Valerija Botrić

The Institute of Economics, Zagreb
Department for Current Economic Trends, Short-term Forecasts and Fiscal Policy, Croatia
E-mail: vbotric@eizg.hr

Ljiljana Božić

The Institute of Economics, Zagreb
Department for Industrial Economics, Innovation and Entrepreneurship, Croatia
E-mail: ljbozic@eizg.hr

INNOVATORS' VS. NON-INOVATORS' PERCEPTIONS OF CORRUPTION IN EUROPEAN POST-TRANSITION ECONOMIES

Abstract

Post-transition countries struggle with their attempt to catch-up more advanced market economies with more or less success. Innovation activities have been emphasized as one of the most important factors for achieving sustainable growth. At the same time, innovation indicators in post-transition countries significantly lag behind the desired levels. According to the Innovation Union Scoreboard 2014, post-transition EU countries are mainly modest and moderate innovators. Only Estonia and Slovenia are classified among innovation followers. Various measurements of shadow economy usually reveal that its size is more pronounced in the catching-up countries. Since shadow economy and corruption can be perceived as major obstacle for doing business, we analyse whether innovators perceive this impediment to be systematically more important than non-innovators across different post-transition EU countries. We expect that perception of corruption as an obstacle to business operations among innovators will be lower in post-transition countries that perform better in terms of innovation. The results imply that there is a link between innovation activity of the firms, perceptions of corruption and the evaluation of innovation enabling specificities in the analysed countries. Thus, in order to boost innovation, not only traditional innovation-supporting policy measures should be considered, but also wider spectrum of activities oriented towards business climate improvement.

Key words: innovation, corruption, post-transition countries

1. INTRODUCTION AND LITERATURE REVIEW

Two often emphasized problems in post-transition countries are low level of innovativeness and high level of corruption. The link between the two problems has been documented in the literature, both on the country and firm level. Anokhin and Schulze (2009), for example, argue that countries aiming to improve innovativeness should put additional efforts to control corruption. Corruption is perceived as major obstacle for doing business in general (De Rosa, Gooroochurn and Görg, 2010). Although it is generally recognised as a problem in societies and economies, extant literature provides evidence on possible positive side of corruption. Often explored question in the literature is whether corruption sands or greases the wheels of an economy and some of the literature explicitly emphasises the effects for the innovative firms.

Meon and Sekkat (2005) argue that corruption in general cannot have positive effects on specific economy as their findings indicate it causes negative effects on investment and growth. Some studies argue that overall effect is not general, but depends on the specific country institutional setting. Habiyaremye and Raymond (2013) found that bribery by foreign firms in host countries can have some positive effects on their innovation activities but it is very harmful for innovation and R&D in transition host countries. They point out that not just public servants but also managers of multinationals benefit from these activities without dealing with externalities of corruption in long run. Some studies additionally argue that effects of corruption differ by types of innovation. Corruption is damaging for product and organizational innovation, beneficial for marketing innovation and has no impact on process innovation development (Mahagaonkar, 2008). The negative effects of corruption on product innovations have been also confirmed by Starosta de Waldemar (2011).

As previously indicated, some authors emphasize that negative effects are more pronounced in countries with efficient governments, while in countries whose governments are less efficient corruption in fact can have positive effects (Méon and Weill, 2010). In developed economies increases in level of corruption leads to double or even more direct decrease of entrepreneurship than it is the case in developing economies (Avnimelech, Zelekha and Sharabi, 2014). Furthermore, effects of corruption are not the same across geographical regions. Corruption has negative effect on investment in transition countries but not on investment in Latin America and Sub-Saharan Africa (Asiedu and Freeman, 2009). In Russia, for instance, corruption is one of the factors that reduce firms' capacity to get involved in innovation activities (Chadee and Roxas, 2013). In transition countries higher level of corruption is related to lower economic prosperity (Goel and Budak, 2006). Although transition economies are usually not considered as developing countries according to their economic indicators, studies certainly reveal that the level of institutional development is not satisfactory. Consequently, without additional research we cannot assume the effects of corruption on innovation activity.

The "greasing the wheels" hypothesis implies revealed general benefits of corruption. Lui (1985) explains how both customers and public servants act to make bribery efficient. Positive perceptions of corruptions have been documented in the literature. Budak and Rajh (2011) reveal that in Western Balkan countries professionals with some experience in bribing are more likely to see benefits from corruption. Kramer (2013) finds that corruption is a solution for anomic condition caused by rapid changes in transition economies that in fact positively affects innovation development. This is found true in case of Bulgaria, one of the least innovative EU countries where corruption has positive effects on both radical and incremental innovation (Krastanova, 2014). The positive impact of corruption on doing business is identified also by Vial and Hanoteau (2010) who provide evidence on positive effects on plant growth.

Since corruption effects have been found different in developing and developed economies, important issue of institutional setting has to be emphasized. Certainly, entrepreneurs' intention is to overcome institutional barriers, and within that setting the bribing emerges as an effective practice. Studies have shown that opportunity motivated entrepreneurs are more sensitive to corruption and more likely to grease the wheels compared to necessity motivated entrepreneurs (Dejardin and Laurent, 2014). Furthermore, corruption reduces negative effects of complex regulations on entrepreneurship (Dreher and Gassebner, 2013). Although there is no evidence on better treatment by public servant, innovative firms are more likely to bribe government officials according to some studies (Ayyagari, Demirguc-Kunt and Maksimovic, 2009).

Discussion on greasing and sanding the wheels still remains open. Relying on extant findings, it can be hypothesized that corruption hinders innovation activities and creates an environment in which firms are unable to develop innovation and introduce it to the market. On the other hand, we cannot exclude possible benefits of corruption for innovation, as identified by existing studies. Thus, it remains to conclude that literature argues the effects of corruption depend on the specific situation.

In this paper we analyse whether innovators perceive this impediment to be systematically more important than non-innovators across different countries. Countries in focus are post-transition EU members. They are Bulgaria, Romania, Latvia, Lithuania, Poland, Croatia, Slovakia, Hungary, Czech Republic, Slovenia and Estonia. Of these countries only Estonia and Slovenia are innovation followers while rest of them are modest (Bulgaria, Romania and Latvia) and moderate innovators[1] (Lithuania, Poland, Croatia, Slovakia, Hungary and Czech Republic). Innovation Union Scoreboard reveals that Estonia and Slovenia have

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[1] According to Innovation Union Scoreboard (IUS), innovation followers are countries whose innovation performance is less than 20 percent above or more than 90 percent of the EU average. Modest innovators are the countries with innovation performance less than 50 percent of the EU average. Moderate innovators are those with the innovation performance below the EU average that ranges between 50 percent and 90 percent of the EU average.

the best innovation performance among selected countries. Their average innovation performance is only slightly below the EU average. In particular, Summary Innovation Index 2013 for EU-28 was 0.554. Its value for Estonia was 0.502 and for Slovenia 0.513. Innovation performance of the rest of the selected countries lags behind the EU average. Bulgaria, Latvia and Romania are the countries with lowest innovation performance in EU. Their innovation performance is less than 50 percent of EU average. Summary Innovation Index 2013[2] for Bulgaria was 0.188, Latvia 0.221 and Romania 0.237. The innovation performance of Lithuania, Poland, Croatia, Slovakia, Hungary and Czech Republic is somewhat better but still well below EU average. Their innovation performance ranges from 50 to 90 percent of EU average. The closest to the EU average of the selected post-transition moderate innovators is the Czech Republic with Summary Innovation Index value 0.422. Summary Innovation Indexes 2013 for the rest of the post-transition moderate innovators are as follows: Lithuania 0.289, Poland 0.279, Croatia 0.306, Slovakia 0.328 and Hungary 0.351[3].

At the same time, the Corruption Perceptions Index of the Transparency International indicates that corruption varies across the post-transition EU member states. The country with the lowest level of corruption perception is Estonia. The Corruption Perceptions Index (CPI) in 2013 for Estonia is 68. The CPI 2013 scores for the countries in our sample are: Poland 60, Lithuania and Slovenia 57, Latvia 53, Hungary 54, the Czech Republic and Croatia 48, Slovakia 47, Romania 43 and Bulgaria 41[4]. This initial overview of the rankings of countries according to the different indicators already provides initial indication that innovation performance is related to corruption level of the country. The relationship is, however, not straightforward. Bulgaria and Romania indeed struggle the most with corruption. However, Poland and Lithuania for example, have corruption level close to Slovenia and Estonia that both have better innovation performance.

In order to further elaborate this issue, we explore the empirical relationship between innovation activity and corruption perceptions in the analysed countries. To that end, the next section contains information on the data used in the empirical analysis. Methodology for the empirics is briefly presented in Section 3, where more emphasis is put on the presentation of the results. The last section summarizes conclusions.

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[2] Summary Innovation Index 2013 and Corruption Perceptions Index (CPI) in 2013 for all countries in the sample are given in the table in Appendix.
[3] More information on innovation performance is available on http://ec.europa.eu/enterprise/ policies/innovation/policy/innovation-scoreboard/index_en.htm
[4] For more information on CPI visit http://www.transparency.org/cpi2014/results

2. DATA AND PRELIMINARY FINDINGS

Data used in this analysis are from the latest Business Environment Survey (BEEPS V) conducted by the European Bank for Reconstruction and Development (EBRD) and the World Bank, which relates to the years 2012-2013. The full database contains responses from 15,600 manufacturing and services firms in 30 EBRD countries gathered employing face-to-face interviews.[5] BEEPS is widely used dataset for research on corruption (e.g. Ayyagari, Demirguc-Kunt and Maksimovic, 2009; Habiyaremye and Raymond, 2013, Kramer, 2013, De Rosa, Gooroochurn and Görg, 2010), since it enables comparative overview across different countries. To the extent that we omit judging on possible cultural differences of responding to the same question in different countries, this approach ensures important insight into the corruption patterns.

The sample used in the analysis in present paper consists of 3,716 firms from the selected countries, among which 2,190 can be considered as innovators. For the purpose of this study innovators are firms that report (1) successful development of new or significantly improved product[6], production/supply practice, organisational/management practices or structures, marketing methods and logistical or business process, and/or (2) investment in (intermural or extramural) R&D and and/or giving employees time to develop or try out a new approach or new idea about products or services, business process, firm management or marketing during the last 3 years. Since we have already emphasized in the introduction that the sampled countries lag behind in innovation activity, it might be surprising that the sample contains relatively large share of innovative firms. Consequently, we might argue that there are overall sample selection issues that might impede on the research focused on comparative analysis of innovation activity on the national level. However, we claim that such sample enables the analysis of the differences between innovative and non-innovative firms across countries because there are no a priori reasons to assume that there would be a systematic difference in responding to these questions between the two analysed subgroups.

The question „To what degree is corruption an obstacle to the current operations of this establishment?" was used to assess the perception of corruption of responding firms. 5-points Likert scale was offered to respondents, ranging from "no obstacle" to "very severe obstacle". The data shows that higher percentages of innovative firms perceive corruption as important obstacle to business (23.15 percent) in comparison to non-innovative firms (12.71 percent) if we consider overall sample. However, as Figure 1 shows, there are important differences in perceptions among countries. In some countries, non-innovative

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[5]More on BEEPS V can be found on http://ebrd-beeps.com/ .

[6] The response rate to the first question, i.e. whether the enterprise had new or significantly improved product during the last the years is rather high in the sample. Thus, although some specific questions related to the type of innovation have higher non-response rate, since we are dealing with the overall innovation activity, these potential missing observation issues found in similar studies should not be reflected in our results.

firms perceive higher corruption problems (Poland), while in others countries the size of the problem for both population subgroups is relatively small (Estonia).
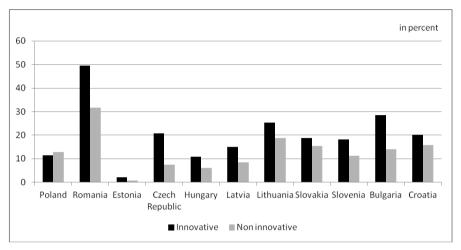

Figure 1 Differences in perceptions of the corruption obstacles

Source: authors' calculations based on BEEPS.

In order to shed some light on such findings, we analyse differences across countries in additional responses. BEEPS enables analysis of a number of interesting questions[7]:

• In any of inspections or meetings with tax officials was a gift or informal payment expected or requested? (Variable name: Tax)

• When establishments like this one do business with the government, what percent of the contract value would be typically paid in informal payments or gifts to secure the contract? (Variable name: Contract)

• In reference to that application for an operating license, was an informal gift or payment expected or requested? (Variable name: Operating)

• It is often said that firms make unofficial payments/gifts, private payments or other benefits to public officials to gain advantages in the drafting of laws, decrees, regulations, and other binding government decisions. To what extent have the following practices had a direct impact on this establishment?

▪ Private payments/gifts or other benefits to Parliamentarians to affect their votes (Variable name: Parliament)

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[7] The term given in the brackets is used as a reference to each described question.

▪ Private payments/gifts or other benefits to Government officials to affect the content of government decrees (Variable name: Government)

▪ Private payments/gifts or other benefits to local or regional government officials to affect their votes or content of government decrees (Variable name: Local)

We report the percentages of innovative firms in each country that have reported corruption experiences as described by previous questions.

Table1

Innovative firms perceptions of corruption, percentage

Country	Tax	Contract	Operating	Parliament	Government	Local
Poland	0	2.01	0	0.93	2.17	1.86
Romania	4.59	0.78	2.17	3.62	4.11	3.62
Estonia	0	0	0	0.72	0	0.72
Czech Republic	0.53	3.13	0.53	9.57	7.46	6.38
Hungary	0	15.00	0	3.13	2.34	0.78
Latvia	0.75	0.25	0	0.75	0.75	0.75
Lithuania	3.17	0.30	1.59	6.35	7.94	9.52
Slovakia	0.72	0	0.72	5.76	7.19	5.76
Slovenia	0.55	1.27	0	1.10	2.21	1.10
Bulgaria	3.03	0	2.42	4.85	6.67	7.27
Croatia	0	0.72	1.58	3.16	3.16	4.74

Source: authors' calculations based on BEEPS.

The truthfulness in answers to every survey can be questioned. The answers related to corruption activity involvement should be taken with additional care, since such practices are often illegal not only on the demand side of the transaction but also for the supply side (i.e. the respondents in the survey). To the extent that cultural and legal differences influence the responses in analysed countries, the absolute comparison of different levels of percentages across the countries should be avoided. However, the data presented in previous table provides some interesting information on the differences in corruption perceptions across countries. For example, in Romania, the country where innovators perceive corruption to be relatively larger impediment to doing business among the analysed countries, respondents have repeated experiences in bribing tax and in general government officials. Such practice could be related to the "greasing the wheel" hypothesis, when government procedures are not

developed in adequate manner, so that the entrepreneurs seek alternative ways to overcome business barriers.

It is interesting also to note that in some countries enterprises are expected to provide gifts to local levels of government (Croatia, Bulgaria, Lithuania), while in others parliament seems to be the place where innovators seek opportunities to enhance their businesses (Czech Republic, Hungary). Although probably the most unreliable question – the percentage of contract amount paid as a bribe – the average number for Hungary seems really high.

In order to investigate the relationship between corruption and innovation output, we have to bear in mind that innovation propensity on a firm level also depends on a large number of factors. Some of the widely studied issues in innovation literature are how firm size (e.g. Hausman, 2005, Keizer, 2002) and sector in which firm operates (e.g. Lööf 2005, Forsman 2011, Becheikh et al. 2006,) reflect in innovation activities. Thus, in our empirical estimates, we include variables firm size and sector to control for these factors. Three dummy variables have been considered as a sector indicator – manufacturing, retail and services – as available from the BEEPS data. The four dummy variables for the size were related to the micro enterprises, small, medium and large, where the classification has been taken from the BEEPS survey, thus ensuring the comparability across countries. Other control variables we use to explain innovation output in this paper are firm age, ownership (private or state) and operating as a part of larger group. We have also considered turnover of the firm, productivity (measured as turnover per employee) and employment changes during the period captured by the survey as control variables, but none of these were significant (or in some cases adequate choices due to potential endogeneity, multicolinearity or other econometric issues) in our specifications.

Relying on these data, specific empirical strategy as well as results is further discussed in the following section.

3. ESTIMATION METHODOLOGY AND RESULTS

Initial investigation on the country level has shown that there is a negative correlation between the innovation scoreboard index and the share of innovative firms perceiving corruption to be important obstacles for their business (correlation coefficient -50.85). This implies that countries in which corruption is perceived as an important problem by innovative firms also lag behind in overall innovative performance.

The question is whether we can find evidence in the sample to reveal if firms who perceive corruption as an obstacle innovate more or less (the so called grease versus sand hypothesis as indicated in introduction). We first estimate simple matching model in order to estimate the impact of corruption perceptions on innovation activity. Specifically, we use the average treatment effect of the treated (ATT) framework where we assume that corruption perception is the

treatment variable and innovation activity is the outcome variable. Within the propensity score matching procedure, initial set of variables considered usual determinants of innovation activity (size, sector, ownership, age) referred to in other studies[8]. Balanced property has been satisfied and the estimates were restricted to common support. Although it can be assumed that there are important endogeneity constraints, we have used this methodology to gain first insights into the relationship between the two variables of interest.

Table 2

ATT estimates: innovation outcome conditional on perceiving corruption to be an obstacle

Method	Estimated ATT	Standard errors	Treated/controls
Nearest neighbour	0.177***	0.028	699/601
Kernel matching	0.172***	0.019	

Source: authors' estimates based on BEEPS.

The results in Table 2 indicate that the firms, which have stated that they perceive corruption to be important obstacle for their business activity, are still more likely to have innovative activities (innovation output) than their matched counterparts. This would either corroborate the "greasing" hypothesis or indicate the firms' determination to innovate in spite of perceived obstacles. The latter could be interpreted optimistically, having in mind the Innovation Scoreboard results for the analysed countries. However, inspection of the sample shows that there are a disproportionally high number of innovative firms in the sample. Consequently, the sample structure itself might provide too optimistic evidence for judging the actual situation in the analysed countries.

In order to explicitly deal with sample selection issues, we rephrase the research question. We investigate whether we can find the determinants of the innovation activity of the firms in the analysed countries, conditional on the fact that they consider the corruption to be important obstacle for their business activity. The dependent variable is thus whether the firm has been classified as innovative. This has been modelled with the Heckman probit procedure. Corruption perception has been put into relationship with different performance scores of innovation scoreboard index in order to incorporate the different economic conditions the firms face in the analysed countries. The results of the estimates are presented in the following table[9].

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[8] The probit estimates from the propensity score matching algorithm available from the authors upon request.
[9] The table presents results of the robust estimates, which were similar to the estimates without this specific option.

Table 3

Propensity of innovation, controlling for corruption perceptions

Variable	Coefficient	Standard error
Innovation – probit equation		
Constant	0.777**	0.303
Age	-0.002	0.005
Private firm	0.061	0.162
Segment of larger firm	0.078	0.191
Small	0.384*	0.196
Medium	0.476**	0.207
Large	0.847***	0.262
Manufacturing	0.240**	0.096
Corruption – selection equation		
Constant	-2.871***	0.820
Human resources	5.937***	1.728
Research system	13.624***	1.869
Finance and support	-3.206	0.650
Firm investment	-1.540**	0.770
Linkages and entrepreneurship	-7.297***	1.329
Intellectual assets	-3.024***	0.750
Innovators	4.139***	1.107
Economic effects	-1.481***	0.466
Diagnostics		
N=3714	Wald chi2(7)=20.75***	LR (rho=0) chi2=16.30***
Censored=3015	Log likelihood=-2033.607	Wald (rho=0) chi2=16.06***
Uncensored=699	Rho=-.607 (.117)	

Notes: ***denotes significance at the level of 1 percent, ** at the level of 5 percent and * at the level of 1 percent.

Source: authors' estimates based on BEEPS.

Since our results have shown that the rho value is statistically different from zero, the overall likelihood of the estimates is not equal to the sum of the likelihoods of selection equation and probit equations. Consequently, sample selection correcting for the perception on corruption makes sense. Thus, we have found that the probability of innovation activity is increasing with the size of the enterprise and the sector the enterprise operates in, conditioning on the corruption perception differences. It also shows that some of the frequently emphasized determinants of innovation activity of firm – being a segment of a larger enterprise or operating as a private firm (as opposed to state ownership) – were not significant for our countries.

Additionally, it is interesting to note - from the selection equation - the relationship between various dimensions of Innovation Scoreboard index and corruption perceptions of sampled firms in post-transition countries. The results

imply that in the countries with more favourably assessed human resources, research system and innovators in general, corruption is more likely to be perceived as the important obstacle to doing business. On the opposite side, countries in which firm investment, linkages and entrepreneurship, intellectual assets and economic effects were assessed more favourably, firms seem to have put less emphasis on the corruption to being important obstacle for doing business. It could be argued that these correlations are due to the fact that the indicators themselves represent the countries the firms originate from. Even with this indirect connection, it seems that these factors which are used for innovation performance rating are also correlated with corruption perception of the firms.

The results presented in this paper imply that there is a link between innovation activity of the firms, perceptions of corruption and the evaluation of innovation enabling specificities in the analysed countries. Since innovation scoreboard indicators are frequently taken into account by policy makers when considering new innovation policy measures, it is important to notice that they should also consider wider set of business climate indicators, including corruption perceptions. Such combined perspective might results in the better coordination of overall economic policy mix, that might boost additional innovation activity and consequently spur overall catching-up process.

4. CONCLUSIONS

The main focus in this paper was to empirically analyse the relationship between corruption perceptions and innovation activity in the post-transition European economies. The reason for choosing the sampled countries is that they have been frequently assessed in public debates as well as in research studies as lagging behind more innovative economies and having important governance impediments for successful entrepreneurship development. Based on the BEEPS data, we have confirmed that in most of the analysed countries innovative firms perceive corruption to be major impediment for their business activity, even more so than non-innovative firms emphasize the same issue. Since innovation activity is relatively low in these countries, it could be argued that general policy recommendation to enhance the efforts to reduce corruption should be made, since corruption might deter potential innovators from their activities.

Empirical analysis has shown that firms still innovate in the analysed countries, even if they perceive corruption to be important impediment for their business activity. Based on these results we cannot argue that innovation activity would be higher if corruption perceptions were lower in the analysed countries. It might be the case that enterprises have found the way to operate within the society labelled by high corruption perceptions and that sudden changes of the system could also create additional obstacles. Or it might be the case that decreasing corruption would reduce their operating costs and thus enable better

business performance. Such causal relationships are beyond the scope of the present paper.

We have, however, established that the degree of corruption perceptions reported by the respondents in the analysed countries is related to different segments of overall innovation scoreboard index. Consequently, corruption perceptions are correlated also with other factors contributing to overall business climate in a specific country, which makes it more or less favourable for innovation activity.

Our analysis has additionally shown that after corruption perceptions are accounted for, innovation propensity is higher for firms that are larger (in comparison to micro firms) and also the firms in manufacturing (in comparison to services and retail). The first finding might be related to the issue of access to finance, where larger firms have more and better established links with financing institutions. Although manufacturing and services are rather similar when it comes to innovation (Sirilli and Evangelista, 1998), our results reveal that manufacturing firms in selected countries are more likely to innovate. This might indicate presence of structural industrial differences in post-transition EU countries when it comes to innovation and calls for further research focusing on specific sector or industry.

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Appendix

Summary Innovation Index and Corruption Perceptions Index for the countries in the sample in 2013

	Summary Innovation Index	Corruption Perceptions Index
Estonia	0.502	68
Slovenia	0.513	57
the Czech Republic	0.422	48
Hungary	0.351	54
Slovakia	0.328	47
Croatia	0.306	48
Poland	0.279	60
Lithuania	0.289	57
Bulgaria	0.188	41
Latvia	0.221	53
Romania	0.237	43

Sources: Innovation Union Scoreboard and Transparency International.