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SHORT ARTICLE

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Firm subsidies in Central and Eastern Europe and Central Asia: is there urban bias?

Frank Crowley

ABSTRACT

Regional disparities exist due to the uneven impact of economic development. The World Bank's World Development Report (2009) advocates that attempts to spread out economic activity will undermine growth. This study finds that policy-makers in Central and Eastern Europe and Central Asia favour subsidizing firms in less urbanized locations. However, innovation market outcomes would probably be higher if there was an urban bias in subsidy distribution.

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INTRODUCTION

Economic development is not evenly spread. The World Bank's (2009) *World Development Report: Reshaping Economic Geography*. states the challenge for governments is to allow, and even encourage, 'unbalanced' economic growth and attempts to spread out economic activity will undermine national growth. The underlying theoretical ideas in the WDR for development are cemented in new economic geography theory (NEG). In summary, the central argument of the report is for policy-makers to take a space-blind approach where growing cities are critical for development (Barca, McCann, & Rodríguez-Pose, 2012). However, there are other reports that advocate for place-based interventions to tackle regional disparities. The Barca Report (Barca, 2009) for instance, based on two influential Organisation for Economic Co-operation and Development (OECD) (2009a, 2009b) reports, argues for developed European Union countries that placed-based policies and the specificity of the wider regional and local context of institutional, cultural and social characteristics matters for development policy. Policies should focus on tackling underutilized resources and social exclusion in peripheral regions (Barca, 2009).

While both reports are focused on regions and countries other than those studied in this paper, their conceptual catalysts propose an interesting dilemma for policy-makers. That is, should policy-makers follow a space-blind approach and abandon lagging rural areas in favour of growing urban areas or should they follow a place-based approach and try to exploit the unused potential of peripheral

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regions? Or alternatively, by blending policy ideas from both reports, policy-makers may support both urban and rural areas. The primary objective of this study is to examine what approach policy-makers are currently taking in Central and Eastern Europe (CEE) and Central Asian economies.

This study examines whether policy-makers subsidize firms in urban or rural areas. Following this, it explores what are the subsidy–firm performance outcomes. Particular interest is attributed to the firm-performance outcomes for firms located across areas with different levels of urbanization. The focus here is on developing and under-developing countries which are the primary countries of concern for the WDR (2009). The study employs an endogenous treatment-effects model using data from the Business Environment and Enterprise Performance Survey (BEEPS).

LITERATURE REVIEW

Increasing returns and positive external economies generated by urban growth play a pivotal role in shaping economic development (Krugman, 1991). Firms benefit from urbanization and/or localization externalities which occur in larger cities (Romer, 1986). Larger cities have 'more' resources such as access to larger labour pools, better infrastructure, access to better universities, schools, services and so forth. Being located in a more concentrated area also creates more interaction and experiences between agents which enable individuals to learn, develop and accumulate more skills at a faster pace (Glaeser, 1998). A large number of firms in the same industry benefit from cluster effects (Porter, 1990), from sharing pooled specialized labour and market information with customers, competitors and suppliers. However, urban areas can also suffer from agglomeration diseconomies and local institutional weaknesses are also evident in densely populated and core regions (McCann & Ortega-Argilés, 2013).

Less urbanized peripheral regions can have weakly developed support organizations and a lack of dynamic clusters (Tödtling & Trippl, 2005), and have place disadvantages that cities do not have such as poor access to the technological frontier, critical markets and skilled labour (Bergström, 2000). As a result, economic performance is often uneven throughout national landscapes. Hirschman (1957) identified that one of the problems associated with economic growth is a dualism effect where there is uneven development of industry throughout geographical areas within a country.

In terms of CEE and Central Asian economies, the most influential recent report on development strategies is *arguably* the World Bank's *World Development Report* (2009). The report has received much criticism particularly from economic geographers primarily in terms of its treatment of institutions, urban bias and in the report's recommendation of spatially blind policies (Rodríguez-Pose, 2010). The Barca Report (Barca, 2009) on the reform of European Cohesion Policy and the OECD (2009a) report *How Regions Grow* advocate that development policy needs to be place-based and connected to local institutional conditions. Essentially, these key international reports are advocating contrasting approaches to the development policy prescribed in the WDR. However, it is unclear if policy-makers in CEE and Central Asian economies are following the approach advocated by the World Bank. Would following the advice of the World Bank lead to improved regional outcomes?

METHODOLOGY AND DATA

A two-step model is employed to examine, firstly, the location of recipient firms (whilst controlling for other factors) and, secondly, the subsidy–performance outcomes at different levels of urbanization. Firms may be subsidized by policy-makers based on the expected outcomes the intervention will achieve. Therefore, firm performance and the allocation of subsidies are potentially simultaneously related. This simultaneity creates a selection bias (Crowley & McCann, 2015) as firms that receive subsidies are not chosen at random. Hence, controlling for subsidies

by measuring for effects from independent variables is complicated by the fact that subsidy allocation is also a function of firm performance. Given this logic, there is some unobservable factor that affects both assignment to treatment (subsidies in this case) and the potential outcome (STATACORP, 2015). Hence, to control for this unobservable factor in both the treatment and potential outcome, an endogenous treatment-effects model is chosen for the estimation, which produces the treatment-effects models outlined in equations (1) to (6):

$$Y_{i0} = E\left(Y_{i0}|X_i\right) + e_{i0} \tag{1}$$

$$Y_{i1} = E\left(Y_{i1}|X_i\right) + e_{i1} \tag{2}$$

$$T_i = E\left(T_{i0}|Z_i\right) + v_i \tag{3}$$

$$Y_i = T_i Y_{i1} + (1 - T_i) Y_{i0} \tag{4}$$

$$E\left(e_{ij}|X_i, Z_i\right) = E\left(e_{ij}|Z_i\right) = E\left(e_{ij}|X_i\right) = 0 \; for \; j \in \{0|1\} \tag{5}$$

$$E\left(e_{ij}|T\right) \neq 0 \; for \; j \in \{0|1\} \tag{6}$$

where, for firm $_iY_{i1}$ is the potential outcome of receiving a subsidy; Y_{i0} is the potential outcome when the subsidy is not received; T_i is the observed binary treatment of being a particular firm that fits the government's strategy for intervention; and Y_i is the observed outcome. Y_{i0} and Y_{i1} are determined by its expected value conditional on a set of determinants X_i and an error term e_{i0} $for j \in \{0|1\}$. The determinants for X_i include whether the firm is research and development (R&D) active, firm size, education and training of employees within the firm, industry type, age of the firm, age and domestic interaction variable (infant domestic firm), location indicator, main market indicator, domestic firm, multiplant firm indicator and country dummies. The subsidy treatment is given by its expectation conditional on a set of determinants Z_i and an error term v_i. The determinants of Z_i are outlined in Table 1. Equation (6) includes endogeneity to the estimation, where the unobservables between outcome and treatment are correlated. Using this methodology, the potential-outcome means (POMs) and average treatment effects (ATE) are estimated. See STATACORP (2015) for more information on the empirical approach behind these estimations.

The data used for this study stem from the fifth Business Environment and Enterprise Performance Survey (BEEPS). BEEPS provides firm-level data on a broad range of issues about the business environment and performance of firms, including business–government relations, firm financing, labour, infrastructure, informal payments and corruption, and other topics such as training and innovation (Bank, 2014). There are 6,710 observations used for this analysis from 18 countries,[1] where government intervention is more prevalent. BEEPS is particularly useful for investigating the type of questions being studied in this paper as it is rich in firm-performance indicators, urbanization location indicators, internal-firm indicators and business geographic–environment indicators. A description and mean statistics of the variables are outline in Table 1. Almost 12% of the firms sampled received government subsidies.[2] A total of 37% of

Table 1. Variables and mean estimates.

Variable	Description	Mean
Innovation	= 1 if the firm introduced new to firm or market product innovations in the previous three years; 0 otherwise	37.19
Productivity growth	= 1 if the firm experienced productivity growth between 2009 and 2012; 0 otherwise	44.22
Employment growth	= 1 if the firm experienced employment growth between 2009 and 2012; 0 otherwise	74.39
Subsidies	= 1 if the firm received a subsidy in the previous three years; 0 otherwise	11.78
Research and development active	= 1 if the firm spends on research and development (R&D) activity; 0 otherwise	14.12
Firm size	Number of employees (log)	3.10
University	Proportion of the workforce in the firm with a third-level qualification	30.92
Services	= 1 if the firm is categorized as a service firm; 0 otherwise	58.86
Manufacturing	= 1 if the firm is categorized as a service firm; 0 otherwise	41.14
Age of the firm	Since first opened (years)	15.36
Training	= 1 if the firm invests in training for workers; 0 otherwise	43.45
Domestic	= 1 if the firm is a domestic firm; 0 otherwise	93.50
Multiplant	= 1 if the firm is a multiplant firm; 0 otherwise	8.35
Capital or city greater than 1 million	= 1 if the firm is located in an area with a population greater than 1 million; 0 otherwise	27.81
City 250,000–1 million	= 1 if the firm is located in an area with a population between 250,000 and 1 million; 0 otherwise	25.94
City 50,000–250,000	= 1 if the firm is located in an area with a population between 50,000 and 250,000; 0 otherwise	13.81
City under 50,000	= 1 if the firm is located in an area with a population less than 50,000; 0 otherwise	32.44
EU firm	= 1 if firm located in the European Union; 0 otherwise	36.40
Main market local	= 1 if the main market of the firm is local; 0 otherwise	53.50
Main market domestic	= 1 if the main market of the firm is domestic; 0 otherwise	38.13
Main market international	= 1 if the main market of the firm is international; 0 otherwise	8.37

Source: Business Environment and Enterprise Performance Survey (BEEPS), 2014.

firms introduced a new-to-firm or new-to-market innovation. A total of 37% and 74% of firms experienced productivity[3] and employment growth, respectively. The results are presented and discussed in the next section.

RESULTS

From the results shown in Table 2, the targeted firms are in less urbanized areas, are large, high-tech, manufacturing, older, invest in employee training and sell their products nationally or internationally. Clearly, there is subsidy bias towards less urbanized regions. This bias is contrary to the advice outlined in WDR (2009). Balanced regional development appears to be a significant factor for policy-makers in CEE and Central Asian economies. The other spatial implication of these results is that firms that operate in local markets are less likely to receive subsidy support. This suggests that the potential for firms to export and enter foreign markets may be a key driver of subsidy allocation decisions.

The average treatment effects (ATE) (Table 3) indicate that subsidies have a positive effect on firm innovation and employment growth outcomes. Evidently, subsidy intervention is having a positive effect and improving market outcomes, relative to the counterfactual of a world with no subsidies. From a regional development perspective, it is critical to identify if firm performance returns are higher for subsidized firms in more urbanized location vis-à-vis subsidized firms in

Table 2. What types of firms are more likely to receive subsidies (equation 3)?

Variable	Effect
Research and development active (high-tech bias indicator)	0.298***
	(0.056)
Firm size	0.166***
	(0.018)
University	0.001
	(0.001)
Services	–0.245***
	(0.049)
Age of the firm (infant industry bias)	0.008*
	(0.004)
Domestic	0.195
	(0.123)
Domestic*Age (domestic and infant industry bias indicator)	–0.005
	(0.004)
Training (partial – appropriability bias indicator)	0.173***
	(0.046)
Multiplant	0.051
	(0.076)
City 250,000–1 million (urban bias indicator)	0.230***
	(0.075)
City 50,000–250,000 (urban bias indicator)	0.206***
	(0.076)
City under 50,000 (urban bias indicator)	0.159***
	(0.065)
Main market local (exporting firm bias)	–0.242***
	(0.077)
Main market domestic	–0.089
	(0.071)

Notes: Reference categories are manufacturing firms, capital city and cities with a population over 1 million and the main market is international.
Country effects are controlled for in the models, but not reported.
***Significant at the 1% level; **significant at the 5%; *significant at the 10% level.

Table 3. Firm performance average treatment effects (ATE) and potential outcome means (POMs).

Treatment effect	Innovation	Employment	Productivity
Subsidies (1) ATE	0.633***	0.283***	0.125
Subsidies (0) POMs	0.310***	0.679***	0.417***

***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level.

Table 4. Performance returns for subsidized firms in less urbanized locations.

Urban classification	Innovation	Employment	Productivity
City 250,000–1 million	–0.796***	0.008	0.077
	0.203	0.192	0.171
City 50,000–250,000	–0.658***	–0.358**	0.462***
	0.197	0.185	0.168
City under 50,000	–0.454***	–0.041	0.273**
	0.159	0.155	0.137

Notes: Reference category is capital city and cities with a population over 1 million.
All other variables are controlled for as identified in method section, but not reported.
Country effects are also controlled for in the models.
***Significant at the 1% level; **significant at the 5% level; *significant at the 10% level.

more rural regional locations. Table 4 presents the results for this analysis. Firms in less urbanized locations (relative to capital and city with populations over 1 million) are significantly less likely to innovate. Firms located in mid-sized cities (with a population between 50,000 and 250,000) are less likely to have employment growth, relative to the reference category. However, firms located in less urbanized locations are more productive.

CONCLUSIONS

This study has identified a number of findings relevant for regional policy and development in CEE and Central Asian economies. The allocation bias to less urbanized areas may be motivated to counter unbalanced regional growth caused by market forces. Such an approach is inconsistent with the advice from the WDR (2009). Policy-makers in CEE and Central Asian economies may see a trade-off between efficiency and equity and are opting for rebalancing growth in emerging regions through subsidy bias. Perhaps such an approach may help lagging regions make productive use of their resources – resources which otherwise may be constrained if left to market and agglomeration forces (Farole, Rodríguez-Pose, & Storper, 2011; McCann & Ortega-Argilés, 2013). This is an approach that is more aligned with recommendations of the Barca Report (Barca, 2009).

What is clear for policy-makers in the context of regional development is that the likelihood of innovation returns is lower in less urbanized locations. However, efficiency gains for subsidized firms are greater in more rural locations. These results may seem counter-intuitive, but perhaps subsidies are offsetting the disadvantages of more isolated locations. Additionally, the paradox may be explained by product life cycle theory (PLC) (McCann, 2007). Subsidized firms in more urban areas may be more likely to product innovate because they are benefitting from urbanization and localization externality advantages, as described above under NEG theory, which are important for the earlier stages of the PLC. Firms in rural areas may be concentrating more of their efforts on being efficient as their products may be more standardized. Hence, firms located in rural areas may have better productivity but reduced capacities to product innovate. Further, the results suggest that if more urban firms *were* (counterfactual) subsidized at the expense of

rural firms, innovation market outcomes would probably have been greater, which undermines long-term economic growth.

Of course, the analysis is not without its limitations. The study draws on data from across many CEE and Central Asian economies and, hence, the local implications of vertical firm subsidy targeting at a country level are lost. There are also potential limitations with the data as BEEPS V measures perceptions of the business environment which may influence how respondents answer firm-performance questions. Further, much of the criticism of the WDR was focused on the spatially blind institutional approach of the report. Future studies should focus on examining the importance of local institutions in supporting subsidy provision and outcomes.

NOTES

1. This sample is smaller than the original sample as the data from all countries were not used. This was primarily due to low subsidy allocations in some countries. In addition, not all firms answered all questions in the data for the countries used. In particular, this was the case for sales data. The countries included are Slovenia, Slovakia, Lithuania, Latvia, Hungary, Czech Republic, Estonia, Mongolia, Bosnia-Herzegovina, Moldova, Kazakhstan, Serbia, Romania, Poland, Russia, Turkey, Croatia and Bulgaria.
2. The data do not indicate what the subsidy was granted for.
3. Productivity is measured as the log of sales per worker. Sales data have been adjusted to purchasing power parities (PPP) across countries using world development indicators' PPP conversion data from the World Bank. Growth is only measured as a binary variable that is either 1 if the firm experienced growth, and 0 otherwise. Using a measure of productivity, such as total factor productivity, would result in the loss of a substantial number of observations, and sales per worker is a widely used measure in the literature.

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No potential conflict of interest was reported by the author.

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