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**Conference Paper**

## Entrepreneurship and cities: evidence from the post-communist world

51st Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World", 30 August - 3 September 2011, Barcelona, Spain

**Provided in Cooperation with:**

European Regional Science Association (ERSA)

*Suggested Citation:* Belitski, Maksim; Korosteleva, Julia (2011) : Entrepreneurship and cities: evidence from the post-communist world, 51st Congress of the European Regional Science Association: "New Challenges for European Regions and Urban Areas in a Globalised World", 30 August - 3 September 2011, Barcelona, Spain, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<https://hdl.handle.net/10419/119951>

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# ENTREPRENEURSHIP AND CITIES: EVIDENCE FROM THE POST-COMMUNIST WORLD

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## ABSTRACT

This study investigates variation in entrepreneurship across cities of Commonwealth of Independent States during 1995-2008, utilizing a unique dataset and employing the System Generalised Method of Moments technique. Our findings suggest that banking reform facilitates entrepreneurship, whereas the size of state discourages it. Our results confirm a U-shaped relationship between per capita income and entrepreneurship. We also find that cities with higher concentration of universities are likely to drive entrepreneurial entry that provides some evidence for the importance of agglomeration economies in terms of higher concentration of knowledge which may lead to intensified exchange of ideas driving opportunity-based entrepreneurship.

## INTRODUCTION

Over the past three decades small firms have been credited with playing a much more important role in the economy than had been previously assumed (Acs & Audretsch 1990; Acs et. al. 2008). First, small businesses emerge as a driving force behind the technological change and innovation (Schumpeter 1939; Audretsch and Thurik 2004); through exploring new opportunities they are responsible for generating much of the market turbulence and creating the mechanism of regeneration (Marshall 1920). Second, small firms increase competition and provide diversity among firms through newly created niches (Brock & Evans 1986; Storey & Johnson 1987). Third, they emerge as an important engine behind job creation (Birch 1987; Westhead and Cowling 1995; Acs and Armington 2004).

Acknowledging the positive relationship between entrepreneurship and economic development, a growing number of empirical studies have focused on explaining variation in entrepreneurial activity at various spatial levels with the majority of them taking either a cross-country perspective or looking at the inter-regional differences. More recent studies on entrepreneurship have shifted their focus to examining cross-city variation in entrepreneurship, attributing urban success to more abundant supply of entrepreneurship (Acs et al. 2008; Glaeser and Saiz, 2003; Glaeser 2007; Glaeser et. al 2010; Glaeser and Kerr 2009; Bosma and Schutjens 2007, 2009; Belitski and Korosteleva 2011).

Acs et al. 2008 explore differences in entrepreneurial perceptions and entrepreneurial behaviour across 34 world cities using Global Entrepreneurship Monitor data. While their paper provides a rich comparison of the characteristics of new venture creation across world cities, it falls short of providing testable implications for variation in entrepreneurship across these cities. Bosma and Schutjens (2009) explore the determinants of entrepreneurial activity at a larger level of regional aggregation in Europe, distinguishing also between low- and high-ambition entrepreneurs. Belitski and Korosteleva (2011) explore how various demographic, socio-economic and geographical characteristics of European cities and institutional country-level settings affect entrepreneurship, proxied by the rate of self-employment, in 377 European cities during the period of 1989-2006. They find that in the context of European cities self-employment seems to capture rather low-value-adding business activity at best or to simply reflect new types of subordinate employment which have little to do with opportunity-driven entrepreneurship. These results hold largely true for both East European cities and West European ones, although there is some weak evidence that knowledge-hub cities seem to exhibit positive relationship with self-employment in the latter.

Despite a growing number of spatial-oriented studies of entrepreneurial activity worldwide, to our best knowledge Belitski and Korosteleva (2011) are the first who attempted to explain variations of entrepreneurship across Western vs. East European cities by this providing some insights on whether cities of transition economies are any different from their Western counterparts in terms of factors driving their entrepreneurial activity. They find that the role of institutions, notably property rights protection, and the size of the financial sector, play less prominent role in Eastern Europe compared to its Western counterpart. Estrin and Mickiewicz (2011) show that transition economies generally exhibit lower rates of entrepreneurship than observed in most

developed and developing market economies. They argue that this difference is even more pronounced for the Commonwealth of Independent States (CIS) compared to Central and Eastern Europe (CEE). Despite the fact that small businesses have steadily become to play a more important role in urban economics of transition, there is still an obvious scarcity or virtually no existence of research in this field in the context of transition economies. The scarcity of cross-city research in the context of the region can be attributed to a number of reasons, including lack of data; low interest of regional policy-makers in urban private sector development and prevailing thinking and planning at a larger level of space aggregation such as municipality (rayon) and beyond; existence of different approaches to measuring entrepreneurial activity across transition countries.

This paper investigates variation in entrepreneurial activity, proxied by the logarithm of small businesses, across 98 cities located in seven CIS countries, namely Russia, Ukraine, Belarus, Moldova, Georgia, Armenia and Azerbaijan, during the period of 1995-2008. By using cities as a unit of analysis the aim of this study is twofold: to bridge the city-level gap in empirical research on entrepreneurship in the CIS; to focus on urban heterogeneity in entrepreneurship unlike the regional one. Regional level studies deal both with urban and rural areas, and in this setting entrepreneurial activity has different characteristics. Furthermore, in accordance with urban incubator hypothesis the incidence of entrepreneurship is higher in urban agglomerations (Tödtling and Wanzenböck 2003). Small firms benefit the most from positive spatial, agglomeration and knowledge spillover effects (Saxenian 1994). As evidence shows areas with a larger number of small- and medium-sized firms have always tended to do better. Some examples include Detroit, Boston and Silicon Valley businesses, and a recently emerged hub of high-tech start-ups in the New York City, which according to a study by market research firm CB Insights placed New York second to Silicon Valley in high-tech innovations<sup>1</sup>. This list also includes London with a 'Tech City' in its East part, dubbed Silicon Roundabout, which emerged in 2008 as a cluster of internet start-ups and which is expected to stretch from Shoreditch to the 2012 Olympic games site farther east, and which is expected to strongly contribute to city success and social cohesion (The Economist 2010). Unsurprisingly, while looking for ways to boost employment and growth of their cities, local authorities among others focus on boosting private sector developments, and even more so entrepreneurship. A better understanding of the determinants of entrepreneurship in the context of cities can help guide a more efficient policy-making.

To investigate variation of entrepreneurship across CIS cities we utilise 1995-2008 dataset collected during 2009-2010 from the Offices of National Statistics in the aforementioned countries. We employ an advanced econometric technique, the System Generalised Method of Moments (SYSGMM) technique, to estimate our model. This allows to address a number of econometric problems, including potential endogeneity of some of our regressors; the presence of predetermined variables; and the presence of fixed effects which may be correlated with the regressors.

Our findings suggest that heterogeneity in entrepreneurial activity across CIS cities is largely explained by a U-shaped per resident income, advocating the prevalence of both necessity- and opportunity-driven entrepreneurship in the region as opposed to widely perceived belief of the dominance of "necessity-push at start-ups" (Welter and Smallbone 2011). Our results also show the importance of concentration of higher-education institutions in cities which may provide some indirect evidence for the importance of agglomeration economies in terms of higher concentration of knowledge which may lead to intensified exchange of knowledge and ideas driving opportunity-based entrepreneurship. Finally, we find some marginal support for larger size of local authorities disincentivising entrepreneurial entry, and for progress in banking reform enhancing it.

The paper proceeds as follows. The next section discusses the specifics of entrepreneurship development in transition economies. The following section focuses on the determinants of entrepreneurial activity and formulates hypotheses. The two subsequent sections discuss data and methodology, and empirical results, whereas the last section concludes.

## **ENTREPRENEURSHIP DEVELOPMENTS IN TRANSITION ECONOMIES**

The fall of the Berlin Wall in late 1989 marked the beginning of transition of socialist countries to a market economy. The near simultaneity of regime changes often contributed to the perception that the former Soviet republics and the countries of Central and Eastern Europe by and large fit a common model of post-socialist transition, in which differences mainly lie in the degree or sequencing of market-oriented reforms. Stabilisation and liberalization programmes accompanied by structural reforms appeared to shape transition of CEE and CIS countries from a planned economy to a market economy. The reality of transition has proven more complex than it was viewed at the beginning, revealing some differences in initial conditions and institutional developments that played substantial role in defining the success or failure of transition.

One of the issues facing transition countries at the early start was the need to develop a private business sector, which occurred through small-scale privatisation and the creation of new businesses from scratch (*de novo* firms). Despite a number of hardships, including economic instability, institutional deficiencies, lack of public support and hostile social attitudes towards entrepreneurship, *de novo* firms experienced exponential growth in the early 1990s, driven by abundant market opportunities which were suppressed under the communist system, and the lack of governmental regulations. Along with this the transition experience offered some unique institutional opportunities for entrepreneurship to develop.

Institutions, viewed as norms and rules both formal and informal, may simultaneously enhance entrepreneurial activity and constrain it (North 1990). The institutional context will also affect allocation of individual efforts between various types of entrepreneurial activities whether these are productive, unproductive or destructive (Baumol 1990). While regulation may hinder prospects of one entrepreneur, it can open opportunity for another. In the early years of transition weak institutional environment benefited various organised criminal groups that following Baumol's typology (1991) could be regarded as destructive entrepreneurs. However, institutional loopholes have created opportunities not only for destructive or unproductive entrepreneurship to flourish, but they have also led to a surge in productive entrepreneurship, for example, formally registered business consultancy firms rendering some advice in acquisition of permits and licenses. Following Welter and Smallbone (2011) "the consultancy firms that developed to fill institutional gaps were not gray sector enterprises but some of the most innovative and successful firms in the business services sector".

One of the peculiar features of transition economies in terms of private sector development is that entrepreneurship there has predominantly been viewed as necessity-driven at start with a large proportion of small business traders being seen as proprietors opting for satisfying their direct consumption needs rather than opportunity-based entrepreneurs oriented towards business growth (Scase 2003). Glinkina (2003) advocates that since the primary function of a proprietor is survival, proprietorship as unlikely to initiate dynamic growth in transition countries. At the same time Scase (2003) acknowledges that both proprietorship and entrepreneurship are dynamic categories and not rigidly defined, implying that it is possible for proprietors to turn into entrepreneurs and vice versa. Aidis et al. (2004) advocates a more dynamic view to be adopted which emphasizes the learning capacity of individuals over time, in particular where high levels of human capital are involved, as well as improvements in business environment as the two factors likely to enable changes in the aspirations of individuals and their ability to spot and exploit new entrepreneurial opportunities.

By the mid-late 1990s, after tremendous initial explosion in new business formation, the majority of transition economies experienced a declining trend (Kontorovich 1999; Radaev 2003) that was largely explained by more rigid regulatory environment, increasing levels of competition, scarcity of financial resources and weak institutional environment (Radaev 2003; Aidis 2005). According to Geroski (1995) this trend is consistent with stylised facts on firms' entry, where the entry rate peaks early in the life of a market, but declines later with the survival rate of most entrants being low. Furthermore, this can be explained by the natural cause of economic development where entrepreneurship declines with increase in the level of income reflecting the emergence of economies of scale with individuals preferring income stability, while being employed by larger firms, over risky business initiatives (see Carree et al. 2002; Wennekers et al. 2005). It picks up again as the income level passes a certain threshold with the trend being normally driven by accumulation of financial resources which can be directed towards launching a business, and improvements in business environment, offering new opportunities for entrepreneurial development (*ibid.*).

On average transition economies exhibit lower rates of entrepreneurial activities compared to other developed and developing economies which is even more true for the CIS compared to Central and Eastern Europe (Aidis et al. 2008). Estrin and Mickiewicz (2011) attribute this to the negative effect of the legacy of communist planning, which needs to be replaced with formal market-supporting institutions. They further argue that along with the establishment of formal institutions, it is necessary to develop new informal institutions, in particular to rebuild the generalised trust. Estrin and Mickiewicz (2011) see the longer prevalence of the communist rule, leading to a lack of institutional memory, as one of the reasons why entrepreneurship rates vary between CIS states and their CEE counterparts. Following, Schwartz and Bardi (1997) they posit that "time spent under communism is associated with the prevalence of a system of norms and values not conducive to generalized trust which is a prerequisite to entrepreneurship". The prevailing conditions of surveillance and detailed monitoring of citizens triggered distrust that was often in contradiction to the official ideology promoting cooperation and trust (*ibid.*). The authors conclude that given slow pace of change in informal institutional environment creation rebuilding generalised trust may be delayed until after full generational change.

In this paper we go on to explore variation in entrepreneurship across CIS cities looking at the role of various socio-economic and demographic characteristics of cities, and structural reforms aimed at establishing market-oriented institutions. Our overarching ambition is to offer a better understanding of the determinants of entrepreneurship in the context of cities that can help guide a more efficient policy-making. In the next section we discuss some literature pertaining to the determinants of entrepreneurial entry and postulate our main hypotheses.

## **ENTREPRENEURIAL ENTRY: THEORY, HYPOTHESES AND CONTROLS**

Earlier empirical studies on urban economics and entrepreneurship show that a number of factors can be identified as to likely shape cross-city variation in entrepreneurial activity. These can be broadly grouped as follows: (1) socio-economic characteristics of cities; (2) institutional context; (3) availability of inputs including financial resources; (4) urbanisation economies; and (5) geographic characteristics (see Glaeser 2007; Glaeser and Kerr 2009).

In this section we first discuss the literature related to our key hypotheses and further proceed with the discussion of other factors (control variables) which are likely to affect entrepreneurial entry in the context of FSU cities, linking them to the groups of factors identified above.

### **City income level**

Income level represents the first group of factors. A wealthier urban environment, associated with higher payoff and larger market potential, is expected to provide more incentives to entrepreneurs in pursuing market opportunities. In their theoretical extension of the New Economic Geography model Glaeser et al. (2010) propose that in an open city the level of (endogenous) entrepreneurship is increasing with demand. The higher levels of per capita income reflect a stronger customer base which in turn should be conducive to entrepreneurial entry.

At the macro level entrepreneurship literature suggests that entrepreneurial activity varies in countries at different stages of their economic development. Wennemers et al. (2005) find a U-shaped relationship between the two variables, suggesting that nascent entrepreneurship is high in low-income countries where entrepreneurship is often seen as an alternative for employment. As per capita GDP increases, the rate of entrepreneurial activity falls that may be explained by the emergence of economies of scale. Following the considerations of income stability that can be provided by large domestic firms, many individuals prefer employment to business creation at this stage. However, entrepreneurial activity surges again after passing a certain threshold in high-income countries, indicating the accumulation of individual savings which can be used to start a business and economic environment favourable to exploitation of new opportunities.

Following our discussion in the previous section, in the aftermath of the collapse of the Soviet Union, start-ups in the region have been found to be predominantly necessity-driven that reflects the scarcity of income earning alternatives (Scase 2003; Glinkina 2003). More rigid regulations coupled with emergence of larger competitive firms have contributed to a decline in new business creation throughout the mid-end of 1990s. However, with market maturing and respective improvement in economic environment to the benefit of entrepreneurship development, new opportunities emerged incentivizing individuals to launch growth-oriented businesses. So, unlike the conventional view of predominance of “necessity-push at start-up” (Welter and Smallbone 2011: 108) we expect to find the presence of both necessity-driven and opportunity-driven entrepreneurs across CIS, with the latter prevailing in wealthier cities. Therefore, our first hypothesis is formulated as follows.

*Hypothesis 1: The level of income has a U-shaped form with respect to entrepreneurial entry.*

### **Institutional context**

Drawing on the work of North (1990) and Baumol (1991, 1993, 2005) institutions, viewed as norms and rules both formal and informal, may simultaneously enhance entrepreneurial activity and constrain it. The former occurs via better functioning institutions reducing transaction costs such as, for example, linked to contract enforcement, and via reducing risk associated, for example, with expropriation of private assets either by the state or economic agents. Better functioning institutions consequently enable the economy to move from a ‘relationship-based personalised transaction structure to a rule-based, impersonal exchange regime’ (Peng 2003). On opposite deficient institutions characterised by weak rule of law, higher levels of corruption, a lack of

property rights enforcement may constrain entrepreneurship, as has been shown in the context of transition economies, including Russia (Aidis et al. 2008; 2010).

Furthermore, the quality of the institutional environment affects the allocation of entrepreneurial efforts among its various uses (Baumol 1990; discussed earlier), and some specific entrepreneurial strategies. Welter and Smallbone (2010, pp.100-111) identified six types of entrepreneurial responses to the external environment in which entrepreneurs were operating in the former Soviet countries, including (1) “prospecting”, denoting firms who respond to changes in external environment via innovation and adoption of a more flexible organisation structure; (2) “evasion”, implying adaptation to inadequate legal environment via, for example, combining legal and informal production; (3) “financial bootstrapping”, meaning relying on resources alternative to formal external finance, including borrowing from families and friends; (4) “diversification”, which is used deliberately to make the business success less noticeable to officials or rent-seeking economic agents offering “protection” in exchange<sup>2</sup>; (5) social capital or networking (see also Aidis et al. 2008 for discussion of this phenomenon in the context of Russia); (6) various forms of individual adaptation of entrepreneurs to administrative and bureaucratic burdens. These strategies are typical of the CIS region, and they emerge in response to weak institutional environment.

In our analysis, we concentrate primarily on structural reforms enabling establishment of market-oriented institutions. For this we use EBRD transition indicators which measure the progress in transition. More specifically we look at the progress in banking reform and large-scale privatisation<sup>3</sup>. Along with structural reforms we also look at size of the state; property rights protection and business regulation.

*The banking sector reform* aimed to advance the financial development through the establishment of a two-tier banking system, liberalisation of interest rates and credit allocation, full convergence of banking laws and regulations with Bank of International Settlements standards, and provision of full set of competitive banking services (EBRD 2010). It is widely acknowledged that more developed financial markets are likely to alleviate borrowing constraints through the wider allocation of savings to potential investment projects and facilitation of the risk management in the presence of information asymmetries and transaction frictions (Levine 1997). With wider supply of finance and competition, the financial institutions are pushed to choose more challenging financial options including entrepreneurial finance. This is particular topical for transition economies for which scarcity of financial resources is more pronounced than for market economies (for the discussion of the relevant literature see Korosteleva and Rodionova 2011). Respectively, our next hypothesis postulates:

*Hypothesis 2a: Progress in banking reform is positively associated with entrepreneurial entry.*

The advancements in *large-scale privatisation* are expected to have an ambiguous effect on entrepreneurship. In many post-communist towns, dubbed “large enterprise-driven” there still prevails a vertically integrated industry which lacks independent suppliers. That makes it difficult for new businesses to sprout. The majority of the working-age population living in such towns are employed by such incumbents with only minimum share of city residents of a working age being engaged in services sector dominated by small firms. Such structural distortions are still typical of the majority of the CIS countries, but even more so for Belarus which is regarded as a laggard in transition. Thus, in Belarus industry, dominated by large-scale vertically integrated enterprises, remains the largest sector of the economy in terms of employment generation and the second largest (after services) in terms of contribution to GDP.

Porter’s Five forces model (1979) suggests that among other things the degree of competition in the market depends on the threat of buyers or sellers to integrate backwards and forward. The higher the degree of vertical integration, the more discretion businesses have over exercising their monopoly power. New firms are unlikely to enter the market when either a supplier or distribution network is largely controlled by few incumbents. Bolton and Whinston (1993) develop a model showing (among other things) that vertical integration increases supply assurance concerns for non-integrating downstream firms. Departing from Chinitz’s (1961) study on large integrated firms depressing the external supplier development, Saxenian (1994) argues that the development of independent suppliers, while lowering the effective cost of entry, enhances entrepreneurship. Large-scale privatisation and enterprise restructuring may help facilitate the development of supplier linkages between large and small firms via large enterprises’ downsizing and specialization, and so it is likely to enhance entry of new firms. At the same time, large-scale privatisation is expected to drive competition that may force entrepreneurs quit the market (Parker 2009). In this paper we indirectly test Chinitz’s (1961) hypothesis.

*Hypothesis 2b: Large-scale privatisation facilitates entrepreneurship to the extent of enhancing independent supplier development*

*The size of the state* has been argued to adversely influence entrepreneurial entry (Aidis et al. 2010). Higher tax income associated with a larger size of the state and higher marginal tax rates for higher earners reduces the expected returns to entrepreneurs and discourages entrepreneurial entry (Parker 2009). Higher tax income can also be associated with a more generous welfare provision system, implying among other things higher unemployment benefits. These generous benefits are likely to increase opportunity cost of going into entrepreneurship (Estrin et al. 2011). Accordingly we hypothesize:

*Hypothesis 2c: A greater size of the government will discourage entrepreneurial entry*

As far as *property rights protection* is concerned strong property rights are important not only for high-tech entrepreneurship with a strong intellectual property position but also for other forms of entrepreneurship to the extent that in the first place property rights guarantee the status quo via providing crucial security of private property against an arbitrary action of the executive branch of the government (Estrin et al. 2011). This is particularly topical in the context of CIS states. As discussed earlier, many successfully functioning businesses prefer to diversify rather than invest in business expansion of their core activities to avoid risk of expropriation by governmental officials, such as for example tax inspection officers. It has been shown that strong property rights have a fundamental positive effect on economic activity and entrepreneurship. Acemoglu and Johnson (2005) show that property rights institutions have pronounced effects on investment, financial development and long-run economic growth. Aidis's et al. (2008) empirical account reveals that among various institutional indicators, the property rights system plays the most pivotal role in determining entrepreneurial activity. Johnson et al. (2002) provide evidence that weak property rights discourage entrepreneurs to reinvest their retained profits into business. Based on this we postulate our next hypothesis.

*Hypothesis 2d: Strong property protection is associated with increase in small businesses*

According to the public interest theory, a stricter *business regulation*, requiring a proper screening of new firms will allow for the entry of only those firms which meet minimum standards for providing a quality product or service that should benefit the society. On the other hand, the public choice theory views regulation as potentially inefficient with industry incumbents being likely to benefit the most. Once they are able to influence the regulation in their favour, incumbents increase their power to the extent that restraints entry of new firms and competition. In their study of the regulation of entry of start-ups in 85 countries Djankov et al. (2002) find that countries with overly regulated business environment have higher level of corruption and larger unofficial economies, providing some supporting evidence for the public choice theory argument. In their majority, empirical studies on business regulation conform to the proposition that overregulated environment inhibits entrepreneurial entry (Grilo and Thurik 2005; Grilo and Irigoyen 2006; Vat Stel et al. 2007). Regulatory constraints are found to be of particular detriment to opportunity-driven entrepreneurship (Ardagna and Lusardi 2008). Vice-versa, lower entry barriers are positively associated with the rate of firm entry (Klapper et al. 2006; Demircuc-Kunt et al. 2006). Respectively, our next hypothesis is formulated as follows:

*Hypothesis 2e: More flexible business regulations encourage entrepreneurship*

### **Concentration of knowledge**

Our next hypothesis is associated with urbanisation economies. Start-ups are inevitably about new ideas, and the ability of some agglomerated locations to foster new ideas is one potential reason why they become centres of entrepreneurship and self-employment. Innovations are outcomes of 'knowledge intensive environments' i.e. groupings of large and small firms interacting with public research organisation and providers of knowledge intensive services. Spatial concentrations boost self-employment by supporting the transfer of old ideas and the creation of new ones. Saxenian (1994) argues how the flow of ideas helped to create the entrepreneurial cluster of Silicon Valley. Cities with higher concentration of higher education establishments are more likely to be incubators of new ideas. Furthermore, as part of Europe's agenda to promote sustainable growth via innovation and entrepreneurship, many EU neighbourhood countries, including the majority of the CIS states studied here, embark on promotion of clusters, enhancing also collaboration between small businesses and research institutions. Respectively, we hypothesize:

*Hypothesis 3: Cities with higher concentration of higher education establishments are likely to drive entrepreneurial entry.*

Along with the key factors discussed above in this study we also control for other variables which are likely to affect entrepreneurial entry according to theoretical and empirical evidence.

## Other controls

Along with the level of income we also consider unemployment as part of socio-economic characteristics of cities as a likely determinant of entrepreneurial entry. The effect of the rate of unemployment is ambiguous. On the one hand side, it may have a push effect with entrepreneurship being seen as the only available occupational alternative. In this case entrepreneurship is most likely to be necessity-driven and associated with basic low-scale business activities (Mandelman and Montes-Rojas 2009). It is important to note here that necessity-driven entrepreneurship is more likely to take a form of self-employment, implying that the unemployment effect may not necessarily show up or it may be inversely associated with entrepreneurship when proxied by small businesses. Furthermore, higher tax income can also be associated with a more generous welfare provision system, implying among other things higher unemployment benefits, which could reduce incentives to go into entrepreneurship. Furthermore, unemployment is a cyclical phenomenon and may simply mirror economic recession and demand deficiency, making entrepreneurial entry unlikely.

As part of 'inputs availability' group we control for capital investment ratio in cities. Although, generally expected to have a positive effect on entrepreneurial entry, the role of capital investment in the context of the FSU may be ambiguous, and the possibility of a crowding out effect as a result of public funds being channelled to support large-scale state-owned enterprises is not excluded.

Along with knowledge concentration we also control for other variables associated with urbanisation economies. Local interactions that give rise to agglomeration spillover for entrepreneurship are extensively discussed in Duranton & Puga (2004) and Rosenthal & Strange (2004). The proposition that agglomeration economies have a positive effect on productivity goes back to Marshall (1920). The scale of the urban environment may impact productivity through availability of a larger pool of workers and their skill diversity, co-location of firms across diverse industries, the proximity of customers and suppliers. In agglomeration economies a larger home market essentially increases the returns to business entry (Agrawal et al. 2008; Gerlach et al. 2009; Simonen & McCann 2008). So, the incidence of entrepreneurship is likely to be higher in urban agglomerations where entrepreneurs' payoffs are governed by higher technology, knowledge and consumer demand. So, respectively urbanisation economies are expected to have a positive impact on entrepreneurial entry.

We also add city geographical controls, including location proxied by latitude and longitude, the size of city and distance from Moscow. However, given dataset constrain we are unable to control for industry effects.

## DATA AND METHODOLOGY

### Sample Description

To investigate variation of entrepreneurship across FSU cities we utilise the 1995-2008 data collected from the Offices of National Statistics in Russia, Ukraine, Belarus, Moldova, Georgia, Armenia and Azerbaijan as part of a larger project entitled "Cities: An Analysis of the Post-Communist Experience". Our dataset contains urban audit indicators across various domains specific to our study. These include economic and social characteristics of cities and other indicators used to test our main hypotheses pertaining to entrepreneurial entry at city level. We merge these statistics with institutional country-level data, derived from the Polity IV data<sup>4</sup> and Heritage Foundation<sup>5</sup>, EBRD transition indicators (EBRD Transition Reports, various issues), and geographical characteristics of cities to shed some light on the effect of institutional settings and city spatial effects on entrepreneurial entry. More specifically, the dataset is represented by 98 cities<sup>6</sup> covering Russia (54 cities), Belarus (6 cities), Ukraine (26 cities), Moldova (1 city-capital), Georgia (5 cities), Armenia (5 cities), Azerbaijan (1 city-capital). These cities, though varying in size<sup>7</sup>, are generally considered to be the most appropriate spatial units for modelling and analysis purposes.

### Variable Definition

We use a number of small businesses taken in logarithms to measure entrepreneurship. According to national statistical offices small businesses are defined as firms with 50 employees or less (100 employees respectively in manufacturing sector). Small businesses as a measure of entrepreneurial activity has been widely used in a number of empirical studies (for discussion see Parker 2009). There is a huge variation in the number of small businesses across our sample. The number of registered small businesses is extremely low in Naryn-Mar, Russia, varying from 60 to 165 over the period of 1995-2008, and Nazran, Russia, varying from 128 to

1857 respectively. In 6 out of 98 cities the number of registered small businesses over the 1995-2008 is below a thousand. These cities include Chernigov, Ternopil, Uzhgorod in Ukraine and Elista, Naryan-Mar and Nazran in Russia. At other extreme, Kiev, Moscow - capital cities, - and Saint-Petersburg show high rates of entrepreneurial activity with the number of small businesses reaching more than 40,000 on average over the period of our analysis<sup>8</sup>.

To test our *Hypothesis 1* we use city GDP<sup>9</sup> per resident in constant 2005 USD prices obtained from our CIS Urban Audit dataset. There is no universally accepted set of measures of institutional quality. So far, many scholars have largely relied on what is commonly referred to as institutional outcome variables (Glaeser et al. 2004). These include survey indicators provided by the International Country Risk Guide (e.g. a measure of risk of expropriation), the World Bank measures of Governance effectiveness; EBRD Transition indicators; the World Bank's Doing Business indicators; and the Heritage Foundation / Wall Street Journal indices. To measure the effect of banking reform and large-scale privatisation (*Hypotheses 2a and 2b* respectively) we employ EBRD transition indicators, scored from 1 denoting "little progress" to 4 - "significant progress". To measure the size of the local government we use a city-level indicator, defined as local government expenditure to GDP ratio (*Hypothesis 2c*). For the strength of property rights (*Hypothesis 2d*), we use the Polity IV measure of efficient constraints on the arbitrary power of the executive branch of the government, named "constraints on executive". It has been argued as the most appropriate measure for protection of citizens against expropriation by the government and powerful elites (Acemoglu and Johnson 2005). To test *Hypothesis 2e* we use the Heritage Foundation business freedom index (BFI) which measures the rigidity of business regulation. It reflects various barriers to start, operate and exit business, and it scores from 0 to 100 with 100 denoting the highest degree of business freedom (Beach and Kane 2008). Finally, we use the number of universities in the FSU obtained from the "Universities in CIS" and "Universities worldwide information resources" databases<sup>10</sup> to test our *Hypothesis 3*. Table 3 reports variable definitions and descriptive statistics, including our control variables. Table 4 shows the correlation matrix between variables used in this study.

## Methodology

We use the following model to examine the determinants of entrepreneurial activity in a panel of 98 cities during 1995-2008.

$$S_{it} = \beta_1 S_{it-1} + \beta_2 X_{it} + \beta_3 Z_{it} + u_{it} \quad (1), \quad i=1, \dots, N; t=1, \dots, T$$

$$u_{it} = v_i + e_{it} \quad (2)$$

where  $S_{it}$  is our self-employment rate and  $S_{it-1}$  is its lagged value (predetermined variable).  $X_{it}$  is a vector of our two potentially endogenous variables, namely GDP per resident, the rate of unemployment, and the ratio of capital expenditure to GDP.  $Z_{it}$  is a vector of strictly exogenous control variables listed in Table 1. The error term  $u_{it}$  consists of the unobserved city-specific effects,  $v_i$  and the observation-specific errors,  $e_{it}$ .

The dynamic structure of equation (1) makes both the OLS and fixed effects estimators upwards and downwards biased respectively, and inconsistent, since the predetermined variable and endogenous variables are correlated with the error term. Therefore, to estimate equation (1) we use the System Generalised Method of Moments (SYS GMM) estimator (Arellano and Bond 1991; Arellano and Bover 1995; Blundell and Bond 1998). The use of this estimator allows to address econometric problems which arise from estimating equation (1). These include (a) the problem of potential endogeneity of some of our regressors, notably GDP per resident, the rate of unemployment and the ratio of capital investment to GDP; (b) the presence of predetermined variables - the lagged dependent variable  $S_{it-1}$  that gives rise to measurement error as it is correlated with past errors; (c) the presence of fixed effects which may be correlated with the regressors; (d) our finite sample. SYS GMM allows the predetermined and endogenous variables in levels to be instrumented with suitable lags of their own differences (Roodman 2006).

Table 3 reports the results of SYS GMM, OLS and Panel Fixed effects estimators. Comparing the results of all three estimators used, one can see that the results obtained from the System GMM model are superior given that: (a) the autoregressive term is positive and significant, and its value lies between the respective terms obtained by fixed effects (which provides the lower bound) and OLS (which provides the upper bound); (b) there is gain in efficiency; (3) the instrument set is valid as evidenced from Hansen test of overidentified restrictions; (4) all variables of interest have expected signs.

## EMPIRICAL RESULTS AND DISCUSSION

Table 3 reports estimation results based the three models used, notably pooled OLS estimation (column 1); panel fixed effects estimation (column 2) and System GMM (column 3). Neither the basic Hansen test of over-identifying restrictions nor the Difference Hansen test, which focus on the additional instruments validity, used by the System GMM estimator detect any problems with instrument validity and autocorrelation in residuals, which allows us to consider that column 3 is the most efficient and robust estimation (Arellano and Bond 1991). Given superiority of SYS GMM model (as also discussed in the previous section) we proceed our further discussion primarily based on the results reported in column 3.

We find strong support for our *Hypothesis 1*, suggesting a U-shaped relationship between the logarithm of a number of small businesses and income level proxied by GDP per resident. These results suggest the prevalence of both necessity- and opportunity-driven entrepreneurship in the region unlike commonly believed predominance of “necessity-push at start-up” (Welter and Smallbone 2011). These results are also consistent with Carree et al. (2002) and Wennekers et al. (2005).

Our results also suggest that entrepreneurial entry is positively associated with the progress in banking reform (H2a). To the extent that the banking reform promotes financial development via elimination of financial market frictions, reduction in transaction costs and risks associated with financing start-ups, it eases borrowing constraints which can be particularly severe for small businesses. Developed financial institutions are found to be particularly beneficial for small firms compared to large ones (Beck *et al.* 2005). We also confirm our *Hypothesis 2c*, suggesting a disincentifying effect of a larger size of the state. These results are consistent with earlier empirical studies (Aidis et al. 2010; Estrin et al. 2011).

At the same time we fail to find any support for our property rights hypothesis (H2d). This, perhaps, can be explained by the fact that entrepreneurs choose to respond to institutional deficiencies, in our instance weak property rights protection, via employing various adaptive strategies such as, for example, a strategy of diversification: they choose to invest in unrelated businesses instead of growing their core businesses before “beginning to attract too much attention of the wrong sort” (Welter and Smallbone 2011). Such strategies impose growth constraints on existing businesses, preventing many of them to exploit economies of scale. We also do not confirm our *Hypotheses 2b*, related to the effect of large-scale privatisation, and *Hypothesis 2e*, related to the rigidity of business regulations. In fact, Aidis et al. (2008) also failed to find any significant effects of start-up entry barriers on entrepreneurial entry.

We also find that heterogeneity in entrepreneurial activity across CIS cities is largely explained by higher concentration of higher education establishments (*Hypothesis 3*) that we interpret as some evidence of the importance of agglomeration economies in terms of higher concentration of knowledge which may lead to intensified exchange of ideas driving opportunity-based entrepreneurship.

Among our control variables we fail to find some evidence of the significance of market size, proxied by the logarithm of population density, although it fails fairly narrowly to pass the 10%-significance level and it is positively related to entrepreneurial entry. For robustness check we also experimented with the level of GDP at constant prices as a proxy for market size (while excluding per resident income from this specification). Similarly, with per resident income we introduced a squared term of GDP to capture likely U-shaped relationship between the market size and the logarithm of small businesses. We obtained broadly similar results with all our key hypotheses being confirmed (these results are available from authors upon request). We find a significant and positive effect of air pollution, used as another proxy for agglomeration economies. We fail though to find any significant effect of capital investment, distance from Moscow, geographical controls and capital city. Finally, a negative and significant effect of the rate of unemployment is likely to be explained by unemployment mirroring adverse economic conditions or unemployment pushing individuals more into self-employment rather than in business registration, given a burdensome regulation and relatively higher cost of the latter.

## CONCLUSIONS

Our key findings suggest that heterogeneity in entrepreneurial activity across FSU cities is largely explained by a U-shaped per resident income, with cities exhibiting higher rates of entrepreneurial activity when income level is low, advocating therefore the prevalence of necessity-driven entrepreneurship. However, as city income increases, the rate of entrepreneurial activity falls suggesting the likely emergence of economies of scale and larger firms providing better returns and income stability. Finally, entrepreneurial activity surges again after passing a certain threshold, being largely associated with the accumulation of individual savings that can be used

for launching new businesses and economic environment favouring exploitation of new opportunities. Our results also show the importance of concentration of higher-education institutions in cities which may provide some indirect evidence for the importance of agglomeration economies in terms of higher concentration of knowledge which may lead to intensified exchange of knowledge and ideas driving knowledge-based entrepreneurship. Finally, we find some marginal support for a larger size of local government disincentivising entrepreneurial entry, and a banking reform, on the contrary, enhancing it. Our findings have important policy implications. Apart from emphasizing the importance of further advancements in a banking reform crucial for promoting financial development and reduction in borrowing constraints for small businesses, the authorities should also adopt a complex approach in further reforming a taxation system where reduction in tax rates should be coupled with minimising tax inspections and corruptive practices embedded in the “grabbing hand” model of government intervention (Shleifer and Vishny 1999), found to urging entrepreneurs to adopt strategies constraining business growth. Finally, to promote knowledge-based entrepreneurship the local authorities should concentrate on encouragement of cluster development between universities and local businesses.

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### ACKNOWLEDGEMENTS

The authors acknowledge the financial support of the Global Development Network jointly with its regional partners in the Commonwealth of Independent States and Central Eastern Europe, including The Economics Education and Research Consortium (EERC), Kyiv School of Economics (KSE) and CERGE-EI University as part of a larger project called "Cities: An Analysis of the Post-Communist Experience". The authors are thankful to Tomasz Mickiewicz, Randy Filer and Tom Coupe for their useful feedback and advice.

### NOTES:

1. Financial Times, Life & Arts, 2010. Lighting in a bottle. October 30/Sunday October 31 2010.
2. To illustrate this Welter and Smallbone (2010:111) discuss a case study the owner of a successful business involved in managing and letting advertising hoarding space in Minsk, Belarus, who was considering opening a coffee shop rather than expanding her key business. She explained this referring to business expansion strategy of ‘being too risky because her successful enterprise was beginning to attract too much attention of the wrong sort’.
3. While small-scale privatisation can be more relevant for small business creation, we fail to find any significant effect of it, given that our dataset starts only from 1995 whereas small-scale privatisation has been largely completed in the majority of transition economies by that time. Given nearly 90% correlation between small and large-scale privatisation we had to drop small-scale privatisation from our model. We also tested the significance of competition policy; enterprise restructuring and securities market establishment, failing to find any significant results. In the case of enterprise restructuring the sign of the coefficient with respect to entrepreneurial entry is positive (unlike in the case of large-scale privatisation) that would have provided some support for hypothesis 2.b if this effect had been found significant. Given its high correlation with large-scale privatisation we tested its effect separately with the results available from the authors upon request.
4. See M. Marshall and K. Jagers, 2009. Polity IV Project: Political Regime Characteristics and Transitions, 1800-2008, Dataset Users’ Manual, available from <http://www.systemicpeace.org/polity/polity4.htm>.
5. For discussion see Beach, W., & Kane, T. 2008. Methodology: measuring the 10 economic freedoms. In K. Holmes, Feulner, E., & O’Grady, M. (Eds.), 2008 *Index of Economic Freedom*: 39-55. The Heritage Foundation: Washington.
6. We use NUTS3 city level data.
7. In our sample city size varies from less than 50,000 such as Gori in Georgia, Naryan-Mar and Nazran in Russia to 10,500,000 residents in Moscow, Russia.
8. The table showing distribution of the number of small businesses by cities is available from authors upon request.
9. City GDP is calculated using the proportionate distribution of city population in respective years and applying these as weights to obtain relevant city GDP. To minimise a measurement error, the start and end points of the series have been taken as the means for the first and last 3 years following Cheshire and Magrini’s approach (2009).
10. For more detailed information please see <http://univer.in> and <http://univ.cc>.

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**Table 1: Descriptive statistics and definitions of the variables**

Variable	Definition	Obs.	Mean	St. dev.	Min	Max
<i>Dependent variable</i>						
LnSME	Number of small businesses registered, logarithm	1160	8.46	1.05	4.09	12.35
<i>Explanatory variables relevant to hypotheses tested</i>						
university	Number of universities in a city	1372	7.33	13.26	1.00	103.00
gdppr_city	City GDP per resident squared, constant 2005 USD	1157	2852.04	5023.64	245.75	93703.88
gdppr_city^2	City GDP per resident, constant 2005 USD	1157	3.33x10 <sup>7</sup>	3.84x10 <sup>7</sup>	60392.64	8.78x10 <sup>9</sup>
expenditure_gdp	Ratio of expenditure to GDP	1077	0.59	0.47	0.06	5.73
banking	Banking reform and interest rate liberalisation from 4- to 4+	1372	2.17	0.41	1.00	3.00
large_pri	Large -scale privatisation; from minus 4 to 3+	1372	2.92	0.60	1.00	4.00
exconsrt	Polity project. 'Executive constraints' 1=unlimited authority to 7=executive parity	1372	4.37	1.11	2.00	7.00
<i>Explanatory variables: controls</i>						
airpolution_res	Air pollution, 1000 tons per resident	1148	0.29	0.55	0.00	5.46
lnpopdensity	Population density in the city per sq. km, logarithm	1307	7.75	0.58	5.82	9.18
capital_invest_gdp	Ratio of capital investment to GDP	987	0.24	0.17	0.01	1.51
capitalcity	1= capital-city, 0 otherwise	1372	0.07	0.26	0.00	1.00
unemploy	Unemployment rate, %	1040	3.45	4.08	0.10	30.20
latitude	Latitude	1372	50.70	6.20	40.10	68.58
longitude	Longitude	1372	38.12	8.34	20.31	56.19
distance	Distance from Moscow, km	1358	1059.69	514.06	167.00	2230.00

**Source:** CIS Urban Audit 1995-2008.

**Table 2: Correlation matrix for CIS urban audit variables**

	LnSME	expenditure_ gdp	capital_ invest_gdp	university	lnpopdensity	airpolution_ res	unemploym	latitude	distance	longitude	gdppr_city	gdppr_city^2	capitalcity	banking	large_pri	exconsrt	hfbusfree
LnSME	1.00																
expenditure_ gdp	-0.30*	1.00															
capital_ invest_gdp	0.03	0.21*	1.00														
university	0.64*	-0.19*	0.00	1.00													
lnpopdensity	0.19*	-0.35*	-0.09*	0.28*	1.00												
airpolution_res	-0.09*	-0.07*	-0.09*	-0.11*	-0.12*	1.00											
unemploym	-0.08*	-0.10*	-0.06*	-0.15*	0.10*	-0.09*	1.00										
latitude	0.04	-0.18*	-0.19*	0.11*	0.04	0.38*	-0.39*	1.00									
distance	-0.16*	0.27*	0.18*	-0.15*	-0.38*	0.12*	0.37*	-0.49*	1.00								
longitude	0.14*	0.13*	-0.03	-0.09*	-0.42*	0.16*	0.20*	-0.04	0.32*	1.00							
gdp_city	-0.07*	-0.13*	0.14*	0.13*	-0.10*	0.50*	-0.15*	0.30*	0.09*	0.08*	1.00						
gdp_city^2	-0.17*	-0.06*	0.14*	0.01	-0.13*	0.44*	-0.05*	0.15*	0.12*	0.09*	0.89*	1.00					
capitalcity	0.42*	-0.18*	0.05*	0.55*	0.19*	-0.11*	0.17*	-0.14*	0.12*	-0.02	0.05	0.00	1.00				
banking	0.05	-0.04	0.10*	-0.01	-0.03	0.00	0.13*	-0.21*	0.11*	0.04	0.17*	0.06*	0.02	1.00			
large_pri	0.11*	0.01	-0.31*	-0.04	-0.26*	0.04	0.17*	-0.02	0.12*	0.44*	-0.06*	-0.01	-0.13*	0.35*	1.00		
exconsrt	-0.04	-0.11*	-0.04	0.00	0.05*	-0.02	0.04	-0.22*	0.06*	-0.10*	-0.03	0.00	-0.02	0.45*	0.38*	1.00	
hfbusfree	0.04	0.02	-0.09*	-0.04	-0.07*	0.02	0.30*	-0.05*	0.12*	0.24*	0.00	0.01	0.07*	-0.04	0.23*	-0.12*	1.00

Note: \* - significant at 0.05 level. Source: CIS Urban Audit 1995-2008.

**Table 3: Estimation Results**

Estimation of the model						
Dependent variable $S_{it}$ (Number of small businesses registered - SME)						
<i>Variable</i>	Pooled OLS	p-values	FE	p-values	SYS-GMM	p-values
	(1)		(2)		(3)	
L.LnSME	0.93 (0.02)	0.00	0.370 (0.02)	0.00	0.520 (0.14)	0.00
expenditure_gdp	-0.693 (0.03)	0.03	-0.030 (0.05)	0.57	-0.340 (0.20)	0.20
capital_investment_gdp	-0.403 (0.05)	0.43	-0.090 (0.08)	0.28	-0.050 (0.38)	0.38
university	0.005 (0.00)	0.01	-0.010 (0.02)	0.75	0.030 (0.00)	0.00
lnpopdensity	0.021 (0.02)	0.32	0.590 (0.07)	0.00	0.170 (0.11)	0.15
airpollution	0.004 (0.02)	0.78	0.020 (0.06)	0.73	0.160 (0.08)	0.06
unemploy	-0.001 (0.01)	0.75	0.001 (0.00)	0.98	-0.051 (0.02)	0.04
latitude	-0.002 (0.00)	0.08	-	-	-0.010 (0.01)	0.37
longitude	0.002 (0.00)	0.12	-	-	0.011 (0.00)	0.41
distance	-0.001 (0.00)	0.73	-	-	-0.001 (0.00)	0.86
gdppr_city	-0.000 (0.00)	0.24	0.000 (0.00)	0.28	0.000 (0.00)	0.00
gdppr_city^2	0.000 (0.00)	0.32	0.000 (0.00)	0.80	0.000 (0.00)	0.00
capitalcity	0.009 (0.03)	0.78	-	-	-0.089 (0.30)	0.77
banking	0.006 (0.02)	0.84	0.280 (0.10)	0.00	0.480 (0.26)	0.07
large_pri	0.034 (0.05)	0.51	0.120 (0.06)	0.07	-0.110 (0.08)	0.21
exconsrt	0.010 (0.00)	0.58	-0.040 (0.02)	0.20	0.031 (0.03)	0.34
hfbusfree	-0.010 (0.01)	0.00	-0.001 (0.00)	0.69	-0.001 (0.00)	0.98
constant	0.650 (0.26)	0.01	0.19 (0.71)	0.78		
Country controls	No		No		Yes	
Year dummies	No		Yes		Yes	
R-square	0.95		0.47			
Pr>z AR(2)					0.26	
Hansen test, Pr.>chi2					0.55	
Dif. Hansen test, Pr.>chi2					0.64	
Number of obs.	730		730		730	

Source: Authors' calculations based on CIS Urban Audit dataset 1995-2008.

Notes: Standard errors (in parentheses) are robust to heteroskedasticity. The figures reported for the Hansen test and Difference Hansen test are the p-values for the null hypothesis: valid specification. Instruments for first differences equation GMM-type [L(2/.)( LnSME unemploy capital\_invest\_gdp gdppr\_city gdppr\_city^2)] collapsed. Instruments for levels equation: GMM-type [DL.( LnSME unemploy capital\_invest\_gdp gdppr\_city gdppr\_city^2 ) collapsed and all other regressors, including time controls, used as standard instruments here. Note: the autocorrelation test shows that the residuals are an AR(1) process which is what is expected. The test statistic for second-order serial correlation is based on residuals from the first-difference equation. Number of instruments 81.  $F(33, 83) = 3505.77$

