of formal IT and marketing divisions, and an increased on outsourcing on the other. However, both in 2005 and in 2009, these export status groups exhibited significant variations in corporate organization structures.

Tab. 6 presents descriptive statistics on learning-by-exporting, depending on export destination. Both groups of exporters show significant differences from non-exporters in their involvement in product, technological and managerial innovations in both surveying periods. Notable exceptions were the introduction of new products and domestic benchmarking in 2005.

Tab. 6 Share of organizational and managerial innovators in groups differing by export direction in 2005–2009, %

	No exports in 2005	Only CIS exports in 2005	Non-CIS exports observable in 2005	Significance of variance*
A formal IT unit				
- in 2005	32.5	49.6	62.1	0.000
- in 2009	22.4	37.6	47.8	0.000
ISO certification				
- in 2005	31.8	44.8	53.8	0.000
- in 2009	36.6	49.6	70.6	0.000
R&D spending				
- in 2005	46.0	72.4	78.0	0.000
- in 2009	24.0	41.9	58.1	0.000
Managers holding MBA, etc.				
- in 2005	14.9	23.0	37.0	0.000
- in 2009	22.3	29.1	39.5	0.002
Introduction of a new product				
- in 2005	45.1	49.6	55.9	0.131
- in 2009	42.3	57.3	52.9	0.014
Introduction of a new technology				
- in 2005	26.8	40.2	44.1	0.001
- in 2009	28.0	41.0	47.8	0.000
Domestic benchmarking				
- in 2005	86.2	92.3	90.4	0.173
- in 2009	87.8	92.3	95.6	0.033
International benchmarking				
- in 2005	30.1	50.4	64.7	0.000
- in 2009	42.3	68.4	79.4	0.000
Partial outsourcing				
- in 2005	4.5	8.5	15.4	0.001
- in 2009	12.2	20.5	24.3	0.007
A formal design unit				
- in 2005	45.1	67.5	62.5	0.000
- in 2009	41.9	53.0	62.5	0.000
A formal marketing unit				
- in 2005	55.3	65.8	72.8	0.002
- in 2009	41.1	47.0	58.8	0.004
A formal after-sales unit				
- in 2005	28.0	44.4	44.1	0.001
- in 2009	28.0	35.9	42.6	0.013

Note: Based on Pearson's chi-squared test

In 2009, global exporters were generally more frequently involved in all types of innovative activities compared to CIS exporters (excluding the introduction of new products). In

some areas, the difference was very impressive. For example, the share of enterprises reporting ISO certification in 2009 was 21 percentage points larger in the first group than in the second. Other areas show less significant differences, which makes the evidence on learning-by-exporting effects in ex-USSR markets less conclusive.

6. Estimation approach and model description

Both theoretical and empirical research suggests that there are other determinants impacting “learning” and innovative development of firms, apart from exporting. In particular, the propensity to innovate and implement new managerial technologies may depend on the sector and the firm’s size. Apart from these factors, we postulate that ownership (specifically, foreign ownership and government ownership) may also have a role. Finally, a firm’s membership in an integrated group (vertically or horizontally integrated) may also be important.

As a general approach to empirically estimate learning effects, we use the following model:

$$LEf_i^T = F(LEf_i^{T-1}, Exp_status, Size, Ownership, age, ind), \quad (1)$$

where LEf_i stands for various measures describing firm activities in innovations and managerial and organizational improvements, Exp_status – denotes its export status, $Size$ represents firm size, $Ownership$ refers to firm ownership characteristics (including its membership in integrated groups), Age represents the age of the firm, and Ind indicates its type of activity.

Theoretically, various integrated indicators may be used as dependent variables that represent “learning”. However, this paper attempts to estimate the impacts of exporting and other determinants on simple, individual measures. On the one hand, this approach allows for more objectivity, which may be impaired when an aggregation mode for individual measures is subjectively selected. On the other hand, the approach reveals the specific individual measures that are affected by exporting. The individual indicators of learning used as dependent variables and predictors are listed in Tab. 7.

Tab. 7. Dependent variables and predictors

Model №	Symbol of dependent variable	Description of dependent variable
LRN1	IT	A formal IT division in the firm (0 or 1 for each period)
LRN2	ISO	ISO certification (0 or 1 for each period)
LRN3	RD_zatr	R&D spending (0 or 1 for each period)
LRN4	Manadv	Managers holding an MBA and or a degree in economics from a Western university (0 or 1 for each period)
LRN5	NewProd	Introduction of a new product (0 or 1 for each period)
LRN6	NewTech	Introduction of a new technology (0 or 1 for each period)
LRN7	Bench_otech	Domestic benchmarking (comparison with domestic competitors) (0 or 1 for each period)
LRN8	Bench_zarub	International benchmarking (comparison with foreign competitors) (0 or 1 for each period)
LRN9	Outsource	Outsourcing of selected managerial functions (0 or 1 for each period)
LRN10	Dep_design	A formal product design unit (0 or 1 for each period)
LRN11	Dep_market	A formal marketing unit (0 or 1 for each period)
LRN12	Dep_service	A formal after-sale service unit (0 or 1 for each period)
Predictors		
	Exp_status	Firm membership in one of the four groups (1 – firms who exported both in 2005 and in 2009; 2 – “new exporters”, who had no exports in 2005, but had some in 2009; 3 - “ex-exporters”, who exited export markets; 4 – non-exporters, who had no exports in either period of observation);
	Size	Log number of employees
	Foreign	Foreign ownership (0 or 1)
	State	Government (federal, regional or municipal) among owners (0 or 1)
	Ch_ownership	Change of ownership between 2005–2009
	Holding	Membership in an integrated business group (0 or 1)
	Age	Membership in one of the three groups of firms (1 – established before 1992, i.e. during the Soviet times, 2 – established early in transition in 1992–1998, 3 – established after 1998)
	Ind	Dummy variables reflecting type of economic activity (8 manufacturing activities: 1-food production, 2 – textiles and clothing, 3 – timber and woodworking, 4 – metals, 5 – chemicals, 6 – machine-building, 7 – electrical and electronic equipment, 8 - transport vehicles and equipment)

To estimate the dependent variables, which take discrete values of 0-1, we use standard probit regressions to estimate the dependence of an indicator in 2009 on the previous value of the same indicator, firm export status and other firm characteristics. Tab. 8 denotes the respective lagged dependent variable as LRN_05_i. To avoid endogeneity issues related to the causal direction of firm size and ownership, the model uses lagged values of these predictors.

Therefore, the estimated equations are written as

$$\Pr(LEf_{it} = 1) = \text{Pr obit}(a_0 + a_1 LEf_{it-1} + a_2 Size_{it-1} + a_3 Foreign_{it-1} + a_4 State_{it-1} + a_5 Holding_{it-1} + \sum_{j=1}^3 \beta_j Exp_status_{jit} + \sum_{k=1}^2 \gamma_k Age_{kit} + \sum_{l=1}^7 \delta_l Ind_{lit}) \quad , \quad (2)$$

The results are presented in Tab. 8.

For the purposes of a robustness check, apart from standard robustness tests, we introduce additional predictors in the model, in particular, one representing a change of major owner in the period between 2005 and 2009. All of the key results remain robust.

While not all of our indicators of innovations seem to be impacted by export we find some evidence of learning-by-exporting effects. First, 9 out of the 12 indicators of innovative behavior show positive and statistically significant values (at 1 percent in four cases, at 5 percent in four cases and at 10 percent in one case) for the group of continuous exporters, i.e., firms engaged in exporting activities in both periods of observation. As we have included lagged values of the dependent variables as predictors, we therefore estimate changes in firm behavior in a dynamic framework from 2005 to 2009. Therefore, this indicates that continuous exporting activities encourage firms to undertake technological and organizational innovations more often than non-exporters tend to do.

New exporters, who did not have any exports in 2005 but reported exporting in 2009, differ from non-exporters on fewer indicators. Export entry has a significant and positive effect on the establishment of formal IT units, embracing of international benchmarking, outsourcing of selected managerial functions, and the probability of R&D financing.

It is noteworthy that export starters, unlike incumbent exporters, do not exhibit any visible correlation between export entry and the introduction of a new product or technology. This may suggest that investments in R&D that may have been undertaken following (or simultaneously with) export entry have not yet yielded any results.

As for ex-exporters (i.e., firms that have exited from export markets), they are very similar to non-exporters in their propensity to innovate. However, it should be noted that this group is small in our sample, which may be the reason for the low values of the coefficients. Meanwhile, many coefficients in this group are negative, which may suggest that exiting firms lose their propensity to innovate, even compared to firms that were never involved in exporting.

Contrary to expectations, the estimations have not revealed any significant effect of ownership type or group membership on the propensity to innovate. The government being an owner does not have any effect at all, while foreign ownership shows only one significant coefficient – on the variable representing domestic benchmarking. The latter, in our view, is quite in line with common sense, as it is reasonable to expect foreign owners to be more interested in global rather than Russian benchmarking of their companies.

Tab. 8. Regression results for the model estimating determinants of firm innovative behavior

	LRN1	LRN2	LRN3	LRN4	LRN5	LRN6	LRN7	LRN8	LRN9	LRN10	LRN11	LRN12
LRN_05_i	1.009***	0.9588***	0.2676*	0.5034***	0.4318***	0.104893*	0.1809	0.3006***	1.2107***	0.878***7	0.8435***	1.1088***
DE_1	0.566***	0.4326**	0.568***	0.3243*	0.3594**	0.3836***	0.5315**	1.0354***	0.3307	0.3430**	0.0858	-0.2862
DE_2	0.469***	0.123	0.3773*	0.3278	0.1616	0.1763	0.2014	0.7114***	0.51479**	0.18028	-0.1088	-0.0907
DE_3	-0.341	-0.228	0.119	-0.2487	-0.3637	-0.3213	0.2181	0.2513	0.0010	*-0.5562	-0.1806	-0.3043
Size05	0.330***	0.3051***	0.2848***	0.1997***	0.1485**	0.2233***	0.1510	0.0919	0.4102***	0.11494	0.1637**	0.2788***
F05	-0.204	-0.425	0.1026	0.2423	-0.2482	0.0909	0.7251**-	0.0345	-0.1806	-0.1102	0.0673	0.2176
S05	-0.0583	-0.029	-0.060	-0.0645	0.1419	-0.2341	0.4360	-0.0164	0.2546	0.4154	0.0956	0.1842
Holding05	0.0198	-0.054	0.0508	0.0808	-0.0628	-0.0615	0.0746	0.00136	0.2338	-0.3081**	-0.1488	-0.2037
age1	0.3105	0.02223*	0.6703**	-0.1963	0.2547	0.3807*	0.5063**	0.1362	-0.4049	-0.1067	-.0505	0.1227
age2	0.4475	0.24736	0.8748***	0.3294	0.3285	0.5831**	0.4264	0.2380	-0.2020	0.1478	-0.1149	0.13367
ind2	0-0.0936	-0.4605*	0.1945	-0.6094**	-0.0910	-0.06433	0.1046	0.1854	-0.2137	0.2415	0.1078	-0.3425
ind3	-0.4158	-0.4260	0.0618	-0.7861**	-0.3868	-0.0869	0.02021	0.1821	-0.0033	-0.2815	-0.2034	-0.1537
ind4	0.01144	0.0669	0.6194**	0.1806	0.0052	0.1249	-0.3984	-0.1712	-0.2300	-0.2374	0.2944	0.2273
ind5	-0.4515	0.4440	0.2363	-0.1324	-0.3308	-0.2403	-0.1153	-0.1042	-0.1586	0.1549	-0.0514	0.5134*
ind6	0.1459	0.4007*	0.8031***	0.1828	0.1754	0.4044**	0.0797	0.05198	-0.4297	0.8354***	0.1631	0.9898***
ind7	0.01326	.04300*	0.5551**	0.0227	-0.0551	-0.1008	-0.3704	0.01056	-0.4806	0.5998**	0.06449	1.2381***
ind8	-0.3586	0.1652	0.6539***	-0.1768	-0.0249	-0.03721	-0.1839	0.2255	-0.4362	0.2744	-0.1181	1.1502***
_cons	-3.446***	-2.474***	-3.5543***	-1.9430***	-1.4467***	-2.2933***	-.2520	-1.1945	-3.3665***	-1.400***	-1.5257***	-3.026***
N obs	487	493	456	472	499	499	499	499	499	499	499	499
R ²	0.27	0.25	0.19	0.13	0.08	0.08	0.08	0.14	0.2	0.19	0.11	0.35

Note: *** - significant at 1 percent, ** - 5 percent, * - 10 percent. In groups by export status, non-exporters (those who did not report exporting in either round of the survey) are a reference group. LRN_05_i – values of respective dependent variables in the previous period. Reference categories: DE_4 (non-exporters), age3, ind1.

Belonging to the Group of companies (holding) does not affect innovative behavior either. This indicator shows the only significant (negative) coefficient — on the formal product design variable. This may be accounted for by the fact that design functions are centralized on the group level and/or that a sizeable portion of products is supplied within the group, which does not provide any incentives for new design solutions.

Notwithstanding that the coefficients on the sector dummy variables are significant for about half of the specifications, we are not in a position to make any explicit or unambiguous conclusions about the strength of learning-by-exporting effects across sectors. In practically every case, sector differences stem from some “natural” specifics of the sector. Thus, it is quite apparent that after-sale maintenance would apply more to machine-building industries than to producers of intermediate goods or current consumption goods (metals, woodworking, chemicals, food and textiles). Overall, outsiders in the learning-by-exporting process will include either small-scale exporters (e.g., food), or mass producers.

To test the third hypothesis, which assumes differences in learning-by-exporting effects depending on whether the export destination is a CIS or non-CIS market, we modify the model by replacing the export status variables (new-old-ex exporters) with variables indicating whether the firm exports to non-CIS markets, only to CIS markets or is not engaged in exporting at all. Therefore, the equation is specified as

$$\Pr(\text{LEf}_{it} = 1) = \Pr \text{obit}(a_0 + a_1 \text{LEf}_{it-1} + a_2 \text{CIS_05}_{jit} + a_3 \text{NCIS_05}_{jit} + a_4 \text{Size}_{it-1} + a_5 \text{Foreign}_{it-1} + a_6 \text{State}_{it-1} + a_7 \text{Holding}_{it-1} + \sum_{j=1}^{j=3} \beta_j \text{age}_{jit} + \sum_{k=1}^{k=8} \gamma_k \text{ind}_{kit}) , (3)$$

where NCIS_05 takes a value of 1 if the firm exported to non-CIS countries and 0 otherwise, and CIS_05 takes a value of 1 if the exports were limited to CIS. The other variables in the model are unchanged from the previous specification (Tab. 8). Non-exporters provide a reference group. Results are reported in Tab. 9.

Tab 9. Impacts of export destination on innovative behavior of firms.

	LRN1	LRN2	LRN3	LRN4	LRN5	LRN6	LRN7	LRN8	LRN9	LRN10	LRN11	LRN12
LRN_05	1.0147***	0.9909***	0.2726**	0.4965***	0.4572***	0.0985	0.20200	0.3355***	1.1926***	0.8839***	0.8380***	1.109***
NSIC05	0.2681	0.6494***	0.5011***	0.2246	0.0890	0.2340	0.5777**	0.7615***	-0.0942	0.34202**	0.221453	-0.125895
SIC05	0.2050	-0.0194	0.2143	0.0255	0.2588*	0.18456	0.2757	0.5042***	0.1828	-0.0485	-0.0294	-0.3520*
Size05	0.3433***	0.2886***	0.2800***	0.2035***	0.1784**	0.2395***	0.1470	0.1170	0.4615***	0.1135	0.1449**	0.2539***
F05	-0.1313	-0.4842	0.15205	0.2738	-0.1648	0.1484	-0.7217**5	0.1318	-0.0996	-0.0769	0.0497	0.1815
S05	-0.0597	-0.0195	-0.0499	-0.0851	0.1631	-0.2152	0.4507	-0.0132	0.2497	0.4069*	0.0917	0.1743
Holding05	0.0677	-0.0184	0.0567	0.1163	-0.0214	-0.0271	0.0829	0.0343	0.2348	-0.2619*	-0.1313	-0.2005
age1	-0.1542	-0.2054	-0.1991	-0.5391***	-0.0697	-0.1929	0.0872	-0.1293	-0.2572	-0.2220	0.0889	0.0015
age2	-0.4190	-0.203	-0.8350***	-0.3176	-0.3058	-0.5466**	-0.4205	-0.2227	0.1943	-0.1012	0.1412	-0.1176
ind2	-0.0031	-0.4539*	0.2607	-0.5450*	-0.0562	-0.0327	0.1363	0.2679	-0.1780	0.2670	0.1005	-0.3411
ind3	-0.3595	-0.6230**	0.0165	-0.8117**	-0.3039	-0.0750	-0.0310	0.1638	0.1029	-0.3552	-0.2789	-0.2151
ind4	0.1873	0.1423	0.7224***	0.2766	0.0852	0.2009	-0.3343	0.0160	-0.1111	-0.1580	0.2962	0.1974
ind5	-0.2940	0.5370	0.3244	-0.0453	-0.2156	-0.1401	-0.0747	0.0556	-0.0653	0.2554	-0.0418	0.4945*
ind6	0.1592	0.3237**	0.7904***	0.1731	0.1660	0.3739	0.0701	0.0510	-0.3607	0.7663***	0.1176	0.9605***
ind7	0.1895	0.4923**	0.6577**	0.144318	0.031913	-0.0179	-0.3101	0.234812	-0.34841	.6800***	0.05215	1.2235***
ind8	-0.1754	0.2592	0.7574***	-0.068371	0.065267	0.057097	-0.1263	0.4164**	-0.3686	0.3864**	-0.09882	1.1496***
_cons	-2.9765***	-2.1481***	-2.5745***	-1.5622***	-1.3043***	-1.7920***	0.2082	-0.9572**	-3.6815***	-1.2561	-1.5800***	-2.7831***
N obs	-0.1542	-0.2054	-0.1991	-0.5391***	-0.0697	-0.1929	0.0872	-0.1293	-0.2572	-0.2220	0.0889	0.0015
R2	-0.4190	-0.203	-0.8350***	-0.3176	-0.3058	-0.5466**	-0.4205	-0.2227	0.1943	-0.1012	0.1412	-0.1176

Note: *** - significant at the 1 percent level, ** - at 5 percent, * - at 10 percent. In export destination groups, the reference group is the non-exporters, i.e., those who did not report any exporting in either the first or the second round of the survey. LRN_05 denotes a lagged value of the dependent variable. Referecne categories: Non-exporters, age3, ind1.

The estimation results (Tab. 9) suggest that exporters to non-CIS countries are significantly more likely to implement innovations (versus non-exporters), primarily organizational innovations including ISO certification, domestic and international benchmarking, and the establishment of product design units. Regarding technology innovations, significant differences are observed only for the R&D spending indicator.

The learning effect of CIS exports is visibly weaker. Significant positive differences are revealed only on international benchmarking. However, there is a weak correlation with the observed probability of new product introduction. We should also note that exporting limited to CIS markets has a weak and *negative* effect on the establishment of after-sale service units. This may be explained by the fact that such units are largely needed to service Russian consumers, while in other countries maintenance and servicing may be more efficiently organized through outsourcing (to local companies). This may be further confirmed (indirectly) by the negative (albeit non-significant) coefficient for the group of non-CIS exporters in the service unit equation. Sector-wise, results similar to the first model are preserved.

Another noteworthy finding is that government or foreign ownership practically never shows any impact on learning-by-exporting effects. Firms from the group of old Soviet enterprises look somewhat weaker than firms established after 1991 on variables such as MBA managers and outsourcing, but they tend to implement domestic benchmarking more frequently.

7. Key conclusions

Contrary to the existing stereotypes of low competitiveness and domestic orientations, Russian manufacturing enterprises were quite active in international markets in the latter half of the last decade. About a half of the sample comprising large and medium-size manufacturing firms was engaged in exporting to some degree. During 2005–2009, average export-to-sales ratios increased significantly. All of the above indicates that Russian firms are increasing their global involvement, albeit slowly. Obviously, export entry goes both ways, with some enterprises exiting export markets. However, the share of export starters in this period is noticeably larger.

In this paper, we have attempted to investigate whether there is any impact of global trade engagement on manufacturing firm behaviors and managerial decisions compared to firms that are only oriented toward the domestic market, and if there is, how exactly it works. Using panel data from the two rounds of the survey, we employed regressions to estimate the probability of innovative decisions by firms depending on their export status, i.e., their belonging to one of the following groups: continuous exporters, export starters who entered export markets during the two rounds of observation, export quitters, and firms never engaged in exporting. The results

obtained suggest some tentative conclusions for a positive effect of exporting on embracing new technologies, primarily those in organization and management.

Exporters, most noticeably long-time and continuous exporters, are more active in monitoring their competitors, both domestically and internationally, and more frequently engage highly qualified managers (holders of foreign degrees). Exporters are more active in IT implementation (at least they tend to have formal IT units more frequently). Some evidence has been obtained in support of their increased concern for higher quality of goods, as they establish special-purpose product design units. The most encouraging result may be seen in the evidence on exporters' higher R&D financing, as this is the area where Russian manufacturing enterprises lost more ground than elsewhere during the transformation slump in the 90s. The re-establishment of corporate research practice and culture may be seen as an important shift toward normal development that relies on new, original technological solutions rather than relatively accessible and cheap primary resources.

It should be emphasized that if, as numerous studies and our own earlier results suggest, productivity growth precedes export entry (i.e., firms self-select into export markets), the analysis in this paper would indicate that positive changes in firm innovative behavior seem to occur subsequent to their export entry rather than prior to it. Moreover, this response to changes in the competitive environment does not seem to come instantly. In other words, firms tend to gradually learn new process and management approaches and practices. This conclusion may be supported by the evidence that comparatively recent export starters tend to outperform non-exporters on far fewer parameters than the group of continuous, incumbent exporters. Moreover, "learning" starts from borrowing and embracing managerial decisions and behavior tactics that lead to faster returns, including regular benchmarking, IT implementation, ISO certification, etc.

There is still another conclusion that we can suggest with some caution: non-CIS exporters are more prone to learning. Meanwhile, firms exporting only to CIS markets differ from non-exporters mostly in their closer monitoring of foreign competitors. This finding is quite consistent with other studies, specifically the paper by [Wilhelmsson and Kozlov, 2007], which shows that productivity gains are more likely for exporters to industrially advanced economies.

It is also of note that we have hardly discovered any dependence of firm behavior on owner characteristics. This evidence is also in line with other studies, showing that firm competitive environment (exposure to strong competition) has a more significant effect on firm behavior patterns than its ownership.

In conclusion, we should say that we do not consider our findings final and exhaustive. Our rough estimates of both behavior and exporting activities (in this study, we largely use qualitative variables, i.e., a decision being made, or exporting taking place) may at best serve as

an indication of a positive correlation between exporting and learning. The results will certainly need further elaboration. Another important area of further research may be to extend the range of globalization factors and to supplement the exporting impact analysis with an investigation of possible effects of resource imports as still another channel to shape new behavior patterns.

References

- Avdasheva S.B., Budanov I.A., Golikova V.V., Yakovlev A.A. 2005. Modernizaciya rossiiskih predpriyatii v tsepkah sozdaniya stoimosti (na primere trubnoi i mebel'noi promyshlennosti Rossii). *Ekonomicheskii zhurnal VShE*. Vol. 9, N 3, pp. 361-377.
- Golikova V., Gonchar K., Kuznetsov B. (forthcoming) "Does international trade provide incentives for efficient behavior by Russian manufacturing firms?" *Post-Communist Economies*, 2012, vol.24, №. 3
- Aghion, Philippe, Richard Blundell, Rachel Griffith, Peter, Howett and Susanne Prantl. 2004. "Entry and Productivity Growth: Evidence from Microlevel Panel Data," *Journal of the European Economic Association*, Papers and proceedings 2, pp. 265-276.
- Aghion Ph., Bessonova Y. .2006. On entry and growth: theory and evidence. *OFCE*, June 2006. P. 259–278.
- Aghion, Ph., N. Bloom, R. Blundell, R. Griffith, and Peter Howitt. 2005. "Competition and Innovation: an Inverted U Relationship," *Quarterly Journal of Economics* 20(2), pp.701-728.
- Arrow, Kenneth. 1962. "Economic Welfare and the Allocation of Resources for Invention," in R. Nelson (ed.) *The Rate and Direction of Inventive Activity* Princeton University Press, 609-625.
- Aw, B. Y., M. Roberts and D. Y. Xu . 2009. 'R&D investment, exporting, and productivity dynamics,' *NBER working paper*, Working Articles No 14670,
- Aw, B., Roberts, M., and Winston, T. 2007. Export Market Participation, Investments in R&D and Worker Training, and the Evolution of Firm Productivity. *World Economy*, 30(1), 83-104.
- Baldwin, J. and Gu, W. 2004. Trade Liberalization: Export Market Participation, Productivity Growth, and Innovation. *Oxford Review of Economic Policy*, 20(3), 372-392.
- Bernard, A.B. and Jensen, J.B. 1999. Exceptional exporter performance: cause, effect, or both? *Journal of International Economics*, 47, 1-25.
- Brambilla, Irene, Lederman, Daniel and Guido Porto, 2010. Exports, export destinations, and skills. *NBER Working Paper* 15995 <http://www.nber.org/papers/w15995>.
- Bustos, Paula. 2011. Trade Liberalization, Exports, and Technology Upgrading: Evidence on the Impact of MERCOSUR on Argentinean Firms. *The American Economic Review* 101 (February 2011), pp. 304–340 <http://www.aeaweb.org/articles.php?doi=10.1257/aer.101.1.304>
304
- Castellani, D. and A. Zanfei .2007. 'Internationalisation, innovation and productivity: how do firms differ in Italy?' *The World Economy*, 30(1), 151–176.
- Constantini, J. A. and M. J. Melitz. 2008. 'The Dynamics of Firm-level Adjustment to Trade Liberalization', in E. Helpman, D. Marin and T. Verdier (eds.), *The Organization of Firms in a Global Economy* (Cambridge, MA: Harvard University Press), 107–41.
- Correa, P, 2011. Binding Constrains and Policy Options for Export Diversification in Russia. A microeconomic Approach. Presentation at the XII International Academic Conference on Economic and Social Development, - Higher School of Economics, Moscow, April 5-7 2011
- Damijan, J., C. Kostevc and S. Polanec. 2008. 'From innovation to exporting or vice versa? Causal link between innovation activity and exporting in Slovenian microdata,' LICOS.

Discussion Article 204/2008, LICOS Centre for Institutions and Economic Performance, Katholieke Universiteit Leuven.

Julan Dua, Yi Lub, Zhigang Taoc and Linhui Yuc. 2010. "Exporter Heterogeneity and Learning from Exporting: Evidence from China", (mimeo)

Fabrizio, S., D. Igan, and A. Mody. 2007. "The Dynamics of Product Quality and International Competitiveness." *IMF Working Paper 07/97*, International Monetary Fund, Washington, DC.

Fagerberg, Jan, 1994. "Technology and International Differences in Growth Rates," *Journal of Economic Literature*, American Economic Association, vol. 32(3), September pp. 1147-75,.

Gerschenkron, A. 1962. *Economic Backwardness in Historical Perspective: A Book of Essays*. Cambridge, MA: Belknap Press of Harvard University Press, 456 pp.

Gorodnichenko Yu., Svejnar, J., and K. Terrell. 2010. "Globalization and Innovation in Emerging Markets". *American Economic Journal: Macroeconomics*. Apr 2010, Vol. 2, No. 2: pp. 194-226

Greenaway, D. and Kneller, R. ,2004. "New Perspectives on the Benefits of Exporting". *Economie Internationale*, pp. 100-110.

Greenaway, D. and Kneller, R., 2007. Firm Heterogeneity, Exporting and Foreign Direct Investment. *Economic Journal*, 117, pp.134-161.

Grossman, G., and E. Helpman. 1991. *Innovation and Growth in the Global Economy*, MIT Press.

Hallak, Juan Carlos, Sivadasan Jagadeesh. 2009. Firms' exporting behaviors under quality constraints. *NBER Working Paper 14928* <http://www.nber.org/papers/w14928>

Helpman, E., M. Melitz and S. Yeaple. 2004. 'Export versus FDI with heterogeneous firms,' *American Economic Review*, 94(1), pp.303–316.

Ito, Keiko and Lechevalier Se´bastien, 2010. Why some firms persistently out-perform others: investigating the interactions between innovation and exporting strategies. *Industrial and Corporate Change*, Volume 19, Number 6, pp. 1997–2039
doi:10.1093/icc/dtq056

Kandogan, Y. 2004. "How Much Restructuring Did the Transition Countries Experience? Evidence from Quality of Their Exports." *Working Paper 637*, William Davidson Institute, University of Michigan, Ann Arbor.

Matsuyama, K. (2007). "Beyond Icebergs: Towards A Theory of Biased Globalization," *The Review of Economic Studies*, 74 , pp. 237-253.

Melitz, M. J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity," *Econometrica*, 71(6), pp. 1695-1725.

Schumpeter, J. A. 1943. *Capitalism, Socialism, and Democracy*. New York: Harper

Sutton, J., 2007. "Quality, Trade and the Moving Window: The Globalization Process," manuscript.

Verhoogen, E.A. 2008. "Trade, Quality Upgrading, and Wage Inequality in the Mexican Manufacturing Sector." *Quarterly Journal of Economics*, 123(2): 489–530.

Wagner, J., 2007. “Exports and Productivity: A Survey of the Evidence from Firm-level Data,” *World Economy* 30 (1): 60-82.

Wakelin, K. 1998. ‘Innovation and export behaviour at the firm level,’ *Research Policy*, 26, pp. 828–841

Wilhelmsson, F., Kozlov K. ,2007. “Exports and productivity of Russian firms: in search of causality”. *Economic Change*, 40: pp. 361–385

Gonchar Ksenia, leading research fellow, Institute for Industrial and Market Studies of the National University-Higher School of Economics.
E-mail: kgonchar@hse.ru; kgonchar@yandex.ru, phone: +7 495 698 35 76

Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE.