URBAN AGGLOMERATION EFFECTS AND COMPANY PRODUCTIVITY IN RUSSIA: EMPIRICAL EVIDENCE BASED ON MANUFACTURING INDUSTRY SURVEY

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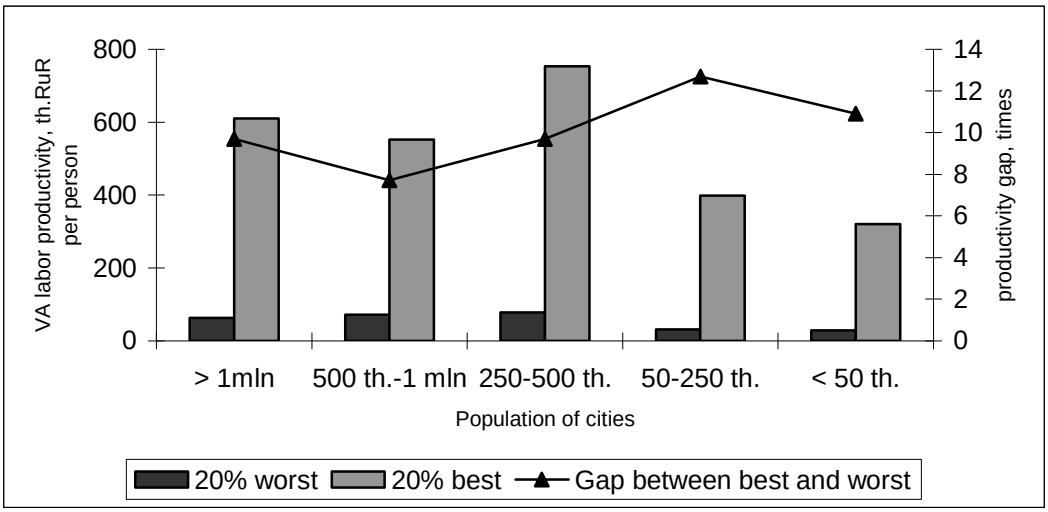
1. Introduction

Geography in Russia is not everything. But it matters a lot, and probably dominates among its institutions. Size, diversity, remoteness, low-density populations and enormous territories with cold and hostile environment, inadequate infrastructure connecting remote territories to markets seem to affect the pace of reforms more dramatically than we expected (Golikova, Gonchar, Kuznetsov, Yakovlev, 2006; Lugovoy et.al, 2007). Moreover, recent studies demonstrated that some geographically damned locations – first of all small peripheral towns in remote regions – maybe are just prohibitive for economic growth (Zubarevich, 2009)

Figure 1 reports that average value added labor productivity at manufacturing enterprises falls with the reduction of the hosting city size. Among enterprises located in different size group of cities the gap between 20 percent best and 20 percent worst enterprises (measured by value added labor productivity) accounts for factor 6-12. The smaller the city, the larger is the gap.

This paper explores the impact of urban agglomerations on company productivity and growth in Russia. We understand here the agglomeration economy as “external economy of scale brought about by the massing of population in one place”, followed by more complex infrastructure, greater division of labor, availability of transport, shopping and other facilities [Routledge Dictionary of Economics, 2002].

Figure 1. Productivity gap between manufacturing enterprises across size groups of cities



Source: Gonchar, 2008 (survey data)

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The attention to the topic was inspired by the large empirical literature which established the importance of company location within the "thick market" territories, and significant premium to productivity, wages and innovation that this location brings. In Russia this topic has already received practical political implication. Intensive discussions are taking place whether the small non-competitive cities, which fail to generate neighboring effects, should be closed down like loss-making enterprises, while people should be stimulated to move into larger cities. The government long-term development program introduces the "need to design and develop agglomerations", driven by the idea to economize on administration cost and help to attract investment. It should be mentioned that in the Soviet past both extreme regional policy lines were tested: non-perspective towns and villages were forced to be abandoned, and larger cities' growth was limited by restrictive registration practice. Both policies resulted in serious failures. Therefore the experts suggest looking with caution at the campaign of "the total country's clusterization and agglomeration" [Artobolevsky, 2007].

The primary source of data is the Survey of 1,000 manufacturing enterprises of 168 four-digit industries (eight two-digit) in 49 Russian regions, conducted in 2005-2006 jointly by the Higher School of Economics and the World Bank. Study of agglomeration effects was in a certain sense a by-product of the survey, since we did not ask our responders any location-related questions. But preliminary analysis showed extraordinary impact of location on company performance. To reflect this finding, objective locational data was linked to the survey data base to look for and possibly explain the urban agglomeration effects. Unfortunately we lack basic data on transport costs, municipal economics and therefore the set of analyzed factors is quite limited.

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2. Literature on agglomeration effects: recent research trends

Agglomeration became the subject of theoretical and empirical literature in social sciences more than two centuries ago and started probably with the work of Adam Smith (1776). He noticed that productivity and wages were higher in larger towns and densely populated areas. Von Thűnen, 1826, in his land-rent analysis demonstrated how the product structure of agricultural producers depends on the distance between the farm and the market. Later a number of scholars were intrigued by the scale effects arising from concentrated markets. Foremost among these scholars were Alfred Weber, 1890, who documented how production factor's rent depends on its location; August Loesch, 1940, who showed that the decision of the firm to launch production is based on demand factors, transaction costs and scale economy and that certain economic activities may be carried out exclusively in larger cities. Marshall, 1920 wrote about agglomeration externalities – external effects of neighborhood. He suggested a specific urban advantage that arises from lower transport costs — labor market pooling protects workers against firm- or industry-specific shocks.

After a certain period of reduced attention to the topic, the interest returned back following reconsideration of the nature of economic growth in the works of Arrow (Arrow, 1962) and Romer (1986). Recent active advocates of economic geography are Dani Rodrik and Paul Krugman. For example, Rodrik, 2003 names external trade, institutions, and geography the main determinants of economic growth.

Summing up, several factors may be termed as agglomeration forces which affect greater economic efficiency of businesses located in larger cities with their surroundings. These are:

- Scale economies in production and consumption and stronger division of labor (Mills, 1967; Dixit, 1973). It was documented that the scale economy is the main force that influences productivity and costs, though the negative externalities of concentration diminish the scale economy effects with the growth of the city above the certain limit;
- Reduction of transportation costs for goods, people and ideas (Glaeser, 1998; Krugman , 1991),
- Reduction of transaction costs due to labor market matching (Acemoglu,1996): if workers increase their human capital, firms which employ them are more likely to invest into equipment. A higher probability of finding a match and a better quality of matches are quoted as important mechanisms of agglomeration forces.
- Shared inputs: ready available specialized workers in larger cities can reduce costs for businesses (Krugman, 1993). Concentrated markets allow for sharing of local infrastructure, risks and gains from variety and specialization.
- Better perspective to increase the human capital due to the pooled labor market and larger bargaining power of workers who have many potential employers. These workers will invest more in their human capital (Rotemberg and Saloner, 1991);

- Companies in agglomerations are more likely to outsource non-core services, marketing, after sales services than those in smaller towns, thus leading to vertical disintegration and increased efficiency (Scott 1988; Storper 1989).
- Heterogeneous environment of the cities is more productive for creativity, learning and knowledge generation and dissemination. People learn when they interact, and intensity of interactions is significantly higher in the metropolitan areas than in isolated cities (Porter,1998; Audretsch & Feldman, 1996; Saxenian, 1994).

It is also stated in literature that agglomeration forces have their own dynamics. Thus Markusen, 1985, Gereffi and Korzeniewicz, 1994 showed that at the early stages the companies are mostly interested in such externalities of agglomerations as access to information, unique qualification and connections to other companies. More mature companies are interested in cost savings and access to markets. Saxenian, 1980, also showed that "new agglomerations", like Silicon Valley, are less attractive for the routine manufacturing.

Some works predict reduction of agglomeration forces due to the negative externalities of territorial concentration: larger cities tend to concentrate poverty and criminality, struggle with the traffic jams and environmental problems. Competition for land, pure water and air stimulated spatial dispersion of enterprises, reinforced by the spreading out of information technologies.

3. Some facts about the Russian economic geography – context for the empirical estimation of agglomeration effects

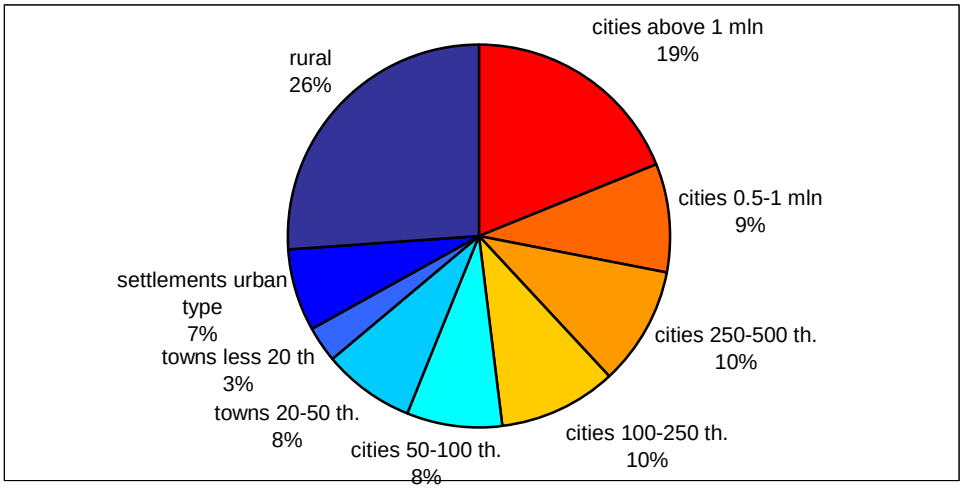
Before we discuss the findings of the empirical analysis it is useful to look at some important facts about the Russian geography to see the magnitude of challenges.

Territorial differentiation is probably the most important fact. The gaps in labor productivity and living standards grew in transition years following redeployment of human capital, investments and uneven distribution of crisis shocks. In the 2000s Russia experienced a strong external and internal migration. As Andrienko and Guriev, 2005, showed, Russia is second to the United States in the attraction of foreign migrants, if formal and informal new migrant are counted (altogether 15-16 million people between the census of 1989 and 2002). Internal flow of migrants took place from Northern and Eastern regions to Western Russia. As a result, some locations in the East lost up to 50 percent of population.

In total workforce and population shrank significantly, therefore the capacity of rural and defective territories to supply labor for urban agglomerations is almost exhausted. Another important stylized fact is that the labor markets are not functioning well, being restricted by administrative prohibitions in political capitals and regulation of salaries.

At the first glance, the population in Russia is highly urbanized – three thirds of people live in towns. The percentage living in cities over 20,000 accounts for 64 percent. The share living in the largest metropolitan areas – cities above 1 million people reached almost one fifth and continues to grow. However, the share of population living in cities above 100,000 inhabitants remains relatively low. Figure 2 reports that almost half of population is living in the rural settlements and small towns – as a rule highly depressed, not sufficiently restructured, hosting the ageing and decreasing population.

Figure 2. Distribution of population across settlements



Source: Zubarevich, 2009

Russian urban population historically used to grow in the form of agglomerations. Though the country has too few cities, if total population and country size are taken into account. Many cities – even larger ones – do not generate agglomeration effects because of the scarcity of resources and functions they host (reduced diversity), underdeveloped transportation infrastructure which is expected to connect larger cities to their smaller neighbors. Mature agglomerations are located mostly in the European part of the country, in Transvolga region, Ural and few sites along the Transsiberian railroad.

Scholars failed to agree on the precise number of Russian agglomerations and their population. Lappo and Polyan, 2007, write than by 1989 about 44 percent of Russian population was concentrated in larger urban agglomerations around cities with more than 250,000 inhabitants. Trevish, 2009, writes that only 9% of Russian population live in urban agglomerations, though they produce 21% of the national GDP. He is arguing that the Russian territory may be described as rarefied and decreasing social and economic space. He even declares "crisis of the size" in Russia, meaning unbalanced demand and supply of its territory.

Urban agglomeration forces are weakened in Russia by the path dependence. Many cities emerged and grew "by command" in the process of late industrialization in the 1930s -1950s, when the city grew after location of the manufacturing plant, not vice a versa (Lappo and Polyan, 2007).
Industrial development, not sufficiently supported by urban advance, left behind too many underdeveloped cities which fail to generate positive externalities of territorial concentration. Even some political capitals (Ivanovo, Chelyabinsk, Volgograd, Lipetzk, Tyumen, Kurgan) remain narrowly specialized and vulnerable to economic shocks. Altogether about 400 settlements may be safely named company towns. Zubarevich, 2009, showed that the fate of these towns had its ups and downs, many host non-competitive companies and appeared particularly exposed to the current crisis (steel factory towns in remote areas in particular).

Nevertheless there is reason to believe that peripheral towns may be plugged to the growth pattern of agglomerations which concentrate financial and human capital (Zubarevich, 2006). In spite of barriers to migration, it may be safely assumed that during transition the agglomerations in Russia have significantly matured. This was the result of several developments: (1) crisis shocks in peripheral cities were higher. They reduced demand for qualified and relatively well paid labor which had nothing to do but to move; (2) labor mobility has increased due to the snowball rise of automobiles and extensive road construction; (3) municipal and regional authorities encourage the process of economic agglomeration in search for the federal subsidies targeted at the support of "base cities and sputnik towns".

Re-distribution of power between the center and the regions has also influenced the rise of political capitals. The level of spatial concentration in political capitals in Russia is remarkable and has significantly increased during the transition years. Figure 3 reports how main metropolitan centers (Moscow and St.Petersburg) have almost tripled their role in investments and doubled in services and retail trade between 1990 and 2005. Our survey of manufacturing industry companies demonstrated that the share of competitive companies in political capitals is almost twice as large as in other cities (Golikova e al, 2006).

Figure 3. Territorial concentration of economic activities in political capitals

	1990	1996	2000	2005
Industrial sales				
Moscow and St.Petersburg	10,5	7,4	6,7	12,1
Other regional centers	30,6	24,6	20,3	23,9
All regional centers	41,1	32	27	36
Investment				
Moscow and St.Petersburg	5,9	12,7	16	16,6
Other regional centers	17	18,6	22	22,1
All regional centers	22,9	31,3	38	38,7
Services and retail trade				
Moscow and St.Petersburg	15,9	27,7	34	27,4
Other regional centers	26,1	25,5	30,1	36
All regional centers	42	53,2	64,1	63,5

Source: Treyvish, 2009

Another specificity of the Russian economic geography is that the recent economic growth (1999-2008) has been clearly associated with the urban agglomerations, coastal economies (except for the Far East) and resource-rich regions. All three types of locations proved to be more sustainable in the current crisis (Zubarevich, 2009), showing that concentration and favorable economic position are self-reinforcing. The spatial nature of economic growth and decline in Russia may result in the policy conclusion that moving of people and investments into the urban agglomerations rather than equalizing of living standards may seriously support development.

3. Empirical results

Urban agglomeration effects have not been subject to intensive economic studies in Russia – the field is mostly occupied by analytical regional geographers. Available empirical econometric analysis as a rule takes a region as a unit of estimation rather than a city. For example, World Bank, 2008, showed that the agglomeration effects in the form of spillovers of growth from neighboring regions appears to have become a factor for regional industrial growth in Russia in the 1999-2004 period. The investment rate, human capital, urban agglomeration (size of the largest city in the region), fuel endowments, a warm climate (no permafrost), and a year-round port appear to have a significant

and positive impact on regional growth. No evidence was found for general divergence in GRP per capita. Earlier Polyakov et al (Analysis of economic growth in regions, 2007) showed similar results, proving that positive scale effect is an innate advantage of larger cities for attracting migrant inflows and investment, and it facilitates accelerated economic growth.

In literature estimation of agglomeration effects has primarily been based on the Hall/Solow residual approach. More recent studies incorporated additional factors – like industry specificity, material inputs - to the traditional production function model. Thus, Shefer, 1973, analyzed statistics of 20 industrial sectors located in large cities and showed that doubling of the city size results in 14-27 percent increase of productivity. Sveikauskas, 1975 proved 6-7 percent productivity growth with the doubling of the city size. In Rosenthal and Strange, 2004 empirical literature is reviewed, showing that most studies proved that a doubling of employment density is associated with a 4 to 8% increase in labor productivity.

My aim is not only to look for the correlation between company productivity and location, but to prove that positive externalities of urban agglomeration are extended to the neighboring towns.

Uncertainties relating number, definition and limits of urban agglomerations should first be addressed. In literature it is stated that the agglomeration boundary may be defined as a vastness of possible labor migration. For example, Venables, 2006 shows that positive agglomeration externalities are effective throughout the distance of 45 minutes of car drive. Artobolevsky, 2007 suggests defining the perimeter by the distance which can be covered during one hour trip from the city downtown with public transport. Even if this is true, the edging of daily labor migration depends on many circumstances. Among them are the quality of roads and automobiles, state and cost of public transportation, traditions and habits, local job alternatives. In a big country like Russia readiness of people to travel in search for job and wage depends on the region. It would be correct to take into consideration estimating the perimeter of urban agglomeration the size of the central city and availability of good public transportation which may be expected to increase the boundaries. Unfortunately available municipal statistics does not allow so detailed analysis.

To test the size limits of urban agglomerations we used two definitions: locations as far as 50 and 100 kilometers from the central city. The first one has exhibited much more pronounced effects and in further analysis we considered the radius of 50 kilometers. What refers central cities, we used the official list of the Ministry of economic development (13 agglomerations). The settlement is counted as part of agglomeration in two cases: (1) if this is the central city; (2) if this is a town located within the radius of 50 kilometers from the central city.

To estimate the industry agglomeration effect the data base, generated as a result of the survey of manufacturing enterprises, has been modernized. Objective regional and municipal statistics was linked to each and every observation (1000 enterprises). Linking was possible because we had the

address (town and its population, region). A new dummy variable was created =1, if the enterprise is located within the boundaries of urban agglomeration and =0 in all other cases.

Analysis of descriptive statistics (Figure 4) shows that productivity averages of enterprises within agglomerations are higher than in the rest of the sample. Though agglomeration premium is sector-specific: it is the largest in wood-processing industries, food and transport machinery. And does not exist in chemicals and steel industries. What refers city size, the highest agglomeration effects may be observed in towns with 50,000-250,000 inhabitants and smaller than 50,000 inhabitants (61 percent and 37 percent correspondingly). If enterprises in smallest towns close to the central city are more productive than their analogs in isolated towns by 37 percent, this gives us ground to expect that peripheral towns really may be plugged to the development patterns of larger cities.

Figure 4. Descriptive statistics: VA labor productivity in the group of enterprises located within urban agglomerations across industrial sectors

	Enterprises within agglomerations		The rest of the sample		Gaps in labor productivity, times
	VA labor productivity Th.RUR per worker	Number of observations	VA labor productivity Th.RUR per worker	Number of observations	
Food-processing	350,64	65	180,83	170	+1,94
Textile	131,65	23	76,43	61	+1,72
Wood processing	415,34	16	151,52	61	+2,74
Chemicals	273,15	46	352,16	36	-1,28
Metallurgy	224,65	36	246,75	62	-1,09
Electronic and electrical machinery	187,91	44	155,15	85	+1,21
Transport machinery	309,73	24	160,04	57	+1,94
Machinery	162,97	48	152,59	100	+1,07
Sample average	253,78	302	174,36	632	+1,46

Source: HSE and WB manufacturing industry survey, 2005-2006

The questionnaire we have used for the survey allows us comparing other qualities and behavior of enterprises located in agglomerations with the rest of the survey. In Figure 5comparison of means shows that the companies in agglomerations are more likely to innovate, they report higher R&D expenditure and introduce IT technologies. They have larger share of exporting enterprises, better supplied with infrastructure (less likely to report problems with the electricity and water supply), their international sales are better serviced by the customs control. Though descriptive statistics demonstrates negative externalities of concentration: the market land price is four times higher in agglomerations; these companies are more likely to be burdened by government corruption.

Figure 5. Descriptive statistics: indicators of industrial companies located in the boundaries of urban agglomerations

	Group of enterprises located within the boundaries of urban agglomerations	The rest of the sample
Share of enterprises with IT department, %	50,2	35,6
Share of enterprises which define leadership in unique product manufacturing as a strategic goal, %	42,0	30,5
Share of enterprisers (among exporters) which report high tech export, %	61,9	46,8
Average R&D expenditures (per company), RuR	5357,9	4309,6
Average time for customs clearing, days	14,9	23,1
Share of enterprises reporting access to land as a serious problem, %	29,4	20,7
Average price of land, occupied by the company, RUR mln	241,6	60,4
Share of enterprises, forced to pay bribes, %	59,4	47,3

Source: HSE-WB manufacturing industry survey

The main testable hypothesis predicts that enterprises located in agglomerations are more productive and competitive. Or differently: since companies in agglomerations are as a rule pressed by higher competition, workers have more bargaining power to raise wages, and government control is higher than in remote isolated towns, only those enterprises survive in agglomerations, which are capable to exhibit higher productivity. We also predict the likelihood of higher enterprise productivity in regions which attract new migrants and investment, and are more involved in globalization process.

To examine these hypotheses, we study a model:

$$Y = F(E + R + A)$$

where Y are parameters to be estimated, E are individual characteristics of the unit of observation (enterprise), R – characteristics of the region and A – agglomeration. Description of variables is reported in Figure 6.

We test for the robustness of the results by introducing several measures of the productivity, including linear specification (Log value added productivity), deviation of productivity from the industry average), and computed indicator of competitiveness. Robustness tests do not change the qualitative nature of the results. All regressions control for sector and size of the enterprise. It should be noted that some explanatory variables are highly correlated (investment and globalization, agglomeration and migration), leading to erosion of their significance, if we simultaneously include

them into the model. Therefore in Figure X specifications of the model are reported in which some correlating variables are excluded..

Figure 6. Variable Definition

Variable Name	Description
Agglomeration	Dummy for firms located within the boundaries of urban agglomerations (=1 yes, =0 no)
Export	Dummy for firms that export
Administration	Dummy for firms located in political capitals
Investment	Accumulated investment in four year per capita in the region
Migration	Accumulated migration saldo per capita (region)
Globalization	Export+import divided by regional GDP
Enterprise size	Log employment
Industry	Dummy for firms from eight two-digit manufacturing industries
Independent variable	Log VA labor productivity
Independent variable	Dummy for firms that have VA labor productivity above the sectoral average (=1 higher; =0 lower)
Independent variable	Dummy for firms with high competitiveness (self estimation corrected by the level of VA labor productivity relative to the industry average)

Figure 7 reports estimates from a probit model in which company productivity is regressed on the city qualities, qualities on the surrounding region, and different enterprise characteristics that might shape company productivity. A corresponding set of regressions were estimated separately for the probability of having productivity above the industry average (within the 2-digit sector) and probability of belonging to the group of competitive enterprises.

Our evidence suggests that internal scale economies prevail in Russian manufacturing: enterprise size demonstrates strong and significant effect in all specifications of the model. However, we find that external scale effects - the urban agglomeration - is positively related to VA productivity and significant in a variety of specifications. This finding is consistent with the theory and available stylized facts and case studies.

Study of the model shows that political status of the city and company export are determinants of the likelihood of higher productivity. Intensity of investment in regional economy demonstrated 1% significance in column 2 , where Log VA productivity is regressed and only 6% if deviation from the industry average is used as an independent variable (column 5). If we remove the investment indicator from analysis, the significance of coefficients of globalization grow from 9 to 3 percent in 1-3 columns and from 3 to 1 percent in the second specification of the model. Intensity of regional migration demonstrates impact on productivity only in one specification (7). Though we should admit that paired correlation between agglomeration and migration variables demonstrates 1% significance, while comparison of averages shows that agglomerations are located in the regions where per capita

migration saldo is higher by factor five as opposed to the rest of the sample. Most probably in real life the processes strengthen each other: agglomeration positively affects productivity and wages, as a result the region attracts more migrants and agglomeration grows further. It appears that globalization is significant in several specifications. This can be attributed, at least in part, to the openness of the region which stimulates learning, interaction and competition.

The findings of this paper have implications for the debate on regional development and growth in Russia. Leveling off the standards of living has always been the cornerstone of Soviet and Russian development policy. Though it might be the case that regions are too large and too heterogeneous to positively react to the development stimulus. Cities rather than regions may be subjected to policy design. This paper also contributed to the debate on the nature of agglomeration effects in Russia and provides one of the first quantification of productivity and agglomeration correlation. This paper also argues that agglomeration is only one aspect of external forces which may influence company productivity: openness and relaxed conditions for migration also matter.

There are several directions for further fruitful research. It will focus on the nature of agglomeration forces and check sustainability of current results in the new survey of manufacturing enterprises.

Figure 7. Estimates of regional determinants of productivity in manufacturing industry

Independent variables	Log VA productivity			Deviation of VA productivity form the industry average (=1 if higher, =0 if lower)				Competitiveness		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Administration	0,08** [0,025]	0,08** [0.023]	0,09** [0,012]	0,30*** [0,001]	0,30*** [0,001]	0,32*** [0,001]	0,32*** [0,001]	0,18* [0,076]	0,18* [0,074]	0,19* [0,061]
Agglomeration	0,11*** [0,002]	0,13*** [0,000]	0,11*** [0,003]	0,26** [0,017]	0,35*** [0,001]	0,25** [0,023]	0,35*** [0,001]	0,28** [0,013]	0,33*** [0,002]	0,27** [0,015]
Investments	0,00*** [0,003]	0,00*** [0,001]		1.25e-06 [0,117]	0,00* [0,060]			0,00 [0,222]	0,00 [0,152]	
Migration	-0,01 [0,789]	0,00 [0,999]	0,01 [0,760]	0,10 [0,306]	0,14 [0,147]	0,13 [0,162]	0,19** [0,045]	-0,09 [0,413]	-0,07 [0,536]	-0,06 [0,547]
Globalization	3,23* [0,089]		4,16** [0,029]	13,40** [0,029]		15,08** [0,013]		7,03 [0,236]		8,08 [0,169]
Company export	0,08** [0,012]	0,08** [0.012]	0,08** [0,016]	0,29*** [0,002]	0,30*** [0,002]	0,29*** [0,003]	0,29*** [0,003]	0,26*** [0,013]	0,27** [0,012]	0,26** [0,015]
Enterprise size	0,07*** [0,000]	0,07*** [0,000]	0,07*** [0,000]	0,17*** [0,000]	0,17*** [0,000]	0,17*** [0,000]	0,17*** [0,000]	0,21*** [0,000]	0,21*** [0,000]	0,21*** [0,000]
ind1	0,09 [0,113]	0,09* [0,097]	0,08 [0,152]	-0,31* [0,0079]	-0,23 [0,192]	-0,31* [0,082]	-0,24 [0,165]	-0,34* [0,095]	-0,34 [0,100]	-0,36* [0,085]
ind2	-0,25*** [0,000]	-0,25*** [0,000]	-0,26*** [0,000]	0,12 [0,567]	0,19 [0,347]	0,11 [0,590]	0,16 [0,426]	0,11 [0,616]	0,12 [0,591]	0,09 [0,680]
ind3	(dropped)	(dropped)	(dropped)	-0,07 [0,744]	dropped	-0,05 [0,807]	dropped	dropped	dropped	dropped
ind4	0,13* [0,038]	0,13** [0,037]	0,12 [0,055]	(dropped)	0,07 [0,752]	dropped	0,04 [0,832]	0,45** [0,040]	0,45** [0,041]	0,43** [0,048]
ind5	-0,026 [0,705]	-0,02 [0,751]	-0,04 [0,588]	-0,55** [0,006]	-0,46** [0,023]	-0,55** [0,006]	-0,48** [0,017]	-0,32 [0,169]	-0,30 [0,186]	-0,33 [0,149]
ind6	-0,05 [0,325]	-0,05 [0,363]	-0,06 [0,249]	-0,07 [0,701]	0,02 [0,926]	-0,07 [0,700]	0,00 [0,995]	0,21 [0,307]	0,22 [0,280]	0,19 [0,352]
ind7	0,01 [0,923]	0,01 [0,872]	0,00 [0,983]	0,15 [0,470]	0,23 [0,258]	0,15 [0,458]	0,22 [0,287]	0,21 [0,329]	0,23 [0,296]	0,20 [0,361]
ind8	-0,07 [0,238]	-0,07 [0,253]	-0,07 [0,229]	0,08 [0,650]	0,17 [0,362]	0,10 [0,598]	0,16 [0,371]	0,26 [0,193]	0,27 [0,177]	0,25 [0,203]
cons	1,51*** [0,000]	1,54*** [0,000]	1,53*** [0,000]	-1,69*** [0,000]	-1,66*** [0,000]	-1,67*** [0,000]	-1,59*** [0,000]	-2,51*** [0,000	-2,45*** [0,000]	-2,47*** [0,000]
Number of observations	922	923	922	933	934	933	934	984	985	984
R-squared (+pseudo)	0,15	0,15	0,14	0,09	0,09	0,09	0,08	0,11	0,11	0,11

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