

Small business and poverty: evidence from post-Soviet cities

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Small Business and Poverty: Evidence from post-Soviet Cities

Abstract: The relationship between small business and poverty is inadequately substantiated despite reflecting an important economic and social nexus . We test the direct impact of small business on poverty and poverty on small business. Using panel data across 115 post-Soviet cities in Armenia, Azerbaijan, Georgia, Belarus, Russia and Ukraine, we examine the early (1995-2002) and later (2003-2008) transition periods. Our findings show small business can reduce urban poverty during transition, and that higher poverty in cities impedes small business. We also find changes in regional institutional context, knowledge and locational characteristics can facilitate or hamper both small business and poverty.

Keywords: small business, poverty, economic development, city, transition

INTRODUCTION

There is inadequate evidence on the relationship between small business and poverty (see Amorós and Cristi, 2011; Bruton et al. 2013; Shantz et al. 2018). Although small business is often linked to positive economic outcomes, like jobs, recent research suggests caution in making assumptions about effects on social outcomes, like poverty, and points to the need for clarity specifically on such social outcomes (Cumming et al., 2019; Marionini and Voorheis, 2019; Atems and Shand, 2017).

We investigate the direct effect of small business on poverty, as well as how poverty changes small business (Korosteleva and Belitski 2017), in 115 cities in six former Soviet Union countries (Armenia, Azerbaijan, Belarus, Georgia, Russia, Ukraine). We study the period 1995-2008 and exploit the unique business origins of transition to create insight for these and other economies undergoing change. We build on existing research (Zemtsov and Baburin, 2016; World Bank, 2015) and account for institutional characteristics and endogeneity between poverty and small business (Sutter et al. 2019). Our results show a strong link between small business and poverty during transition.

Cities are especially important in transition economies (Manolova et al. 2008; Barkhatova et al. 2001). Cities host local jobs and incomes (Audretsch et al. 2015), innovation, knowledge and creativity, and business density (Zemtsov and Komarov, 2015; Zemtsov et al. 2016). Using longitudinal data across cities in six countries goes beyond single country (Zemtsov et al. 2016) and other case studies (Aidis et al. 2008; Manolova et al. 2008). We respond to the need for nuanced research to benefit a wide range of decision makers concerned with the regional economy (Baburin and Zemtsov, 2017; Zemtsov and Tsareva, 2018). We also augment studies on business evolution under transition (Zemtsov et al. 2016; Barinova et al. 2018).

LITERATURE AND HYPOTHESES

Background

The small business sector in the post-Soviet context came from both marginal and high status occupations: owners and workers from more marginal backgrounds (e.g. peasants, artisans, redundant skilled workers) as well as former military officers and party leaders, used their human capital and networks to start businesses (EBRD, 2012). People started businesses both because they saw opportunities for profit and because they had no other avenues for work. A new entrepreneurial class with both types of opportunity driven and necessity businesses emerged during transition (see Barkhatova et al. 2001), meaning that both highly resourced people and poorly resourced people were entering into business.

A key motivation for business in the 1990s in Eastern Europe and Russia was considered to be different between two periods of 1990-2002 and 2002-2008 (Manolova et al. 2008; Baburin and Zemtsov, 2017). Negative trends in the economy in the 1990s could have shaped the increase in unemployment, which in turn and in conjunction with liberalization, led to an increase in the number of small firms. Amid diverging conditions in post-Soviet regions, the early 2000s saw significant growth of business (EBRD, 2012). Cities started to provide new functions and attracted labor with new services, markets, and financing (Yakolev and Zhuravskaya 2011).

In the 2002-2008 period, with conditions of high oil prices and active social policy (pensions, benefits, support for large families), poverty levels decreased sharply. Institutional reforms of the early 2000s –Gref's reforms in Russia - also reduced pressure on businesses and simplified the registration of new firms, encouraging officially registered small firms (reduction of informal sector) (Zemtsov et al. 2016).

Transition countries were strongly tied to economic activity in Russia, including access for Kazakhstan, Belarus and Ukrainian labour forces, interdependence in policies as well as Russian subsidies and credit. Small business support became part of economic development policy especially in the 2000s (Manolova et al. 2008).

While the macroeconomic picture generally was improving during high oil prices and social policy in the 2000s, firm density and poverty were fairly stable between cities (Zemtsov et al. 2016). Institutional differences between cities remained significant. Cities with less corruption and informality had higher firm density (Zemtsov et al. 2019). Cities with significant state transfers were likely to have higher poverty, such as Tuva or Northern Caucasus region in Russia¹. Larger cities with larger markets, foreign direct investment and more friendly business climate, attracted small businesses (Lapiente, 2013), and periphery regions felt migration of working populations to cities (Baburin and Zemtsov, 2017: 149).

In the 1990s, the highest level of poverty in Russia was in North Caucasus and lagging regions such as Kurgan, Orenburg, Pskov, etc. In the North Caucasus, a large informal sector reflected in low density of registered firms (Zemtsov and Komarov, 2015; Zemtsov et al. 2016). However, in cities with low poverty and large markets (e.g. St. Petersburg, Tyumen, Nizhny Novgorod, etc.), business conditions were a conduit to new firms (Barinova et al. 2018). These interrelated patterns, which may result in reverse causality, intra-regional and intra-temporal dependence, should be carefully considered as interdependent urban phenomenon.

Hypotheses

The transition context is unique because private business was not allowed under central planning, so many small business owners emerging in transition may be assumed to also be new. This might not be the case where private business was long established. This entrepreneurial activity could catalyze what Rindova et al. (2009) argue to be transformational change.

It could affect poverty by introducing services, resources, markets and methods that positively influence the lives of individuals and communities. Sutter et al. (2019) identified three perspectives on new business and poverty: *reform*, *remediation*, and *revolution*. The reform perspective considers that poverty is the result of non-inclusive systems, and that entrepreneurship can alleviate poverty when there is a dramatic reshaping of the institutional and social context. The remediation perspective considers that poverty results from resource scarcity, and that entrepreneurship can alleviate poverty when resource scarcity is addressed. The revolution perspective questions the relevance of capitalist systems and that new economic systems are necessary for entrepreneurship to alleviate poverty.

It is by now well established that institutional conditions are relevant in understanding business emergence (Baumol, 1990; Barinova et al., 2018; Audretsch et al. 2019). Changes in the institutional condition of a city could, in the reform perspective, lead to substantial changes for the business context. Though highly uncertain due to regulatory and policy change, the reform context could support a favorable environment for small business.

The poor are often cut off from the networks that could help overcome bureaucratic constraints and access financing (see De Soto, 1989; 2000). An important context specific to the post-Soviet transition was the establishment and strengthening of property rights, setting the foundation for private property. Property assets can be meaningful for the poor and help them connect with resources, such as in the formal banking sector, that can be used to start a business (see De Soto, 2000). Also, legal rights to property should encourage business and resulting job creation because people can appropriate the outcomes of engaging in private business activity. As new entrepreneurs expanded and hired, the demand for labor at different

¹ We thank one of the reviewers for this point.

scales responded. Similarly, other reforms related to contracts, business registration, trade laws, and so on were made, creating governance frameworks for private business. The ability to own a private business, along with institutional reforms, enabled small business development (see Manolova et al. 2008). In turn, this dynamic new business sector demanded new markets and new jobs and led to expanded hiring and disposable income of small business owners, employees and more circulation of this income in a community. We thus hypothesize that the growth of small business should lead to better poverty outcomes:

H1: *Small business reduces poverty in cities in transition economies.*

The transition process was not even across the region (Krasniqi and Desai, 2016). The remediation view views poverty as resulting from a lack of resources, which could create problems related to opportunity identification and exploitation (see Sutter et al. 2019). Regions marked by resource scarcity are less likely to host interactions between market agents and supply them with capital (Chlioia et al. 2015), which could mean under-identification of new and opportunities and lower commercialization of knowledge (Audretsch et al. 2015).

For example, better skills, training and networks could boost opportunity identification, and business owners would have better skills to effectively exploit opportunities (Van Eijkel et al. 2011; Bruhn et al. 2010). They should more easily gain local knowledge to identify opportunities in new markets and to leverage resources and technology (VanSandt and Sud, 2012). Also, the nature of transition itself put a heavy focus on finance for the new business sector, often without functional capital institutions catching up. Business owners with social capital and strong networks with financial institutions could secure finance but it was harder for others. Thus, some might have seen benefits of improved capital resources but not others.

This means that it is also worthwhile to consider if poverty can affect small business. Since the rate of change across regions is not likely to be identical (Belitski and Desai, 2016), different regions could experience different changes in resource access over time. We therefore also hypothesize on the effect of poverty on small business.

H2: *Poverty reduces small business in cities in transition economies.*

METHOD

Data and sample

Our main source is the statistical offices in six post-Soviet countries: Georgia, Armenia, Azerbaijan, Belarus, Russia and Ukraine². We also use annual data from Rosstat (Russia) and regional statistical agencies in Armenia, Belarus, Moldova and Ukraine to reduce the volatility of using quarterly data. Offices of National Statistics (ONS) agencies are located in each regional city greater than 100,000 residents, and they collect information guided by provisions in supra-national agreements about statistics and accounting between countries. Due to data limitations, we do not include several cities in the Chechen Republic, Republic of Ingushetia and Khanty Mansi region in Russia (averages for the study period indicate these regions jointly account for <1% of the population in the dataset). Also, geopolitical change related to regional trade partnerships and European integration limits our panel to 1995-2008.

² Data from individual ONS was made compatible through Initiative No 09-9031: “Driving urban economic growth – evidence from transition economies,” part of the larger 2009-2010 project “Cities – an analysis of the post-Communist experience,” supported by the Economics Education and Research Consortium in cooperation with Global Development Network.

In addition, we match the city-level data with aggregated firm data to create control variables for institutional context, from the World Bank Enterprise Surveys. This source covers a wide range of topics, including ownership, performance, human capital, industry and business environment. Our primary interests are proxies for institutional conditions related to conducting business. We use at least two available waves of data over 2008-2013 for the countries in our sample. We cleaned the data for outliers and used the maximum observations available for non-missing values and replaced non-responses or all non-applicable with missing values, leading to 10,670 firms in the Enterprise Surveys.

Our resulting city-level panel comprises 115 cities in six transition economies (see Appendix A1 and A2 for summaries and descriptives of our variables). Table 1 contains variable descriptions and sources. Table 2 presents descriptive statistics.

--- TABLES 1 AND 2---

Dependent variable

A universal measure of poverty is elusive. While often measured like a daily cutoff at purchasing power parity (Ramos 2013), poverty is multidimensional and involves capability deprivation, marginalization, discrimination, and poor health (Amorós and Cristi, 2011).

We therefore measure poverty rate at the household level, which reflects consumption ability. This is taken as the percentage of households with available household income below the minimum consumption budget, which is region specific. The indicator is taken in logarithms. The highest average poverty rates of 81.5 percent in Rivne and 80.8 percent in Lutsk (Western Ukraine), and lowest in the resource-rich cities of Khanty-Mansiysk (9.30 percent) and Salekhard (8.06 percent) in Russia.

Data on poverty rates in transition economies during 1990-2008 was collected based on an approach focused on poverty and transition in Russia (see Zohoori et al., 1998), which relies on the National Longitudinal Monitoring Survey. This was cross-checked with the regional distribution of knowledge and innovation, confirming a clear inter-related pattern (Baburin and Zemtsov, 2017) and data available from the official statistical office. Longitudinal monitoring surveys during the 1995-2008 period in cities provide context on cost of living for low-income persons, official poverty levels, and minimum consumption budget.

Explanatory variables

Our key explanatory variable of interest is *small business*. This is measured as the number of businesses with fewer than 50 full-time employees per 1,000 residents, taken in logarithms. We standardize the presence of small firms in a city by using units of 1,000 residents, to obtain a density indicator that can be compared across cities. This is necessary because firm size and populations are not distributed proportionally across various cities of different sizes.

The highest small business density was in Khanty-Mansiysk and Salekhard, and given relatively small population in those regions, we excluded them from our analysis.

It is worth noting that official statistics may not capture informal business activity, during the transition period³ so we use institutional regional controls (described later) to account for potential informal business activity across regions.

We use one and two year lagged periods, $t-1$ and $t-2$, to account for the intertemporal effect of the impact of small business on poverty in a city. This allows us to consider an instant effect, instead of an effect taken in one to two years; doing this focuses on the direction of the impact as going from small business to poverty, and not the reverse. In our model we also test the reverse effect – how poverty affects small business - which helps us resolve an endogeneity concern. We discuss our empirical strategy further below.

³ Rosstat described how a firm could get into the business register (author correspondence). For a new firm to get into official statistical reports, it has to be at least one fiscal since registration. This could exclude turnover of firms which quickly exit (“one-day firms”), people working at home, and some small informal firms.

Control variables

Some sectors, like mining and manufacturing, could be overly important given relative Russian reliance on natural resources (Gaddy and Ickes, 2013; EBRD, 2012). Industry mix is important (Audretsch et al. 2015; Korosteleva and Belitski, 2017; Barinova et al. 2018) so we measure *industry diversity* with five industry groups in the Rosstat data. Each is measured using the percentage contribution to city GDP from the industry: (1) Manufacturing, mining and energy (2) Trade (3) Construction (4) Finance (5) Education. The reference category is other services (ICT, telecommunications, admin services and transportation).

We control for *population density*, proxied as the number of residents per square kilometre, in logs. Fritsch and Mueller (2004) and Falck et al. (2011) discuss the pros and cons of a population density indicator, which could be complementary to market potential. In cities, this ratio differs in the type of development, like low-rise construction. Population density may affect the relationship we test: due to number of residents in resource-rich small cities, the highest small business density is in Khanty-Mansiysk and Salekhard, which have clearly lower population but typical city size for the region. Given that daily commuting is limited in post-Soviet cities, population density is a reasonable measure to capture residents who live and work within a city's boundaries, though we also acknowledge that cities like Moscow and St. Petersburg may be exceptions.

We include *unemployment rate*, measured as the percentage of unemployed in the working-age (18-65 years) city population⁴. We include dummy variables to identify a *large city* with population greater than 750,000 and a *mid-size city* with population between 350,000 and 750,000 residents (Audretsch et al. 2015). These variables capture potential non-linear agglomeration effects (Fritsch and Mueller, 2004).

To capture locational differences in market potential, we modify Zemtsov and Baburin's (2016) index for regional market potential MP_i :

$$MP_i = GRP_i + \sum \frac{GRP_j}{\alpha \times d_{ij}} + \sum \frac{GRP_c}{\alpha \times d_{ic}} \quad (1)$$

where i is the analysed region; j represents other regions of a country (Russia for Russian regions and Ukraine for Ukrainian, and so on); c is nearest city capital in the region across the border within seven countries in the sample; d is the distance between regions and countries. GRP represents gross regional product, measured as gross city product in 2005 USD constant prices in purchasing power parity, adjusted to USD inflation⁵. Finally, $\alpha = 0.01$ proportion coefficient and shows how the distance to foreign markets affects their potential domestic capacity, based on assuming that if the distance to the regional market is 1,000 km, potential capacity is reduced by 10 times. We assume that market potential is formed within the seven countries in the sample. For example, the nearest city across the border of Hrodna in Belarus is

⁴ Such indicators in transition and developing contexts may be complicated because of issues which could relate to capacity and structure of data collection systems, reporting systems, the unrecorded sector, fear and accountability in reporting processes, and ability to track movement of people. See OECD (2017), Dell-Anno (2016), Eilat and Zinner (2002), Svejnar (2002), and Fischer et al. (1996).

⁵ Data on GRP was taken from annual statistical yearbooks for Russian regions and regional capitals. It is available for all except Russian, Armenian and Azerbaijani cities. We used share of population living in a city as a weight to rescale GRP. For example, GRP of Arkhangelsk in 2006 was 2315.69 million USD with population 354,600 while GRP of the region was approximately 7181 million USD with population 1.1 million. We calculate GRP of Arkhangelsk as $7181 \times 0.3223 = 2315.69$ million. This is an approximation, given strong concentration of residents and weak commuter patterns (except St. Petersburg and Moscow, for which it is available), most cities see value created within boundaries. We also assume that proportion of value creation and labor productivity does not change between city core and region where the city is located.

Vilnius, but Lutsk city in Ukraine will be calculated. We use this measure for regional market potential because proximity to larger markets can support business (Barinova et al. 2018)

We include a binary variable *border city* to identify if a city is located in a region with national border access. We add variable *distance to Moscow*, which was a capital city for all included cities before transition and should still matter in the 1990s as an institutional baseline. We add *distance to Brussels*, which reflects proximity to the European Union and could matter as economies further departed central planning.

In addition to our city level controls, we include year and country fixed effects.
Endogeneity issues and the role of regional institutions

There could be concerns about endogeneity issues between small business and poverty. We aim to resolve this using two approaches: first, we include unobserved factors which are correlated with entrepreneurship but which can also affect poverty in our equation. These are regional institutional variables. Second, we adopt a seemingly unrelated regression estimation (SURE), as we describe in our identification strategy.

It is likely that negative economic trends in the 1990s affected poverty, which in turn, in conjunction with liberalization, could have led to more small firms. This could be because unemployed people created new firms out of necessity (see Fairlie and Fossen, 2018) in conditions of mass enterprise closures, unemployment, and quality of life decline.

In the second part of transition, conditions of high oil prices and active social policy in the 2000s, poverty decreased sharply. Institutional reforms of the early 2000s in Russia and other newly independent countries likely reduced pressure on businesses and simplified firm registration, leading to a significant increase in the number of officially registered small firms (reduction of the informal sector). The revealed patterns may be explained by macroeconomic and institutional development to some extent, including the differences in regional institutions which may resolve the endogeneity problem in our model. Regional institutional characteristics are thus helpful to control for these changes.

We address the potential endogeneity problem by first introducing measures of regional institutions related to the initial year 1995 of our study, as well as averaged indicators over the 1998-2012 period (see Zemtsov et al. 2016; Zemtsov and Tsareva, 2018). Second, we use aggregated firm level data on perceptions of quality of institutions, risk, business environment, and challenges for the 2008-2014 period (Barinova et al. 2018).

A key constraint for many regions is that knowledge is unequally distributed. The role of human capital and creativity of the workforce for regional economic development (Glaeser et al. 2014; Fritsch and Storey, 2014) can facilitate new ideas and knowledge, which become available to further commercialize and multiply (Acs et al. 2013). This can provide knowledge inputs for new and existing small businesses. We therefore account for regional human capital and creativity by including two control variables: *share of R&D* in GRP and *creative city*, respectively. We believe that these proxies effectively capture the state of knowledge in a city and can be replicated in different regional and country contexts.

First, human capital proxied by share of R&D in GRP (Glaeser et al. 2014) is included because investment in R&D is positively associated with entrepreneurial activity and regional economic development (Audretsch et al. 2015). Heterogeneity in knowledge inputs (Baburin and Zemtsov, 2017) warrants normalization of R&D using GRP.

Second, we measure creativity using creative industry affiliations, unlike other approaches using occupational data (Florida, 2002; Boschma and Fritsch, 2009). This is because industry can provide a better description of what type of economic activity is being undertaken by creative people (see Markusen et al. 2008). We created a binary variable “creative city” where a value of 1 reflects that the share of education, arts and finance sectors contribution to GRP is greater or equal to 10, and a value of 0 if otherwise. This measures the extent to which creativity is embedded in the sector, in line with the concept of a creativity

pillar of entrepreneurship (Audretsch and Belitski, 2013). Prior research on Russia used the concentration of creative professions, according to the Pilyasov creativity index methodology (Baburin and Zemtsov, 2017), to measure the role of knowledge and creativity in regional economic development (Pilyasov and Kolesnikova, (2008). Creative cities are leading metropolitan agglomerations in central regions of Russia, cities in South Russia, the Urals, Siberia and the Far East that are centers of industrial development and international trade.

We also created a set of institutional quality indicators using Enterprise Surveys data. Building on the persistence of business (Korosteleva and Belitski 2017) and institutions over short and longer periods (Acemoglu and Robinson, 2008; Zemtsov and Tsareva, 2018), we assume that indicators for 2008-2013 can work as controls for our period⁶. The surveys include retrospective information which dates three years for a focal firm input. To create our controls, we collapsed firm responses about specific obstacles (Table 1).

We then matched collapsed responses by region values by city-region to our data on cities. These controls allow us to see how cognitive proximity, determined by similarity of knowledge and skills, could affect business trajectory (Zemtsov and Tsareva, 2018), labor market participation and even perception of poverty.

Empirical Strategy

We build two models with poverty rate and small business as dependent variables, and estimate them simultaneously given potential for interdependence and endogeneity (Wooldridge, 2010). In addition to resolving the omitted variable bias, this controls for unobserved factors which may affect both outcomes. A standard way of modelling jointly determined indicators is a system of equations, SURE, where two equations (in each model) are linked only by their errors (Zellner, 1962). We apply this for a random effects model using the “sureg” option in Stata 15. The model one represents a system of equations:

$$\begin{cases} Poverty_{it} = \beta_0 + \sum_{i=1}^n \beta_{11}E_{it-1} + \sum_{i=1}^n \beta_{12}x_{it-1} + \sum_{j=1}^m \beta_{13}z_{it} + \sum_{j=1}^m \beta_{14}d_{it} + \rho_c + \lambda_t + u_{1it} \\ E_{it} = \beta_0 + \sum_{i=1}^n \beta_{21}Poverty_{it-1} + \sum_{i=1}^n \beta_{22}x_{it-1} + \sum_{j=1}^m \beta_{23}z_{it} + \sum_{j=1}^m \beta_{24}d_{it} + \rho_c + \lambda_t + u_{2it} \end{cases}$$

where $Poverty_{it}$ is the natural logarithm of poverty rate in a city i at time t ; E_{it} is small business density in a city i in time t (number of small firms per 1,000 residents). x_{it} is a vector of our explanatory variables for a city i at time t ; z_{it} is a vector of our exogenous regional institutional variables for a region j where a city is located for year 1995; d_{it} is a vector of aggregated institutional characteristics for a region i using firm data during 2008-2013, with indicators assumed persistent over the 1995-2013 period, capturing regional heterogeneity. Moreover, we include three additional vectors ρ_c is country fixed effects where a city is located in a country c , λ_t is a vector of time-fixed (city invariant effects) over 1995-2008 across all cities. The error term is denoted by u_{it} and is assumed to be identically and independently distributed with mean zero and constant variance σ^2 .

The equations are related to each other having errors that are jointly normally distributed and therefore inter-dependent. First, we begin with the overall estimation over 1995-2008 using first $(t - 1)$ and second $(t-2)$ lagged values of explanatory and

⁶ While these variables belong to 2008, firm density in Russia was quite stable during 1-2 years, and the stability is likely to be even stronger for leading and lagging regions (see Baburin and Zemtsov, 2017: 179-185). The continuous presence of stable regional leaders and outsiders indicates persistence of business and institutional quality in Russian regions. We assume other countries followed a similar pattern.

control variables (Table 3). SURE estimation allows us to control for interrelated residuals in both equations, which represent unobserved factors that could have affected both poverty and small business, e.g. regional subsidies, age of population, delays in pensions etc.

THE RELATIONSHIP BETWEEN SMALL BUSINESS AND POVERTY

Table 3 uses SURE estimation effects panel regression with the first (column 1-2) and second lagged independent variables (columns 3-4). We perform Breusch –Pagan test for independence, which is positive and significant for both models, confirming that residuals of both equations are inter-related and that the unbiased estimation should be estimating both equations simultaneously.

We estimate the effect of an increase in small business density on poverty (columns 1-3) and the effect of an increase in poverty on small business density (columns 2-4).

--- TABLE 3---

Consistently across the two estimations in Table 3, small business is negative and statistically significant. The impact ranges from -0.71 to -0.93, indicating that a one percent change in small business density in a city could lead to poverty reduction by up to 0.94 percent, supporting H1. We also find that the effect is stronger for the one year lag and starts dissipating from year two. Within the same system of equations, we find that an increase in poverty hampers small business activity. The impact ranges from -0.37 to -0.62, indicating that one percent increase in the share of households with an available income below the minimum consumption budget decreases small business formation between 0.37 to 0.62 percent. This supports H2. Again, the effect is stronger for the one-year lag and weaker for the two year lag. This demonstrates that small business in a city reduces poverty during transition; however, cities with many households in poverty saw less small business.

Interestingly, an increase in unemployment rate has both positive and negative effects on regional small business and poverty. On one hand, an increase in unemployment is associated with higher poverty rates ($\beta=0.01$, $p<0.05$) but on the other hand, has a positive influence on small business ($\beta=0.02-0.03$, $p<0.05$). Population density is positively associated with poverty and is neutral to small business, with higher poverty rates in higher agglomeration economies ($\beta=0.06-0.12$, $p<0.05$). An increase in market potential by one percent reduces poverty in the next year by 0.05 percent and in two years by 0.07 percent.

We also find that city size matters: there is less small business activity in medium size cities compared to small and large cities ($\beta=-0.09$, $p<0.05$).

We find opposite results for our controls for two capitals. Distance to Moscow is positively associated with both poverty and small business (likely due to industrial mix and trade opportunities) while distance to Brussels is negatively associated with poverty and entrepreneurship rates.

Robustness checks

We conduct two sets of robustness checks. First, we compare the early and late period of transition to see if the relationships change as transition matured (Berkowitz and DeJong, 2011). To investigate this potentially interesting link, we apply the SURE model separately for the 1995-2002 period and the 2003-2008 period (see Table 4, columns 1-2 and columns 3-4 respectively).

Second, given that Russian cities make almost half of our data, we run our estimations on Russian cities only (Table 4, columns 5-6), controlling for city-specific locational and institutional characteristics. SURE estimation with interrelated residuals and variety of controls is appropriate for our investigation.

--- TABLE 4---

First, we find that an increase in small business density reduces poverty rate in 2003-2008 ($\beta=-0.68$, $p<0.01$) as compared to the earlier period 1995-2002 ($\beta=-0.46$, $p<0.01$),

supporting H1. We also find that higher poverty reduces small business activity, supporting H2, with the effect being stronger in the first ($\beta=-1.10$, $p<0.01$) than second period ($\beta=-0.89$, $p<0.01$). This makes sense as conditions in transition economies improved over 1995-2010 (Zemtsov and Baburin, 2017: 178-179). We also find a positive and significant relationship between unemployment rate and poverty during the first period ($\beta=0.02$, $p<0.01$),

Large cities ($\beta=0.110$, $p<0.01$) and cities with greater market potential during this period had lower poverty rates ($\beta=-0.101$, $p<0.01$) than cities with less market potential. This effect disappears once institutional reforms took place in 2002-2008.

A major difference in the Russian analysis is that the interplay between poverty and small business is closer to the results for the early transition period. Unlike results for other cities, market potential in Russian cities positively affects small business and poverty. Russian cities that share a national border have less poverty but also less small business (Belitski, 2006).

Distance to Brussels and distance to Moscow matters for poverty and small business in Russian cities; cities in Russia which are located closer to Brussels experienced less poverty and small business. Interestingly, the concentration of creative class reduces small business in Russian cities.

Limitations

A limitation relates to official national statistics and comparable estimates of multilateral and international organizations. This does not mean they are incorrect; we note that national and local authorities can cooperate with international organizations, but it raises potential questions about timing, streamlined definitions, processes, and management of the data.

Another limitation is if omitted variable bias exists, it is likely related to FDI and remittances and the informal economy, as well as presence of corruption and enforcement of institutions. We imposed stronger assumptions on regional institutions based on their persistence, but we are still constrained by our data sources. Longitudinal data availability could improve upon our findings in future research.

DISCUSSION AND CONCLUSIONS: ROLE OF REGIONAL INSTITUTIONS, KNOWLEDGE, AND TIME

Our study empirically documents the relationship between small business and poverty in transition contexts. Our key findings are that small business can reduce city poverty and that cities with more poverty hinder small business. Our findings are robust to city-specific socioeconomic conditions, spatial characteristics, and regional knowledge. Taken together, this suggests a “trap” type of relationship where poverty and weak business activity may be reinforcing each other⁷.

Our results raise points for discussion and future research. It could be that poverty reduction leads to identification of opportunities overall and for poor residents specifically. For example, business ownership among the poor could be encouraged by providing resources such as knowledge and skills (Sutter et al. 2019: 204). Potential entrepreneurs may be better able to identify opportunities when they have resources to start business rather than stay as employees (Kistruck et al., 2013). Cities with a higher poverty rate could have less small business if poorer individuals view employment as more secure than entrepreneurship (Kistruck et al., 2013). Our finding that unemployment is associated with more small business could reflect necessity driven

⁷ We thank one of the reviewers for making this point.

entrepreneurship, or if more labor availability supports small business needs. This is an avenue for future research.

The role of regional institutions

The effects of regional institutions in shaping small business and poverty are mixed. First, cities where businesses perceive obstacles related to tax administration, political instability, corruption, labour regulations, and crime had both higher poverty rates and small business density. This is an interesting finding in the case of some conditions which might be assumed to depress business. On the other hand, this kind of environment could provide opportunities for a business owner willing to pay (see Dau and Cuervo-Cazurra, 2014). In the case of corruption, an appearance of “greasing the wheels” should be interpreted with caution because of the risk of repeated exploitation as well as the long-term effects (Belitski et al., 2016). Both corruption and organized crime were common in transition economies, and in the 1990s when courts and law enforcement were in formation and still weak. Future research could ask if poverty leads to crime, or if cities with lots of crime prevent business formation. Our study looks at the presence of small business, but we cannot infer about business growth: a question for future research, for example, is how pervasive crime or corruption affects small business growth or performance.

We also find that cities where firms reported inadequately educated workforce as an obstacle had less small business. It is unclear why some firm-reported obstacles –tax administration, labor regulations and organized crime - facilitated small business while others – business licensing and permits, customs and trade regulation - reduced small business. This may be related to administrative location of these activities (courts or regulatory agencies) or possibly level of implementation (national or regional). A useful direction for research is to ask if institutions suppress promising businesses or if they filter out those that would waste resources or harm consumers (Audretsch et al. 2019).

Knowledge creation

Not all cities have similar knowledge profiles and exploit entrepreneurial opportunities similarly (Audretsch and Belitski, 2013). Cities with higher share of finance, arts and education (>10%) (creative cities) had lower poverty rates. Cities marked by greater investment in human capital have both more small business and higher poverty (Table 3). These results remain robust across both time periods (Table 4) but the size of the human capital coefficient is larger in the second period compared to the first period. This suggests that economic development also led to greater disparities and more business activity.

For post-Soviet cities in 1995-2008, we find that creative cities had less poverty and less small business. An interpretation could be the context of the dominance of public sector and large firms, which relied on debt financing and could attract and absorb large amounts of labor that otherwise could be employed in small business. The finding of less poverty and less small business in creative cities provides context for decision makers to be aware of when considering priorities.

These findings do not support a remediation perspective, which considers poverty to result from scarce resources. As countries moved towards market economies and institutional reforms, not all the population might necessarily benefit from available resources. We provided preliminary insight that can inform future research on this important question. Scarcity of resources in other cities does not appear to allow small business to flourish.

Differences between early and later transition periods

During the first years of transition in the 1990s, many people become entrepreneurs out of necessity, which would lead to different outcomes than business started because of a strong market opportunity.

Using two time periods, 1995-2002 and 2003-2008, shows change in the relevance of locational factors. For example, distance to Moscow had more impact on small business and

poverty in the first period while the effect is halved in the second period. A possible interpretation is if cities in Russia and other transition economies developed independence in resource distribution and infrastructure, enabling greater economic separation from Moscow, although this dependency still persists (see Fritsch et al. 2019). Distance to Brussels was relevant for poverty and small business in the early period, which was marked by migration to Europe and financial infusions to transition economies. This could be linked to cities starting to develop greater independence or strengthened regional relationships, such as through the Eurasian Economic Community (EaP, 2019) which aimed to strengthen economic integration of member states (Mamlyuk, 2014). Our findings on time are useful for decision makers considering how to structure interventions.

Cities with higher investment in knowledge started to show more significant impact on poverty reduction and small business growth in the later stage of transition, when institutions likely matured and people had some time to adjust to change. This indicates to decision makers that some interventions may not show success quickly. Cities located in creative regions with a higher share of finance, arts and educational contributions, in contrast, had a negative effect on small business and poverty. This is noteworthy because it shows that greater make-up of educational, arts and finance sectors in GRP reduces both poverty and small business. A way to interpret this is that there could have been changes in economic opportunities. For example, people who would have become necessity entrepreneurs may instead have gained reasonable wage options in the financial sector or by occupations supported through public education. These findings point to a need for future research to understand how individuals use entrepreneurship due to necessity over time.

We did not find significantly different effects of regional institutions on poverty and small business in either period. Most changes between the two periods related to poverty and not small business. Factors perceived by businesses as obstacles related to licensing and permits and customs and trade regulation remained concerns over both periods.

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Table 1: Variables, definitions and sources

| Variable name | Description | Source |
|--|---|---|
| Poverty | City share of households (in total number of households) with an available household income below the minimum consumption budget, in logarithm | Official stats |
| Small business | Number of firms with less than 50 full-time employees (FTE) per 1,000 residents, , in logarithms | |
| Unemployment | Unemployment rate, % | |
| Population density | Number of residents per 1 km2, in logs | |
| Market potential | Modified market potential index MP_i (equation 1) | Zemtsov and Baburin (2016) |
| Border region | City located in the region with a national border | Authors |
| Large city | Population >750,000 residents | Official stats |
| Medium size city | Population between 350,000 and 750,000 residents | |
| Distance to Moscow | Distance by road to Moscow city, 000s km | Authors |
| Distance to Brussels | Distance by road to Brussels, 000s km | Authors |
| Mining and manufacturing | % contribution of manufacturing, mining and energy in gross city product | Official stats |
| Trade | % contribution of trade in gross city product | |
| Construction | % contribution of construction in gross city product | |
| Regional knowledge and creativity indicators | | |
| R&D to GRP | Regional R&D expenditure to gross regional product (GRP) ratio, % | Official stats |
| Creative city | Binary variable =1 if city has a high (>10) share of gross city product (GRP) contributed by education, arts and finance sectors , zero otherwise (Florida, 2002). For example, in Russia these are Saint Petersburg, Moscow, Tomsk, Kaluga, Nizhny Novgorod, Ulyanovsk, Novosibirsk, Magadan, Tyumen, Samara, Kaliningrad, Murmansk, Khabarovsk, Petropavlovsk-Kamchatskv. Krasnovarsk. In Belarus - | Florida (2002), (Baburin and Zemtsov, 2017) |

| | | |
|--|---|---|
| | Minsk and Vitebsk and in Ukraine - Kiev, Odessa and Lviv. Share of GRP from these 3 creative sectors in cities of Georgia, Armenia, Azerbaijan is <10%. | |
| Regional level institutional variables | | World Bank Enterprise Surveys (2015) collapsed by authors |
| Obstacle: tax administration | Perceived obstacle to current operations: (0 – no obstacle to 3 – severe obstacle) | |
| Obstacle: business licensing and permits | | |
| Obstacle: political instability | | |
| Obstacle: corruption | | |
| Obstacle: labour regulations to operations | | |
| Obstacle: inadequately educated workforce | | |
| Obstacle: crime | | |
| Obstacle: customs and trade regulation | | |
| Obstacle: courts | | |

Source: Rosstat, Belstat, Ukrstat, Armenian, Azerbaijani and Moldovan statistical agencies (ministries and ONS, 1995-2010).

Table 2: Descriptive statistics

| Variables | Obs. | Mean | St. dev | Min | Max |
|--|-------|-------|---------|------|-------|
| Poverty | 1,301 | 3.36 | 0.57 | 0.00 | 4.56 |
| Entrepreneurship | 1,301 | 2.62 | 0.58 | 0.11 | 4.80 |
| unemployment | 1,151 | 3.01 | 3.67 | 0.13 | 30.20 |
| Population density | 1,301 | 7.52 | 0.67 | 5.10 | 8.84 |
| Market potential | 1,301 | 7.31 | 1.56 | 3.03 | 12.87 |
| Border region | 1,301 | 0.52 | 0.50 | 0.00 | 1.00 |
| Large city | 1,301 | 0.19 | 0.39 | 0.00 | 1.00 |
| Medium size city | 1,301 | 0.32 | 0.47 | 0.00 | 1.00 |
| Distance to Moscow | 1,301 | 1.86 | 2.18 | 0.17 | 11.88 |
| Distance to Brussels | 1,301 | 4.04 | 2.40 | 1.47 | 14.44 |
| Mining and manufacturing | 1,301 | 11.20 | 8.40 | 0.00 | 62.90 |
| Trade | 1,301 | 7.12 | 4.21 | 0.00 | 32.29 |
| Construction | 1,301 | 13.04 | 6.55 | 0.54 | 54.60 |
| R&D to GRP | 1,301 | 0.76 | 0.89 | 0.00 | 6.39 |
| Creative class city | 1,301 | 0.14 | 0.35 | 0.01 | 1.00 |
| Obstacle: tax administration | 1,301 | 1.25 | 0.46 | 0.31 | 2.67 |
| Obstacle: business licensing and permits | 1,301 | 0.99 | 0.51 | 0.00 | 2.15 |
| Obstacle: political instability | 1,301 | 1.64 | 0.57 | 0.62 | 3.86 |
| Obstacle: corruption | 1,301 | 1.55 | 0.56 | 0.22 | 2.74 |
| Obstacle: labour regulations to operations | 1,301 | 0.70 | 0.34 | 0.04 | 2.10 |
| Obstacle: inadequately educated workforce | 1,301 | 1.54 | 0.61 | 0.00 | 2.46 |
| Obstacle: crime | 1,301 | 1.09 | 0.51 | 0.00 | 2.03 |
| Obstacle: customs and trade regulation | 1,301 | 0.95 | 0.49 | 0.07 | 2.57 |
| Obstacle: courts | 1,301 | 0.90 | 0.53 | 0.00 | 2.08 |

Source: Rosstat, Belstat, Ukrstat, Armenian, Azerbaijani and Moldovan statistical agencies (Ministries and Offices of national statistics, 1995-2010); Zemtsov and Baburin (2016), Baburin and Zemtsov (2017), World Bank

Table 3: SURE simultaneous estimation of poverty and entrepreneurship (E'ship) during 1995-2008 (first and second lagged values)

| Dependent variable | Poverty | E'ship | Poverty | E'ship |
|--|---------------------|---------------------|---------------------|---------------------|
| Specification | (1) | (2) | (3) | (4) |
| Lagged period | t-1 (1 year) | | t-2 (2 year) | |
| Poverty | | -0.930*** (0.13) | | -0.710*** (0.13) |
| Entrepreneurship | -0.621*** (0.05) | | -0.371*** (0.06) | |
| unemployment | 0.011** (0.01) | 0.026*** (0.01) | 0.003 (0.01) | 0.032*** (0.01) |
| Population density | 0.060** (0.03) | -0.013 (0.05) | 0.121*** (0.03) | -0.019 (0.05) |
| Market potential | -0.053*** (0.02) | -0.007 (0.03) | -0.072*** (0.02) | 0.016 (0.03) |
| Border region | 0.022 (0.03) | 0.040 (0.04) | 0.005 (0.03) | 0.034 (0.04) |
| Large city | 0.010 (0.05) | -0.047 (0.07) | 0.055 (0.04) | -0.029 (0.06) |
| Medium size city | -0.026 (0.03) | -0.096** (0.04) | 0.029 (0.03) | -0.088** (0.04) |
| Distance to Moscow | 0.145*** (0.03) | 0.145*** (0.05) | 0.149*** (0.03) | 0.115** (0.05) |
| Distance to Brussels | -0.078*** (0.03) | -0.091** (0.04) | -0.077*** (0.03) | -0.071* (0.04) |
| Mining and manufacturing | 0.001 (0.00) | 0.002 (0.00) | 0.004* (0.00) | 0.004 (0.00) |
| Trade | -0.007** (0.00) | -0.005 (0.00) | -0.007*** (0.00) | -0.004 (0.00) |
| Construction | 0.005* (0.00) | 0.011*** (0.00) | 0.001 (0.00) | 0.012*** (0.00) |
| R&D to GRP | 0.062*** (0.01) | 0.112*** (0.03) | 0.050*** (0.01) | 0.084*** (0.03) |
| Creative class city | -0.129*** (0.03) | -0.283*** (0.06) | -0.081** (0.04) | -0.255*** (0.06) |
| Obstacle: tax administration | 0.198*** (0.06) | 0.236*** (0.07) | 0.149** (0.06) | 0.161** (0.06) |
| Obstacle: business licensing and permits | -0.581*** (0.07) | -0.765*** (0.08) | -0.442*** (0.08) | -0.685*** (0.07) |
| Obstacle: political instability | 0.229*** (0.04) | 0.245*** (0.07) | 0.205*** (0.04) | 0.182*** (0.07) |
| Obstacle: corruption | 0.309*** (0.07) | 0.292*** (0.08) | 0.292*** (0.06) | 0.219*** (0.07) |
| Obstacle: labour regulations to operations | 0.223*** (0.08) | 0.305*** (0.09) | 0.149** (0.07) | 0.285*** (0.08) |
| Obstacle: inadequately educated workforce | -0.124** (0.06) | -0.127* (0.08) | -0.098 (0.06) | -0.097 (0.07) |
| Obstacle: crime | 0.190** (0.08) | 0.358*** (0.09) | 0.111 (0.08) | 0.382*** (0.08) |
| Obstacle: customs and trade regulation | -0.253*** (0.06) | -0.226*** (0.07) | -0.231*** (0.06) | -0.137* (0.07) |
| Obstacle: courts | 0.089 (0.08) | 0.069 (0.10) | 0.066 (0.07) | 0.047 (0.09) |
| Country and year fixed effects | Yes | Yes | Yes | Yes |
| Constant | 3.885*** | 5.308*** | 2.922*** | 4.821*** |

| | (0.35) | (0.48) | (0.33) | (0.47) |
|--------------------------------------|--------------------|--------|--------------------|--------|
| Breusch –Pagan test for independence | 1.194*** (0.11) | | 0.656*** (0.13) | |
| N | 1301 | | 1245 | |
| chi-squared | 13823.94 | | 6642.51 | |
| Log-likelihood | -639.51 | | -735.31 | |

Note: Reference industry is other services (ICT, telecom, council, restaurants, tourism) and transportation. Reference country: Georgia, Reference year 1995. Instead of industry dummies share of each industry in GDP were included in regression. Robust standard errors are in parenthesis. The coefficients of the SURE regressions are the marginal effect of the independent variable on the dependent variables in each regression. For dummy variables, it is the effect of a discrete change from 0 to 1.

Significance level: * p<0.05; ** p<0.01, *** p<0.001.

Source: Rosstat, Belstat, Ukrstat, Armenian, Azerbaijani and Moldovan statistical agencies (ministries and ONS, 1995-2010); Zemtsov and Baburin (2016), Baburin and Zemtsov (2017), Enterprise Surveys (2015)

Table 4: SURE simultaneous estimation of poverty and small business for 1995-2002 and 2003-2008, and for Russian cities only (first lagged values)

| Dependent variable | Poverty | E'ship | Poverty | E'ship | Poverty | E'ship |
|--|----------------------|---------------------|----------------------|---------------------|-------------------------------|---------------------|
| Specification | (1) | (2) | (3) | (4) | (5) | (6) |
| Period of analysis | All cities 1995-2002 | | All cities 2003-2008 | | Russian cities only 1995-2008 | |
| Poverty | | -1.101*** (0.07) | | -0.891*** (0.18) | | -1.109*** (0.06) |
| Entrepreneurship | -0.467*** (0.04) | | -0.684*** (0.10) | | -0.431*** (0.03) | |
| unemployment | 0.017** (0.01) | 0.041*** (0.01) | 0.011 (0.01) | 0.024*** (0.01) | -0.005 (0.01) | -0.016* (0.01) |
| Population density | 0.042 (0.03) | -0.077 (0.05) | 0.095* (0.05) | 0.030 (0.07) | 0.057** (0.02) | -0.005 (0.04) |
| Market potential | -0.110*** (0.02) | -0.052 (0.04) | -0.030 (0.03) | 0.030 (0.03) | 0.024** (0.01) | 0.132*** (0.02) |
| Border region | -0.023 (0.04) | 0.003 (0.06) | 0.040 (0.05) | 0.051 (0.05) | -0.075*** (0.02) | -0.109*** (0.04) |
| Large city | 0.110** (0.05) | 0.089 (0.09) | -0.038 (0.08) | -0.111 (0.09) | 0.039 (0.04) | -0.010 (0.06) |
| Medium size city | 0.072* (0.04) | -0.017 (0.06) | -0.070 (0.05) | -0.098* (0.06) | 0.085*** (0.02) | 0.027 (0.04) |
| Distance to Moscow | 0.192*** (0.04) | 0.186*** (0.07) | 0.100** (0.04) | 0.108* (0.06) | 0.141*** (0.03) | 0.256*** (0.05) |
| Distance to Brussels | -0.109*** (0.04) | -0.099* (0.06) | -0.046 (0.04) | -0.078 (0.05) | -0.108*** (0.03) | -0.245*** (0.05) |
| Mining and manufacturing | 0.014*** (0.00) | 0.020*** (0.01) | -0.003 (0.00) | -0.004 (0.00) | 0.020*** (0.00) | 0.025*** (0.00) |
| Trade | -0.003 (0.00) | -0.008 (0.01) | -0.009* (0.01) | 0.001 (0.01) | 0.002 (0.00) | 0.005 (0.00) |
| Construction | 0.001 (0.00) | 0.007 (0.01) | 0.007* (0.00) | 0.015*** (0.00) | 0.003 (0.00) | 0.007* (0.00) |
| R&D to GRP | 0.092*** (0.02) | 0.162*** (0.05) | 0.061*** (0.02) | 0.103*** (0.03) | 0.096** (0.03) | 0.135*** (0.05) |
| Creative class city | -0.157*** (0.05) | -0.316*** (0.09) | -0.134*** (0.04) | -0.270*** (0.08) | -0.198*** (0.06) | -0.301*** (0.09) |
| Obstacle: tax administration | 0.121* (0.07) | 0.085 (0.11) | 0.188** (0.09) | 0.254*** (0.09) | -0.071* (0.04) | -0.078 (0.07) |
| Obstacle: business licensing and permits | -0.320*** (0.07) | -0.655*** (0.11) | -0.690*** (0.11) | -0.712*** (0.12) | -0.271*** (0.05) | -0.608*** (0.08) |
| Obstacle: political instability | 0.108** | 0.178** | 0.307*** | 0.288*** | -0.048 | -0.219*** |

| | (0.05) | (0.08) | (0.07) | (0.10) | (0.04) | (0.08) |
|--|---------------------|--------------------|---------------------|--------------------|---------------------|---------------------|
| Obstacle: corruption | 0.164** (0.07) | 0.213* (0.11) | 0.387*** (0.11) | 0.319** (0.13) | 0.177*** (0.06) | 0.404*** (0.09) |
| Obstacle: labour regulations to operations | 0.128 (0.09) | 0.389*** (0.13) | 0.251** (0.11) | 0.206* (0.11) | 0.244*** (0.07) | 0.448*** (0.11) |
| Obstacle: inadequately educated workforce | -0.046 (0.07) | -0.111 (0.12) | -0.139 (0.09) | -0.128 (0.10) | -0.246*** (0.06) | -0.538*** (0.09) |
| Obstacle: crime | 0.176*** (0.07) | 0.426*** (0.11) | 0.191 (0.13) | 0.316** (0.13) | 0.307*** (0.05) | 0.522*** (0.08) |
| Obstacle: customs and trade regulation | -0.211*** (0.07) | -0.197* (0.11) | -0.237*** (0.09) | -0.236** (0.10) | 0.023 (0.04) | 0.061 (0.08) |
| Obstacle: courts | 0.031 (0.09) | 0.047 (0.15) | 0.097 (0.12) | 0.052 (0.13) | 0.091 (0.07) | 0.373*** (0.11) |
| Country and year fixed effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 4.528*** (0.35) | 6.867*** (0.52) | 3.517*** (0.54) | 4.426*** (0.64) | 3.104*** (0.25) | 5.292*** (0.39) |
| Breusch –Pagan test for independence | 1.155*** (0.07) | | 1.202*** (0.16) | | 1.074*** (0.06) | |
| N | 590 | | 711 | | 852 | |
| chi-squared | 4582.44 | | 11517.02 | | 14072.41 | |
| Log-likelihood | -122.81 | | -403.12 | | -65.03 | |

Note: Reference industry is other services (ICT, telecom, council, restaurants, tourism) and transportation.

Reference country: Georgia. Reference year 1995. Instead of industry dummies, share of each industry in GDP were included in regression. Robust standard errors are in parenthesis. The coefficients of the SURE regressions are the marginal effect of the independent variable on the dependent variables in each regression. For dummy variables, it is the effect of a discrete change from 0 to 1.

Significance level: * p<0.05; ** p<0.01, *** p<0.001.

Source: Rosstat, Belstat, Ukrstat, Armenian, Azerbaijani and Moldovan statistical agencies (ministries and ONS, 1995-2010); Zemtsov and Baburin (2016), Baburin and Zemtsov (2017), Enterprise Surveys (2015)

Appendix A1: Cities, average poverty, small business and unemployment rate: 1995-2008
(1301 obs.)

| City | Poverty | Entrepre- neurship | Unempl | City | Poverty | Entrepre- neurship | Unempl |
|------------------|---------|-----------------------|--------|------------------------------|---------|-----------------------|--------|
| Khanty-Mansiysk* | 9.30 | 93.91 | 1.02 | Maykop | 35.89 | 13.60 | 3.31 |
| Salekhard* | 8.06 | 55.03 | 1.65 | Veliky Novgorod | 24.33 | 13.57 | 4.80 |
| Hrazdan | 49.28 | 46.00 | 12.02 | Ryazan | 28.07 | 13.00 | 1.58 |
| Kharkov | 54.95 | 45.87 | 0.82 | Donetsk | 33.03 | 12.95 | 1.70 |
| Gori | 28.76 | 41.13 | 10.93 | Yakutsk | 22.47 | 12.89 | 0.91 |
| Vagarshapat | 42.21 | 38.42 | 9.65 | Ivanovo | 43.51 | 12.33 | 2.62 |
| Krasnodar | 28.24 | 37.54 | 0.55 | Kostroma | 27.56 | 12.32 | 2.51 |
| Batumi | 25.81 | 36.46 | 21.93 | Penza | 33.54 | 12.17 | 3.70 |
| Rustavi | 12.61 | 35.01 | 8.54 | Lviv | 71.32 | 12.04 | 0.80 |
| Kutaisi | 22.31 | 33.08 | 9.74 | Lutsk | 80.85 | 11.82 | 1.63 |
| Stavropol | 33.24 | 30.38 | 2.50 | Abakan | 27.90 | 11.34 | 2.43 |
| Tyumen | 14.06 | 29.34 | 0.81 | Cheboksary | 33.61 | 11.29 | 4.61 |
| Kemerovo | 17.50 | 28.05 | 1.91 | Tambov | 25.47 | 11.27 | 4.32 |
| Vladivostok | 36.33 | 26.72 | 1.89 | Cherkassy | 49.82 | 11.18 | 2.00 |
| Gyumri | 62.48 | 25.96 | 9.37 | Petropavlovsk- Kamchatsky | 27.23 | 11.05 | 2.45 |
| Rostov-on-Don | 23.19 | 24.93 | 1.35 | Dnipro | 57.04 | 11.03 | 1.04 |
| Samara | 21.12 | 24.15 | 1.67 | Omsk | 22.76 | 10.94 | 0.91 |
| Vanadzor | 41.54 | 24.09 | 10.06 | Ulan-Ude | 37.64 | 10.89 | 2.39 |
| Tbilisi | 15.60 | 23.49 | 22.69 | Odessa | 61.77 | 10.76 | 0.34 |
| Yuzhno-Sakhalin | 24.02 | 23.48 | 1.03 | Rivne | 81.57 | 10.75 | 2.77 |
| Vladimir | 30.04 | 22.92 | 3.36 | Chita | 24.40 | 10.51 | 1.08 |
| Belgorod | 20.57 | 21.81 | 1.38 | Kirov | 32.33 | 10.31 | 2.63 |
| Barnaul | 32.46 | 21.56 | 3.03 | Brest | 25.73 | 10.27 | 2.08 |
| Gorno-Altai | 38.82 | 21.46 | 2.25 | Murmansk | 19.62 | 10.27 | 3.79 |
| Saint Petersburg | 18.84 | 21.39 | 1.22 | Cherson | 70.67 | 10.20 | 1.38 |
| Kaliningrad | 25.98 | 20.03 | 1.57 | Lipetsk | 19.56 | 10.18 | 1.08 |
| Ekaterinburg | 19.90 | 19.62 | 1.57 | Perm | 20.37 | 10.07 | 1.63 |
| Irkutsk | 27.31 | 19.58 | 2.65 | Zaporozhye | 62.14 | 10.07 | 0.68 |
| Vologda | 20.75 | 19.15 | 2.26 | Kurgan | 36.59 | 9.94 | 3.11 |
| Syktyvkar | 18.04 | 18.93 | 2.26 | Vinnitsia | 54.78 | 9.93 | 1.73 |
| Chelyabinsk | 21.80 | 18.77 | 1.33 | Kirovograd | 71.32 | 9.77 | 1.71 |
| Magadan | 20.63 | 18.76 | 3.23 | Khmelnitsky | 74.96 | 9.57 | 0.73 |
| Novosibirsk | 31.41 | 18.73 | 1.69 | Nalchik | 37.41 | 9.53 | 3.30 |
| Kaluga | 27.09 | 18.57 | 1.25 | Orel | 26.12 | 9.37 | 2.27 |
| Blagoveschensk | 35.23 | 18.46 | 2.37 | Elista | 51.99 | 9.35 | 2.46 |
| Anadyr | 22.43 | 18.19 | 3.13 | Smolensk | 21.97 | 9.32 | 0.33 |
| Tomsk | 20.31 | 17.59 | 1.25 | Lugansk | 70.19 | 9.28 | 0.64 |
| Kazan | 18.67 | 16.64 | 1.35 | Kyrsk | 25.66 | 9.10 | 2.77 |
| Orenburg | 28.99 | 16.18 | 0.82 | Nikolayev | 48.00 | 8.86 | 0.90 |
| Ufa | 22.79 | 16.04 | 2.35 | Vitebsk | 25.18 | 8.72 | 2.54 |
| Pskov | 28.84 | 15.63 | 3.32 | Bryansk | 25.74 | 8.59 | 1.97 |

| | | | | | | | |
|-----------------|-------|-------|------|-------------|-------|------|------|
| Uzhgorod | 72.17 | 15.62 | 1.75 | Astrahan | 25.52 | 8.57 | 2.71 |
| Volgograd | 25.05 | 15.39 | 1.15 | Hrodna | 21.44 | 8.57 | 1.99 |
| Krasnoyarsk | 22.06 | 15.35 | 1.65 | Kyzyl | 51.48 | 8.52 | 3.93 |
| Cherkessk | 40.24 | 15.33 | 1.84 | Birobidzhan | 35.00 | 7.95 | 1.98 |
| Petrozavodsk | 19.85 | 15.15 | 4.27 | Ulyanovsk | 27.33 | 7.93 | 1.95 |
| Khabarovsk | 24.59 | 14.87 | 2.65 | Mogilev | 27.27 | 7.78 | 2.47 |
| Saratov | 30.81 | 14.87 | 1.79 | Chernigov | 70.97 | 7.69 | 2.40 |
| Yaroslavl | 20.37 | 14.81 | 1.71 | Vladikavkaz | 29.52 | 7.36 | 2.52 |
| Simferopol | 71.81 | 14.80 | 0.96 | Saransk | 39.03 | 7.35 | 4.86 |
| Voronezh | 26.13 | 14.63 | 2.84 | Sevastopol | 44.84 | 6.94 | 0.75 |
| Yoshkar-Ola | 46.83 | 14.62 | 4.37 | Gomel | 22.30 | 6.58 | 2.37 |
| Nizhny Novgorod | 21.39 | 14.43 | 1.41 | Sumy | 80.51 | 5.47 | 2.08 |
| Arkhangelsk | 24.81 | 14.32 | 2.41 | Poltava | 26.59 | 5.23 | 3.20 |
| Izhevsk | 28.08 | 13.94 | 2.66 | Naryan-Mar | 14.57 | 5.16 | 1.32 |
| Tula | 20.30 | 13.90 | 1.19 | Makhachkala | 47.26 | 5.15 | 2.00 |
| Chernovtsy | 68.64 | 13.87 | 0.93 | Zhitomir | 76.60 | 4.51 | 2.47 |
| Ivano-Frankivsk | 63.08 | 13.83 | 2.16 | Ternopil | 77.24 | 3.82 | 3.86 |
| Tver | 29.35 | 13.82 | 0.79 | | | | |

Note: Khanty-Mansiysk and Salekhard as well as Nazran cities in Russia are excluded. Source: Rosstat, Belstat, Ukrstat, Armenian, Azerbaijani and Moldovan statistical agencies (1995-2010).

Appendix A2: Firm-level data by year, firm size and industry, 2008-2013.

| Country survey | Number of firms | Share in total |
|--------------------------|-----------------|----------------|
| Armenia (survey 2009) | 374 | 3.51 |
| Armenia (survey 2013) | 360 | 3.37 |
| Azerbaijan (survey 2009) | 380 | 3.56 |
| Azerbaijan (survey 2013) | 390 | 3.66 |
| Belarus (survey 2008) | 273 | 2.56 |
| Belarus (survey 2013) | 360 | 3.37 |
| Georgia (survey 2008) | 373 | 3.5 |
| Georgia (survey 2013) | 360 | 3.37 |
| Moldova (survey 2009) | 363 | 3.4 |
| Moldova (survey 2009) | 360 | 3.37 |
| Russia (survey 2009) | 1,004 | 9.41 |
| Russia (survey 2012) | 4,220 | 39.55 |
| Ukraine (survey 2008) | 851 | 7.98 |
| Ukraine (survey 2013) | 1,002 | 9.39 |
| Total | 10,670 | 100 |
| Firm size | | |
| small(<20) | 5,119 | 47.98 |
| medium(20-99) | 3,744 | 35.09 |
| large(100 and over) | 1,807 | 16.94 |
| Total | 10,670 | 100 |
| Industry distribution | | |

| | | |
|--------------------------------------|---------------|------------|
| Basic Metals & Metal Products | 107 | 1 |
| Chemicals & Chemical Products | 91 | 0.85 |
| Chemicals, Plastics & Rubber | 244 | 2.29 |
| Construction | 455 | 4.26 |
| Electronics & Communications Equip. | 193 | 1.81 |
| Fabricated Metal Products | 147 | 1.38 |
| Food | 570 | 5.34 |
| Garments | 415 | 3.89 |
| Hotels & Restaurants | 140 | 1.31 |
| IT & IT Services | 141 | 1.32 |
| Machinery & Equipment | 497 | 4.66 |
| Manufacturing | 1,137 | 10.66 |
| Non-Metallic Mineral Products | 260 | 2.44 |
| Other Manufacturing | 714 | 6.69 |
| Other Services | 2,002 | 18.76 |
| Retail | 2,029 | 19.02 |
| Transport, Storage, & Communications | 89 | 0.83 |
| Wholesale | 1,268 | 11.88 |
| Wood Products & Furniture | 171 | 1.6 |
| Total | 10,670 | 100 |

Source: Data from World Bank Enterprise Surveys (2015) was used to produce regional level indicators by collapsing perception data.