Universität St.Gallen

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April 2014 Discussion Paper no. 2014-07

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Electronic Publication: Fax +41 71 224 31 35
http://www.seps.unisg.ch

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[1] We are grateful to Ralph Clem, Eduard Klein, Heiko Pleines, and an anonymous referee for their comments on earlier versions of this paper. We are also thankful to all the participants in the "Regions, Nation and Beyond. An Interdisciplinary and Transcultural Reconsideration of Ukraine" workshop in Myrhorod, Ukraine, 11-14 September 2013, as well as the "Informal Practices and Structures in Eastern Europe and Central Asia" conference at the University of Fribourg, Switzerland, 21-23 November 2013, and colloquium at the Research Centre for East European Studies (Forschungsstelle Osteuropa) at the University of Bremen, Germany, 17 January 2014, for their questions and comments. Research for this study has been sponsored by the SNF Grant CR11I1L_135348 "Region, Nation and Beyond. A Transcultural and Interdisciplinary Reconceptualization of Ukraine".

Abstract

This paper investigates regional differences in the perception of corruption and informal practices among Ukrainian firms. Using two different data sets from Ukraine we show that perceived corruption differs significantly across regions, even when taking into account the size, industry, workforce composition, and other characteristics of the firms based on propensity score matching. In particular, perceived corruption is highest in the eastern areas and lowest in the western region, which points to distinct business practices that may be rooted in the different political, cultural, and historical development of Ukrainian regions.

Keywords

Corruption, Informal Practices, Regionalism, Ukraine.

JEL Classification

C21, D73, K42, O17, P2.

1. Introduction

Analysing business corruption from different disciplinary perspectives, scholars and practitioners have underscored its negative impact on organizations and countries in the global context (cf. Rose-Ackerman, 1978, North, 1990, La Porta, Lopez-De-Silanes and Shleifer, 1999; Williamson, 2000, Karklins, 2005, Godfrey, 2011, Lessig, 2013, Thompson, 2013, Johnston, 2014). The rise in expertise on this topic, together with the longstanding efforts of such international agencies as the IMF and World Bank as well as national governments, has not led to the desired results, however; corruption is still present and remains one of the main challenges in doing business in many countries (cf. Shleifer and Vishny, 1993, Mauro, 1995, Fisman and Svensson, 2007, Galang, 2012, Shekshnia, Ledeneva, and Denisova-Schmidt, 2014). One of these countries is Ukraine, where corruption is one of the main challenges facing domestic companies in their business activities. Corruption is an obstacle for foreign companies expanding their activities in the country, making it an inhibitor of economic growth and, as recent events in Ukraine demonstrate, a promoter of political instability as well.

Many international rankings name Ukraine as one of the most corrupt countries in the world (Table 1). In its 2013 index, for example, Transparency International, an NGO providing research and data on worldwide corruption, scored Ukrainian corruption as 25 on a scale from 0 (extremely corrupt) to 100 (not corrupt)[1]. Freedom from corruption, according to the Heritage Foundation's 2013 Index of Economic Freedom, is 23 on a scale from 0 (not free from corruption) to 100 (free from corruption). The World Bank ranked Ukraine's control of corruption at -1.03 on a range from -2.5 to +2.5.

[1] Transparency International score corruption on a scale from 0 (extremely corrupt) to 10 (not corrupt) till 2011.

Table 1: Ranking of Corruption in Ukraine: Dynamics in 2009-2013

Indicator (Institution)	Country	2009	2010	2011	2012	2013
Corruption Perception Index (Transparency International)	USA	7.5	7.1	7.1	73	73
	Germany	8.0	7.9	8.0	79	78
	Russia	2.2	2.1	2.4	28	28
	Ukraine	2.2	2.4	2.3	26	25
	Congo, Dem. Rep.	1.9	2.0	2.0	21	22
Freedom from corruption/Index of Economic Freedom (Heritage Foundation)	USA	72	73	75	71	71
	Germany	78	79	80	79	80
	Russia	23	21	22	21	24
	Ukraine	27	25	22	24	23
	Congo, Dem. Rep.	19	17	19	20	20
Control of Corruption/Worldwide Governance Indicators (World Bank)	USA	1.26	1.26	1.27	1.38	N/A
	Germany	1.72	1.74	1.71	1.78	N/A
	Russia	-1.09	-1.06	-1.04	-1.01	N/A
	Ukraine	-1.01	-0.98	-1.00	-1.03	N/A
	Congo, Dem. Rep.	-1.36	-1.42	-1.40	-1.30	N/A

Business corruption in Ukraine is not an isolated phenomenon, however; it is tightly embedded into general corruption in society: in politics (cf. Čábelková and Hanousek, 2004, Wilson, 2005; Neutze and Karatnycky, 2007), education (cf. Round and Rodgers, 2009; Osipian, 2008, 2010; Klein, 2012) and in everyday life. Households might for instance install special devices (*zhuk)* to roll back the numbers on an electricity meter or use other techniques to shift the costs of gas and water consumption (cf. Leipnik and Kyrychenko, 2013). Individuals might prefer to pay their examining doctor informally (~36 USD) rather than make a formal payment to the hospital (~24 USD)[2]. Bribes, exchanging favours, donations to schools for the purpose of favourable assessments (for example, for enrolment or higher grades) or cheating during exams, plagiarism, ghostwriting, and receiving marks not on the basis of academic achievement, but on the monetary and non-monetary interests of professors is a common reality and not an exception. Bribes at public institutions are usually justified by rational-based or value-based reasons such as simplifying

[2] Combating corruption in Ukraine, 2012, http://www.iahr.com.ua/eng/publications/

official procedures or supplementing state salaries. The reforms combating corruption that were promised by the leaders of the Orange Revolution[3] did not bring the effects one might have hoped for (Grødeland, 2010).

Scholars studying business corruption in Ukraine analyze this issue from different perspectives. Pleines (2005, 2010) emphasizes the link between large businesses, politics, and the role of 'oligarchs', a relatively small group of business people who control a substantial share of the country's wealth and who frequently exercise political power directly or indirectly. Many see the rent-seeking behavior of this influential group as the most detrimental form of corruption and informal practices in Ukraine, at least with regard to the country's economic development and rise in inequality. As documented in Åslund (2001, 2005), oligarchs have frequently misused government power to extract formal decisions granting themselves subsidies, tax exemptions, and regulatory privileges, and to either act outside the law themselves, or to induce the illegal behavior of government officials without facing legal consequences. In the 1990s, this allowed them to secure annual benefits of several billion USD in the nontransparent and monopolistic business of gas imports from Russia, the initial backbone of their wealth, using tricks like diverging nominal and real gas prices or even the blunt theft of gas from the main pipeline to Western Europe.

Markovskaya, Pridemore, and Nakajima (2003) explore the presence and impact of corruption in the financial markets. Bilotkash (2006) describes the various forms of tax evasion Ukrainian enterprises use to conceal their activities. Leipnik and Kyrychenko (2013) show the cheating techniques small and large businesses may apply to shift the costs of their utilities. Peretiatko, Humeniuk, Humeniuk, D'Souza, and Gilmore (2009) argue that despite 'the difficulties of operating in the Ukrainian business environment, with its twin problems of bureaucracy and corruption', some forms of entry seem to be successful, such as franchising. Rodgers, William, and Round (2008) describe criminal workplace activities, such as employers who pay their staff in cash in order to reduce their payroll tax obligations, or employees who take advantage of different mechanisms to use company property for private gain.

In spite of its extensiveness and importance, business corruption remains under-researched.[4] The reasons for this are twofold: corruption is not an easy topic to study, nor is it a term that can be

[3] The Orange Revolution started on 21 November 2004, in the wake of accusations of election fraud, and ended on 26 December 2004 with a new election. Orange was the color of the supporters of Viktor Yushchenko (elected president in 2004), while the color of his competitor, Viktor Yanukovych (elected president in 2010), was blue.

[4] Half of all the economic activity in developing countries remains unregistered; these activities might be illegal, but they might not (McGahan 2012). The informal sector is also widespread in developed economies; for example, up to 90% of all activity in the construction sub-trades in New York City and 15% of all employment in Los Angeles County might be informal (cf. Godfrey 2011). Scholars in management studies should indeed play more attention to the informal sector of the economy.

straightforwardly defined. Few business representatives like to talk about corruption, if they are asked about it directly. By admitting their involvement in corruption, they make themselves culpable – and by denying this fact, they render themselves implausible. Hence it might be more productive to ask business representatives not about corruption, but about their daily activities.

Corruption is usually defined as 'the misuse of public power, office or authority for private benefit – through bribery, extortion, influence peddling, nepotism, fraud, speed money of embezzlement' (UNDP) or 'the abuse of entrusted power for private gain' (Transparency International) or 'the abuse of public office for private gain' (World Bank). The words might differ, but corruption is often understood as the 'twisting' of something public into something private. The idea of private property is a relatively new one for post-Soviet Ukraine[5], however, excluding the western part of the country, where private property existed until 1939[6].

Motivated by the heterogeneous historical development of present-day Ukraine (also in terms of business practices), this paper examines the differences in the perception of corruption and informal practices among companies operating in Ukraine across its different regions. Our research is therefore related to a study by Becker, Boeckh, Hainz, and Woessmann (2011), which analyzed reports of corrupt behavior among individuals in several Eastern European countries near the border of the former Habsburg Empire. They found that those living within the former Habsburg territory were less inclined to bribe the police or the courts than those outside, even after controlling for several socio-economic characteristics. The research question of our study differs from theirs, in that we focus on perceived corruption among firms (rather than among individuals) situated in Ukraine (rather than in several countries).

Our empirical analysis is based on a unique business survey of Ukrainian companies that was conducted in 2013 and contains a wealth of firm characteristics, including size, industry, employee structure, financial indicators and other parameters. As a second data source, we have also considered the 2008-09 wave of the Business Environment and Enterprise Performance Survey (BEEPS) provided by the European Bank for Reconstruction and Development (EBRD) and the World Bank. Our estimation strategy relies on matching (see Rubin 1974), which aims at making firms across various regions as similar as possible in terms of their observed characteristics. Any mean difference in perceived corruption and informal practices after controlling for these firm characteristics is interpreted as inherently 'regional' and possibly related to distinct historical,

[5] The country is only now experiencing its first generation of young adults who have grown up with the concept of private property, which is still in development (cf. Markus, 2012).

[6] The western part of Ukraine belonged to the Habsburg Empire from 1722 to 1914 and then to Poland from 1919 until 1939. After World War II, it was annexed by the USSR.

political, or cultural factors. Our results indeed suggest that considerable regional variations exist even after accounting for the industry, employee structure and other characteristics. In particular, perceived corruption is higher in the eastern areas than in the south and the west, which appears to have the lowest perceived levels of corruption and informal practices.

The remainder of this paper is organized as follows: Section 2 introduces the data and provides descriptive statistics. Section 3 discusses the identification strategy, while Section 4 outlines our estimation based on propensity score matching. The results are presented in Section 5. Section 6 concludes.

2. Data

This research project is based on two different data sets. The first data set comes from a survey conducted among Ukrainian firms between January and March 2013 by Socioinform on behalf of a joint project of researchers at the Ivan Franko National University of L'viv (Ukraine) and the University of St. Gallen (Switzerland). The sample is comprised of 625 firms, which are stratified by region and size. 25 firms were sampled in each of Ukraine's 24 *oblasti* (singular: *oblast*), the regular regional administrative units, as well as in the Republic of Crimea (*Krym*), which possesses a special autonomous status. It is worth noting that in addition to the 25 regions mentioned so far, there are two federal cities which constitute administrative entities on their own: the capital city of Kyiv and the Crimean seaport of Sevastopol, where the Russian Black Sea Fleet entertains naval bases. In the sampling design, however, these cities were not considered as separate units, so that firms from the cities of Kyiv and Sevastopol were sampled along with companies from the oblast of Kyiv and the Republic of Crimea, respectively. As outlined below, sampling based on regions allows us to cluster observations of several administrative units into larger units based on historical regions. 20 percent of the sample were small businesses of 20 to 50 employees, 50 percent were mid-sized companies (51 to 250 employees), and 30 percent were large enterprises (251 to 1,000 employees). The data does not include very small (less than 20 employees) and very large companies (more than 1,000 employees).

This survey contains rich information on a range of firm characteristics as of 2013, including, for example, legal form and ownership structure, firm size (number of employees), city size where the firm is located, industry and occupations (share of employees in production, sales, administration, and other areas), as well as financial indicators such as the annual sales and net benefits in 2011 and 2012, share of imports (in inputs) and exports (in sales), assets and liabilities, and the amount and source of newly invested capital in 2012. Several questions are devoted to characterizing the employee structure, such as the workforce composition in terms of gender and education, the share of blue/white collar workers and trainees, the employee growth over the last

three years and the planned growth over the coming three years, and management's satisfaction with employee motivation and qualification. The survey also covers firm policies and procedures concerning health services, bonus payments and employee training, as well as organizational aspects like innovation in the development or acquisition of new patents or the introduction of new products and outsourcing. Finally, survey respondents were asked to judge the occurrence and severity of corruption and informal practices in various public institutions and the consequences for their firms' activities, which will serve as outcome variables.

To address one of the challenges in analyzing corruption – getting insider information on such a sensitive issue – we decided to use the approach developed and tested in the Russian business environment by Shekshnia, Ledeneva, and Denisova-Schmidt (Ledeneva and Shekshnia, 2011; Denisova-Schmidt, 2012; Shekshnia, Ledeneva, and Denisova-Schmidt, 2013, 2014). The researchers 'coded' corruption as 'informal practices' – the practical norms CEOs and managers usually use to get things done. Questions were asked in a way that made it possible to get information about less reprehensible but more widespread forms of corruption such as collusion, conflict of interest, cronyism and nepotism, fraud, gifts and hospitality, lobbying, abuse of power or office and influence-peddling.

To address the other challenge in analyzing corruption – a proper definition of this term – we use the regional information provided in our data. That is, we base our analysis on clustering firms in the 25 administrative units into a coarser set of arguably historically and culturally distinct regions. Our definition of five regions is heavily inspired by the arguments brought forward in Barrington and Herron (2004), but yet rougher than the eight-region division proposed therein, mainly due to small sample issues. We nevertheless think that our classification into east, north, south, west central, and west adequately captures the historical differences across the Ukrainian regions. The eastern region consists of the Donetsk, Luhansk, Kharkiv, Zaporizhzhia, and Dnipropetrovsk oblasti and comprises the most the Russified part of Ukraine, having the longest common history with Russia. The northern region includes Poltava, Kirovohrad, Cherkasy, Chernihiv, and Sumy. The oblast and the capital city of Kyiv would also fall into this geographical area, but are excluded because (i) being the country's capital makes the city distinct to any region in terms of administrative and political significance and (ii) the city and the oblast cannot be distinguished in the data. As discussed in Barrington and Herron (2004), the north is different from the east in that it did not come under Russian control until the middle 1600s to the late 1700s and is less ethnically and linguistically Russian.

As suggested by Barrington and Herron (2004), the southern region consists of Kherson, Odesa, and Mikolaiv. Much of this area (which is ethnically less Russian than the east) had been

under Ottoman Turkish rule until the late 1700s, when Russia gained control. Note that the Autonomous Republic of Crimea is excluded from the southern region due to its arguably distinct culture and history and therefore omitted from our analysis altogether as the sample size would be too small to treat it as region on its own. Barrington and Herron (2004) remark that Russian-dominated Crimea was the last area to join Ukraine (transferred from the Russian Soviet Federated Socialist Republic in 1954) and the only one that did not strongly support independence in 1991, making it by any standard the least Ukrainian part of the country, which also becomes apparent in the current Crimean crisis.

In line with Barrington and Herron (2004), the west central region is composed of Zhytomyr, Vinnytsia, Khmelnytskyi, Rivne, and Volyn. For centuries, these areas had been part of Poland before falling under the control of Russia as a result of the Second and Third Partitions of Poland in 1793 and 1795. Finally, the western region consists of Chernivtsi, Zakarpatia, Lviv, Ternopil, and Ivano-Frankivsk. What these areas have in common is that they belonged to the Austro-Hungarian Habsburg Empire since (at least) the late 18th century (and up to 1918) as a result of the First Partition of Poland in 1772 (bringing Lviv, Ternopil, and Ivano-Frankivsk) and the defeat of the Ottomans in the Russo-Turkish War of 1768-74 (allowing the annexation of Chernivtsi by the Austrians as part of the Bukovina province). Zakarpatia had already been part of Hungary and the Habsburg Empire.

Table 2 provides descriptive statistics on the means for various firm characteristics across regions to give an idea of the geographical differences in the distributions of companies in our sample. We see, for instance, that eastern companies are on average substantially larger than those in other parts of the country; they are more concentrated in sectors like manufacturing and wholesale, and have a workforce that is on average better educated. As discussed further below, controlling for such differences in firm variables will be crucial for assessing regional differences in perceived corruption.

Table 2: Descriptives (main data)

region	east	north	south	w.centr	west
number of employees	380.768	239.376	178.640	209.040	236.192
sector: agriculture (binary)	0.080	0.064	0.120	0.064	0.096
sector: mining (binary)	0.072	0.120	0.080	0.112	0.072
sector: construction (binary)	0.032	0.032	0.040	0.040	0.064
sector: manufacturing (binary)	0.408	0.344	0.227	0.344	0.360
sector: wholesale (binary)	0.144	0.088	0.133	0.136	0.120
sector: transport (binary)	0.064	0.096	0.080	0.112	0.088
sector: information (binary)	0.200	0.256	0.320	0.192	0.200
share of females	0.412	0.413	0.472	0.428	0.432
share of fulltime employees	0.869	0.888	0.860	0.900	0.824
share of employees with high school degree	0.304	0.307	0.399	0.342	0.383
share of employees with bachelor degree	0.348	0.426	0.301	0.360	0.346
share of employees with master degree	0.347	0.267	0.293	0.292	0.272
share of workers	0.745	0.756	0.754	0.775	0.771
share of middle management	0.151	0.138	0.132	0.142	0.149
share of top management	0.073	0.084	0.078	0.065	0.061
share of employees in sales	0.077	0.064	0.050	0.056	0.056
share of employees in production	0.711	0.711	0.733	0.729	0.773
share of employees in R&D	0.022	0.016	0.003	0.019	0.008
foreign ownership (binary)	0.032	0.008	0.027	0.024	0.016
exporter (binary)	0.256	0.152	0.107	0.280	0.336
share of exports of total sales	0.078	0.051	0.024	0.105	0.138
gross revenue: up to 5 mio hryvnias (binary)	0.448	0.568	0.493	0.456	0.384
gross revenue: 5 to 20 mio hryvnias (binary)	0.200	0.240	0.267	0.264	0.304
gross revenue: 20 to 50 mio hryvnias (binary)	0.088	0.048	0.093	0.096	0.152
gross revenue: 50 to 100 mio hryvnias (binary)	0.056	0.032	0.093	0.072	0.088
gross revenue missing (binary)	0.128	0.088	0.027	0.080	0.032
introduced new products (binary)	0.416	0.312	0.240	0.416	0.600
business development in last 3 yrs (1: very bad,…,5: very good)	3.304	3.416	3.480	3.536	3.656
number of obs.	125	125	75	125	125

The second data set comes from the Business Environment and Enterprise Performance Survey (BEEPS), which is a joint initiative of the European Bank for Reconstruction and Development (EBRD) and the World Bank. The survey focusses on firms in Eastern Europe and Central Asia to assess the business development and environment. In its fourth round (2008-09), the BEEPS covered roughly 11,800 firms in 29 countries. Here, we make use of the Ukrainian subsample collected from May to August 2008 and comprising 851 firms. The data were obtained using a stratified random sampling[7] based on industry (manufacturing, retail trade, or other services), firm size (3 strata: 5 to 19 employees, 20 to 99 employees, and 100 to 10,000 employees), and region.

The BEEPS provides a wealth of firm characteristics, including firm and city size, legal form and ownership structure, industry, financial information (among others, annual sales in the fiscal year before the survey), assets and liabilities (for example, loans), imports/exports, innovation and organizational changes (introduction of new products, discontinued product line, and outsourcing in

[7] For further details, see http://www.enterprisesurveys.org/Methodology/, accessed August 12, 2013

last three years). It also contains workforce composition (percentage who are university graduates, number of male/female and skilled/unskilled production workers, problems due to inadequate education), formal training activities, and some information about the judgment on informal practices and corruption. Concerning the regional distribution in BEEPS, 168 firms were sampled in the oblast of Kyiv, 159 in the east, 186 in the north, 172 in the south, and 166 in the west. One disadvantage (besides the age of the data) compared to our first data set is that these regions do not necessarily correspond to the historical regions of Ukraine. For instance, the south includes both the Republic of Crimea and other southern regions, in spite of their very distinct historical and cultural development. Table 3 gives the means for various firm characteristics across regions in the BEEPS. Again, there is considerable variation in the number of employees, the mix of sectors, and the composition of the workforce (for instance education) across various regions.

Table 3: Descriptives (BEEPS)

region	east	Kyiv	north	south	west
number of full time employed	102.673	128.238	136.703	83.807	115.767
number of temporarily employed	8.107	2.912	4.714	4.892	7.790
sector: textile (binary)	0.098	0.142	0.174	0.146	0.135
sector: chemicals (binary)	0.012	0.011	0.008	0.017	0.015
sector: metal processing (binary)	0.037	0.046	0.047	0.030	0.023
sector: machinery (binary)	0.063	0.096	0.131	0.146	0.102
sector: construction (binary)	0.103	0.032	0.068	0.052	0.060
sector: services (binary)	0.257	0.195	0.123	0.185	0.173
sector: wholesale (binary)	0.065	0.096	0.059	0.056	0.060
sector: retail (binary)	0.143	0.135	0.140	0.133	0.154
share of females	0.475	0.295	0.438	0.521	0.412
share with university degree	0.388	0.440	0.269	0.360	0.344
share of employees in production	0.507	0.470	0.495	0.460	0.461
company publicly listed (binary)	0.044	0.085	0.140	0.112	0.098
exporter (binary)	0.145	0.262	0.288	0.180	0.203
gross revenue in mio	18.189	19.434	11.885	7.313	5.939
gross revenue missing	0.262	0.216	0.292	0.412	0.180
introduced new products (binary)	0.519	0.624	0.555	0.494	0.474
outsourced parts of prod. (binary)	0.105	0.213	0.144	0.099	0.143
number of obs.	428	282	236	233	266

3. Identification

Our goal is to estimate the regional differences in the firms' perceived level of corruption/informal practices net of effects rooted in specific regional compositions of firms, which can be attributed to distinct cultural, political, and historical developments. That is, we are interested in the extent to which the regional effect on the firms' assessment of corruption and informal practices can be inherently explained by cultural differences rather than by firm attributes such as size or industry. This requires controlling for any firm characteristics that are likely correlated with both perceived corruption and geographical region. If, for instance, the firms in a particular industry or with a strong export orientation are more severely exposed to corruption –

and, at the same time, more likely to be concentrated in a particular region – then the inherently culture-rooted regional effect will be confounded by industry or the level of exports, unless we account for the latter two characteristics in our econometric analysis.

We will now formally discuss the identification of the regional effect of interest based on the potential outcome framework; see for instance Rubin (1974). To this end, let $D \in \{1,2,...,R\}$ be a discrete variable indicating in which of the 1 to *R* different historical regions a firm is situated. *Y* is the observed outcome variable, one of the measures of corruption and informal practices. By $Y^1, Y^2, ..., Y^R$ we denote the potential outcomes that would be realized if a particular firm was (re-)located to regions *D*=1,2,...,*R*, while all other firm characteristics are kept constant. Note that only one of the *R* potential outcome is actually observed, namely that for the region in which the firm is actually located: $Y = \sum_{d=1}^{R} I\{D=d\} \cdot Y^d$, where $I\{D=d\}$ is the indicator function, which is equal to one if its argument is true and zero otherwise.

In our analysis, we treat the eastern region in both data sets as the reference region, to which we assign *d*=1 and to which all other regions are compared. The reason is that several authors found corruption and informal practices to be more common in the east than in other Ukrainian regions (Becker, Boeckh, Hainz, and Woessmann 2011). We are interested in how different firms in the east would, on average, evaluate corruption and informal practices had they been relocated to a different counterfactual region (Y^d for some $d \neq 1$), while keeping any other firm characteristics that may also affect perceived corruption fixed. Therefore, the parameter we would like to estimate is the mean difference in potential outcomes between Y^1 and Y^d (with $d \neq 1$) among those firms with $D = 1$. This corresponds to the average regional effect on corruption perception among firms in the east, which we denote by θ^{1d}, and is defined as follows:

$$\theta^{1d} = E[Y^1 - Y^d \mid D = 1], d \in \{2,...,R\} \quad (1)$$

Equation (1) explicates that the average regional effect on eastern firms can be defined w.r.t. any potential (non-eastern) region ($d \neq 1$), so that multiple effects $\theta^{1d}, \ldots, \theta^{1R}$ may be assessed (east vs. south, east vs. west...). This is closely related to the multiple treatment framework proposed in Imbens (2000) and Lechner (2001).

To identify these regional effects among firms in the east, we will rely on the assumption that all of the firm characteristics that are jointly associated with the region and the corruption outcomes can be observed in the data. This will allow the finding of firms in other regions that are comparable (in terms of the relevant characteristics) to those in the east and therefore serve as

counterfactual observations under a hypothetical relocation of the eastern firms. To this end, let *X* denote the vector of observed firm characteristics (such as size, industry, and employee structure). We will assume that within *any* subgroup of firms located either in the east or in *one* of the other regions (for example the west), the potential outcome for being located in the respective other region is independent of the actual location (in the east or the other region) after controlling for *X*. This corresponds to the conditional independence assumption (CIA) for multiple treatments of Imbens (2000) and Lechner (2001), which is formally stated in Appendix A.2.[8]

The CIA only appears plausible if our set of observed covariates is rich enough to include all of the characteristics that could potentially confound the regional effect. This assumption is inherently untestable, but we argue that it is likely to be (closely) satisfied in our case. First, our data contains a battery of characteristics that are likely to be correlated with the location, for example, the industry, import/export share, workforce composition, and the occupational distribution. Second, we have thorough information about the financial situation and business activities (such as innovation and outsourcing) that may also affect the judgment of or inclination to corruption and informal practices. Finally, we can also control for municipality size, which is important if perceived corruption differs systematically with the latter and firms are more likely to be situated in larger municipalities in one region than another.

As second identifying assumption, we impose a common support restriction stating that no value *x* among all possible values of *X* perfectly predicts that firms are located in the east. Otherwise, no comparable firms could be found in the other region for eastern companies with such particular *x*. This common support assumption is formally stated in Appendix A.2. Under both assumptions, the average regional effect on firms in the east is identified by

$$\begin{aligned}\theta^{1d} &= E\left[Y \mid D=1\right] - E_X\left[E\left[Y \mid D=d, X\right] \mid D=1\right] \\ &= E\left[Y \mid D=1\right] - E_{p^{1d}(X)}\left[E\left[Y \mid D=d, p^{1d}(X)\right] \mid D=1\right], \quad d \in \{2,...,R\},\end{aligned}$$

where $p^{1d}(x) = \Pr(D=1 \mid X=x, D=1,d)$ denotes the conditional probability (or propensity score) to be located in the east given firm characteristics *X* in the subpopulation with either *D=1* or *D=d* (i.e. firms in the east and in *one* of the regions identified by *d*). The regional effects can therefore be identified by matching eastern firms to firms in other regions with comparable propensity scores. A formal proof for this result is given in Appendix A.2.

4. Estimation

[8] See Rosenbaum and Rubin (1983) for the corresponding assumption under binary treatments.

For the estimation of θ^{1d}, we first estimate $p^{1d}(X)$ in both data sets within each of the respective subsamples of firms with $D=1,d$ (and $d \in \{2,...,R\}$) based on probit specifications. In the probit specifications, which are presented in Appendix A.1, *X* includes, among other things, the firm size, industry, import/export orientation, ownership structure, workforce composition, annual sales, innovation, and size of the municipality. In a second step, we apply within each subsample the propensity score radius matching algorithm of Lechner, Miquel, and Wunsch (2011), which was found to be competitive among a range of estimators in the simulation study of Huber, Lechner, and Wunsch (2013). The algorithm of the estimator is provided in Table A.1 therein. In brief, this matching algorithm relies on the idea of matching to some reference firm in the east all firms in the respective other region whose propensity scores are within a particular distance (or radius) to that of the reference firm. In a second step, the outcomes of the matched firms (within the radius) are weighted according to their distances from the propensity score of the reference firm in order to estimate the potential outcome of the eastern firm, had it been relocated to the other region. Third, a bias correction based on a linear regression of *Y* on *X* is applied to the potential outcome. Finally, θ^{1d} is estimated by computing the potential outcomes for all firms in the east and taking the mean difference between the observed outcomes in the east and the respective estimated potential outcomes.

For radius matching, several estimation options or tuning parameters have to be chosen; see Huber, Lechner, and Steinmayr (2012) for a comprehensive discussion. Most importantly, the size of the radius of admissible distances in propensity scores needs to be defined. We set the latter at twice the maximum distance in the propensity score occurring when matching each eastern firm to its respective closest observation in the other region. However, the estimates presented in the next section are rather insensitive to other choices of the radius (namely, when using the maximum distance or three times this difference as radius). Second, we impose a so-called common support restriction, requiring that eastern firms with larger propensity scores than the largest value among firms in the other region are not used for estimation; see Dehejia and Wahba (1999). The idea is that eastern firms whose propensity scores are so high that no comparable firm in the other region can be found (i.e. are 'off support') should be discarded from the sample in order to avoid bad (or incomparable) matches that may cause bias. The price to pay is that the estimated effect then only refers to the observations for which common support restriction is satisfied (i.e. are 'on support') and its relevance for the initial sample may be questionable if many observations had to be discarded. For this reason, for each estimate in the empirical section, we report the number of observations that are on and off support. A final choice concerns the inference to assess the

significance of the estimate of θ^{1d}. Here, we estimate the p-values based on bootstrapping the t-statistics of the effect estimates as outlined in Huber, Lechner, and Steinmayr (2012).

5. Results

This section presents the assessment of the results for regional differences in a range of outcomes, measuring the perceived level of corruption and informal practices in public institutions and business life as well as the implications for and (counter-)strategies conducted by the firms.

The first question was asked about the prevalence of informal practices and corruption in several institutions: tax inspection, customs, courts, the police, sanitation service, fire inspection, and local, regional and federal administrations, to be evaluated on a scale from 1 (never) to 5 (systematically). Extortion of bribes and non-monetary favors by the control and enforcement bodies seems to be one of the most common forms of corruption in post-Soviet territory, including, for example, in Russia (cf. Shekshnia, Ledeneva, and Denisova-Schmidt, 2013, 2014). This also increased during the recent raider attacks in Ukraine: Falsified court resolutions and procuring tax inspections are 'the most common vehicles of 'gray' raider attacks' (Zimmerer, 2012)[9].

Table 4

How often are informal practices/corruption used by the following institutions?

	mean	raw differences to east				diff. after matching			
	east	north	south	w.centr	west	north	south	w.centr	west
tax inspection (516 obs.)	3.333	0.108	-0.232	0.006	-0.092	0.333	-0.672	-0.035	-0.019
(p-values)		(0.470)	(0.202)	(0.965)	(0.539)	(0.280)	(0.063)	(0.897)	(0.956)
on support (off support)						204(21)	142(32)	205(6)	188(33)
customs (475 obs.)	3.138	-0.112	-0.638	0.362	-0.176	0.093	-0.984	0.049	-0.255
(p-values)		(0.544)	(0.006)	(0.055)	(0.342)	(0.321)	(0.054)	(0.869)	(0.569)
on support (off support)						185(21)	119(37)	186(8)	171(27)
courts/judicial system (486 obs.)	3.149	0.089	-0.402	0.051	-0.360	0.653	-0.372	0.065	-0.489
(p-values)		(0.623)	(0.072)	(0.793)	(0.048)	(0.040)	(0.418)	(0.811)	(0.241)
on support (off support)						202(17)	116(48)	196(5)	175(30)
police (500 obs.)	3.299	0.048	-0.663	-0.129	-0.538	0.583	-0.563	-0.149	-0.701
(p-values)		(0.799)	(0.004)	(0.505)	(0.004)	(0.051)	(0.162)	(0.705)	(0.089)
on support (off support)						203(22)	136(37)	206(1)	182(34)
municipal administration (507 obs.)	2.962	-0.114	-0.276	-0.140	-0.322	-0.090	-0.430	0.041	0.097
(p-values)		(0.500)	(0.213)	(0.420)	(0.057)	(0.740)	(0.367)	(0.878)	(0.778)
on support (treated off support)						207(55)	133(40)	204(3)	195(25)
regional administration (489 obs.)	2.784	0.022	-0.245	-0.031	-0.337	0.232	-0.691	0.286	-0.034
(p-values)		(0.905)	(0.277)	(0.874)	(0.055)	(0.466)	(0.214)	(0.485)	(0.923)
on support (treated off support)						197(18)	125(37)	192(2)	178(31)
national administration (453 obs.)	2.867	-0.074	-0.533	-0.014	-0.465	0.411	-0.613	0.105	0.39
(p-values)		(0.708)	(0.050)	(0.950)	(0.022)	(0.400)	(0.234)	(0.796)	(0.287)
on support (treated off support)						187(14)	106(41)	175(3)	168(29)

[9] Raider attacks represent the 'disposal of the state-owned property and corporate rights other than following the privatization proceedings or illegal seizure of a company' (Zimmerer, 2012: 2). Zimmerer (2012) differentiates between *white* (using loopholes in current legislation), *gray* (using other legal means such as favorable court decisions) and *black* (using physical violence, threatening and bullying) raider attacks. This phenomenon is also widespread in Russia and other Eastern European countries.

Note: P-values are provided in brackets and are based on 999 bootstrap draws. Outcomes range from 1 (never) to 4 (systematically).

The second column of Table 4 gives the respective average responses among firms in the east, while columns 3 to 6 show the mean (raw) differences between the east and the respective other regions, unadjusted for the observed firm characteristics *X*. Columns 7 to 10 provide the estimates of the regional effects, i.e. the differences in the outcomes after adjusting for *X* by matching the eastern firms to comparable companies in the respective other regions. For all differences, p-values based on 999 bootstrap replications are provided in brackets. Furthermore, 'on support' reports the number of observations in the east and the respective other region for which the common support restriction of Dehejia and Wahba (1999) is satisfied (see Section 5). 'Off support' indicates the number of eastern firms with propensity scores too high to find suitable matches in the other region. Common support is generally highest when comparing east to west central, where fewer than ten eastern firms have to be discarded, and least satisfactory when comparing east to south, where the share of dropped observations is around 20 percent of the sample in most cases (but even 30 percent in one case). This should be taken into account when interpreting the results.

Our estimates suggest that considerable regional differences exist in the perceived corruption in public institutions even after adjusting for firm characteristics. Compared to the east, similar firms in the north generally find corruption and informal practices to be more pronounced, and the positive differences referring to courts and police are even significant on the 5 and 10 percent levels, respectively. In contrast, southern companies state the levels of corruption to be lower than in the east. The negative differences for tax inspections and customs are significant on the 10 percent level. In the west, four of the six of the differences are negative and that referring to police practices is significant at the 10 percent level. In the west central region, the results are rather similar to the east. None of the comparably moderate differences are significant at any conventional level.

The second question (see Table 5) was about whether firms comparable to that of the interviewee have to engage in informal practices when dealing with these institutions[10]. This time, no after-matching difference between eastern and northern firms is significant: the level of corruption indicated in the west central region is again similar to that in the east. In line with the previous question, southern firms claim to be significantly less engaged (at the 5 percent level) in informal practices when dealing with customs. Also, the negative difference referring to the court

[10] The question does not directly refer to the firm of the interviewee because this may induce the latter to give socially acceptable responses rather than telling the truth. By referring to 'comparable firms' this issue is hopefully mitigated.

system is borderline significant. Concerning the west, the negative differences referring to courts and police are significant on the 10 and 5 percent levels, respectively. Interestingly, as in the previous question, none of the differences in the judgment of the municipal, regional, and national administrations are significant.

Table 5

How often do companies comparable to yours have to engage in informal practices when dealing with the following institutions?

	mean	raw differences to east				diff. after matching			
	east	north	south	w.centr	west	north	south	w.centr	west
tax inspection (506 obs.)	2.862	0.005	0.027	-0.128	-0.014	-0.008	0.156	-0.206	0.042
(p-values)		(0.974)	(0.883)	(0.381)	(0.927)	(0.976)	(0.605)	(0.367)	(0.846)
on support (off support)						204(26)	137(35)	197(6)	198(30)
customs (462 obs.)	2.261	-0.130	-0.689	0.311	0.026	0.200	-0.702	0.266	-0.229
(p-values)		(0.465)	(0.001)	(0.112)	(0.882)	(0.469)	(0.028)	(0.452)	(0.447)
on support (off support)						182(25)	119(29)	169(7)	178(25)
courts/judicial system (474 obs.)	2.260	0.082	-0.490	-0.010	-0.174	0.659	-0.479	0.128	-0.452
(p-values)		(0.624)	(0.008)	(0.955)	(0.278)	(0.195)	(0.105)	(0.645)	(0.097)
on support (off support)						192(28)	136(25)	183(5)	185(20)
police (485 obs.)	2.387	0.043	-0.564	-0.065	-0.313	0.278	-0.426	-0.099	-0.559
(p-values)		(0.803)	(0.002)	(0.696)	(0.049)	(0.284)	(0.268)	(0.683)	(0.043)
on support (off support)						203(24)	136(32)	191(2)	188(27)
municipal administration (499 obs.)	2.452	0.003	-0.183	-0.036	-0.189	0.188	-0.434	-0.233	-0.02
(p-values)		(0.988)	(0.375)	(0.844)	(0.253)	(0.514)	(0.295)	(0.341)	(0.958)
on support (treated off support)						203(22)	136(35)	191(2)	193(29)
regional administration (484 obs.)	2.206	0.099	-0.284	-0.137	-0.096	0.087	-0.390	-0.269	0.203
(p-values)		(0.582)	(0.157)	(0.437)	(0.560)	(0.806)	(0.242)	(0.267)	(0.530)
on support (treated off support)						196(19)	125(36)	181(3)	194(21)
national administration (458 obs.)	1.934	0.165	-0.305	-0.089	-0.125	0.438	-0.218	-0.122	-0.192
(p-values)		(0.352)	(0.115)	(0.620)	(0.461)	(0.241)	(0.439)	(0.636)	(0.444)
on support (treated off support)						184(18)	121(32)	169(6)	177(24)

Note: P-values are provided in brackets and are based on 999 bootstrap draws. Outcomes range from 1 (never) to 4 (systematically).

The third question (Table 6) was about the presence of informal practices in various aspects of business life, namely in public procurement, when dealing with suppliers and buyers, in the remuneration of employees, in job applications, in the use of firm resources for private purposes, and in competition with other firms. After adjusting for *X*, no significant differences between eastern and northern firms are found. In contrast, firms in the south report encountering significantly less informal practices in public procurement, the remuneration of employees, in the use of firm resources for private purposes, and in competition with other companies. Firms in the west central region state that they have experienced significantly more informal practices in job applications, while all other differences are insignificant. Western firms find the use of firm resources for private purposes and informal practices when competing with other companies to be significantly less systematic. All in all, the three questions considered so far suggest that compared to the eastern reference firms, informal practices and corruption are reported to be somewhat more

prevalent in the north (if anything), rather comparable in the west central region, and rather less prevalent in the south and the west.

Table 6

How often do companies comparable to yours encounter informal practices in the following situations?

	mean	raw differences to east				diff. after matching			
	east	north	south	w.centr	west	north	south	w.centr	west
in public tenders (483 obs.)	2.692	-0.367	-0.774	-0.218	-0.434	-0.345	-0.759	-0.104	-0.087
(p-values)		(0.033)	(0.000)	(0.199)	(0.013)	(0.274)	(0.075)	(0.695)	(0.882)
on support (off support)						198(26)	134(34)	190(10)	177(17)
by suppliers/buyers (479 obs.)	2.168	-0.048	-0.692	-0.007	-0.357	0.073	-0.276	0.090	-0.158
(p-values)		(0.771)	(0.000)	(0.966)	(0.025)	(0.815)	(0.469)	(0.754)	(0.612)
on support (off support)						195(22)	124(40)	190(4)	177(25)
when remunerating employees (500 obs.)	2.353	-0.268	-0.696	0.117	-0.214	-0.366	-0.648	0.156	0.024
(p-values)		(0.134)	(0.000)	(0.499)	(0.226)	(0.188)	(0.092)	(0.598)	(0.961)
on support (off support)						196(24)	145(27)	199(5)	181(21)
by job applicants (480 obs.)	1.423	0.340	-0.187	0.701	0.125	0.197	-0.070	0.656	0.284
(p-values)		(0.011)	(0.074)	(0.000)	(0.303)	(0.404)	(0.665)	(0.036)	(0.487)
on support (off support)						190(21)	132(33)	192(2)	173(23)
use of firm res. for private purposes (484 obs.)	1.695	0.094	-0.507	0.315	-0.220	0.223	-0.622	0.334	-0.472
(p-values)		(0.530)	(0.000)	(0.034)	(0.074)	(0.596)	(0.001)	(0.219)	(0.002)
on support (off support)						196(23)	148(26)	200(2)	177(20)
in competition btw. firms (482 obs.)	1.730	0.109	-0.616	0.097	-0.345	0.179	-0.573	0.176	-0.442
(p-values)		(0.438)	(0.000)	(0.504)	(0.004)	(0.561)	(0.000)	(0.561)	(0.024)
on support (off support)						195(23)	132(38)	194(4)	162(19)

Note: P-values are provided in brackets and are based on 999 bootstrap draws. Outcomes range from 1 (never) to 4 (systematically).

The next question (Table 7) asked whether firms see corruption as a problem for their business operations. No statistical differences were found across the regions, despite the differences in the perceived magnitude of corruption shown in the previous questions. In particular, corruption does not appear to be seen as a much larger concern in the east and the north than in the west and the south. In fact, the mean values are rather high in any region, so that corruption is judged to be similarly detrimental across all parts of Ukraine considered in the study. To see whether companies have arranged themselves according to these circumstances, the last question (Table 8) was about strategies for managing or counteracting informal practices in various aspects of business life. They were asked whether comparable companies interact with local authorities via third parties (as agents or subcontractors) as a sort of buffer strategy, maintain budgets for the development of informal relations with local authorities, pro-actively suggest cooperation with the local authorities form alliances with other firms against corruption, mobilize the mass media against corruption, use courts to fight corruption, or officially turn to national authorities to fight local corruption.

Table 7

Does corruption hamper your business operations?

	mean	raw differences to east				diff. after matching			
	east	north	south	w.centr	west	north	south	w.centr	west
(495 obs.)	2.923	-0.221	-0.154	-0.293	-0.144	-0.001	-0.362	-0.294	-0.291
(p-values)		(0.169)	(0.076)	(0.446)	(0.386)	(0.995)	(0.227)	(0.325)	(0.423)
on support (off support)						197(21)	142(27)	208(4)	185(23)

Note: P-values are provided in brackets and are based on 999 bootstrap draws. Outcomes range from 1 (never) to 4 (systematically).

After adjusting for *X*, mean responses in the north are not significantly different from the east. Companies in the south report significantly less willingness to cooperate pro-actively with local authorities. Firms in the west central region claim to mobilize mass media and courts against corruption more often (significant at the 5 percent level) as well as to call on national authorities to fight local corruption more frequently (significant at the 10 percent level). Finally, western firms state that they make more use of buffer strategies via third parties when dealing with local authorities (the 'outsourcing' of corruption). While there appears to be some variation in managing/counteracting informal practices, no clear ordering in the level of activity across regions appears. No differences were also found in terms of Codes of Conduct and correlated activities such as the internal training of managers and staff on interaction with counterparties as well as the external briefing of partners on the company's rules and standards for working with contractors, government and regulatory agencies, and mass media.

Table 8

To which extent do companies comparable to yours use the following strategies to manage/counteract informal practices?

	mean	raw differences to east				diff. after matching			
	east	north	south	w.centr	west	north	south	w.centr	west
The use of subcontractors, agents and third parties to work with regional authorities and regulatory agencies (573 obs.)	1.656	0.169	-0.096	0.048	0.024	0.205	-0.134	0.193	0.483
(p-values)		(0.112)	(0.393)	(0.637)	(0.822)	(0.312)	(0.543)	(0.289)	(0.046)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Annual budget for informal relationships with regional authorities and regulatory agencies (573 obs.)	1.512	0.099	-0.099	0.096	0.152	0.056	-0.106	0.146	0.287
(p-values)		(0.255)	(0.350)	(0.305)	(0.100)	(0.781)	(0.640)	(0.318)	(0.132)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Proactive proposals to regional authorities and regulatory agencies on cooperation programs and methods (573 obs.)	1.456	0.203	-0.269	0.192	0.110	0.079	-0.349	0.205	0.078
(p-values)		(0.026)	(0.001)	(0.034)	(0.243)	(0.680)	(0.025)	(0.217)	(0.658)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Codes of Corporate Behaviour (573 obs.)	1.760	0.065	-0.040	0.008	0.166	0.135	0.320	0.123	-0.022
(p-values)		(0.552)	(0.798)	(0.944)	(0.160)	(0.603)	(0.236)	(0.526)	(0.922)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Briefing partners on company's rules/standards on working with government and regulatory agencies (573 obs.)	1.704	0.153	-0.131	0.104	0.075	0.340	-0.166	0.066	-0.034
(p-values)		(0.160)	(0.326)	(0.345)	(0.484)	(0.117)	(0.554)	(0.723)	(0.886)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Training of managers and regional staff in the internal rules of interaction with counterparties (573 obs.)	1.888	0.072	-0.195	-0.120	-0.019	0.010	-0.336	-0.023	0.091
(p-values)		(0.544)	(0.183)	(0.290)	(0.875)	(0.975)	(0.265)	(0.906)	(0.733)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Alliances with other companies in the region to counter unscrupulous actions by authorities or regulatory agencies (573 obs.)	1.464	0.219	-0.211	0.136	0.192	0.174	-0.186	0.253	0.098

(p-values)		(0.022)	(0.035)	(0.155)	(0.046)	(0.333)	(0.341)	(0.150)	(0.629)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Use of the media to counter unscrupulous actions by authorities or regulatory agencies (573 obs.)	1.400	0.211	-0.187	0.264	0.182	0.262	-0.178	0.408	0.1
(p-values)		(0.016)	(0.028)	(0.003)	(0.055)	(0.138)	(0.325)	(0.035)	(0.592)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Use of courts to counter unscrupulous actions by authorities or regulatory agencies (573 obs.)	1.504	0.131	-0.197	0.232	-0.070	0.114	-0.226	0.471	-0.108
(p-values)		(0.198)	(0.040)	(0.029)	(0.470)	(0.521)	(0.292)	(0.034)	(0.560)
on support (off support)						221(30)	154(46)	243(7)	212(35)
Formal approaches to state officials to counter unscrupulous actions by regional authorities (573 obs.)	1.392	0.187	-0.139	0.264	0.075	0.025	-0.189	0.394	0.216
(p-values)		(0.038)	(0.175)	(0.006)	(0.430)	(0.897)	(0.184)	(0.090)	(0.371)
on support (off support)						221(30)	154(46)	243(7)	212(35)

Note: P-values are provided in brackets and are based on 999 bootstrap draws. Outcomes range from 1 (never used) to 4 (widely used).

To verify the robustness of our findings, we turn to our second data source: the BEEPS survey, bearing in mind, however, that it is not as recent (and therefore likely less relevant) and that the regions in the survey are defined differently. The results are presented in Tables A.3 and A.4 in Appendix A.1 and briefly summarized hereafter. The first question (Table A.3) on how often comparable companies make additional payments/gifts to various institutions is similar to the question in Table 5. Apart from Kyiv, reported payments/gifts are significantly lower in all other regions when compared to the east. This holds for payments/gifts in general as well as more specifically for payments/gifts to tax authorities, customs officials and courts. Note that our estimates do not confirm the results for northern firms in Table 5, where no significant differences to the east were found. They are, however, in line with the tangentially negative differences for southern and western companies found in the previous question.

Similar to Table 7, the BEEPS asks respondents whether corruption is regarded as an obstacle for business operations (see Table A.4). Again, we do not find any significant differences across regions, despite the distinct answers in Table A.3. Also, a judgment on informal competitors is available in the survey, which are seen to be less detrimental in the west compared to the other regions. This is in line with Table 6, where informal practices in competition between firms are rated to be lower in the west than in the eastern, northern, and west central regions. Finally, the BEEPS also asks whether respondents consider the court system to be fair and uncorrupted. This view is least supported in the west, where the difference with the east is marginally significant, while the mean values in any of the other regions do not differ significantly from the east.

6. Conclusion

This paper has examined differences in the perception of corruption and informal practices among companies in Ukraine across different regions, which have been exposed to differing historical development. Considering two surveys of Ukrainian firms, we used propensity score

matching to make companies comparable across regions in terms of size, industry, employee structure, financial indicators and other characteristics that can potentially affect exposure to corruption. Even after adjusting for such firm characteristics, our results pointed to cross-regional heterogeneity in the perception of corruption, which is likely due to distinct cultural, political, and historical developments in the past and the present. In particular, corruption was found to be less prevalent in the south and in the west when compared to the east, while the findings for the northern and central regions were more ambiguous.

In the light of the current political turmoil, it is interesting whether these regional differences in perceived corruption can be linked to other differences in recent social and societal phenomena between the eastern and western regions. While our analysis does not allow us to establish such links on statistical grounds, it seems nevertheless instructive to relate them to regional patterns found elsewhere in the literature. One of the most striking features is the persistently high geographical polarization of election results (cf. Clem and Craumer, 2005). The west favors more reformist and pro-European parties and movements, as can be seen in its disproportionately large involvement in the Orange Revolution in 2004 and the current Euromaidan movement, whereas the east strongly supports the more pro-Russian parties (e.g. the "Party of Regions"), which traditionally serve as powerbases for the eastern oligarchs coming out of or having close ties to the former Soviet elite. Corruption, (media) manipulation, and electoral fraud (which triggered the Orange Revolution) has been well documented in the scholarly discussion on the political movements controlled by the eastern elite to safeguard their oligarchic power and wealth (see for instance Karatnycky, 2005, and Kuzio, 2005). In line with our findings for Ukrainian firms, this seems to suggest that the electorate in the east more readily accepts corruption and fraudulent behavior, given the overwhelming support (even when accounting for manipulation) for particular political parties.

Arel (2005) discusses the lack of a strong civil society in the east, making the population more vulnerable to being manipulated by their elites, as one possible reason for this. He also mentions the desire to preserve the regional, mostly Russophone identity as a motivation to defy reformist movements, whose political leaders have repeatedly challenged the use of Russian as an official language. Indeed, the empirical results of Constant, Kahanec, and Zimmermann (2011), for instance, suggest that Russian speakers were significantly less likely to vote for the Orange Revolution movement, even after accounting for differences in preferences for political and economic reforms with Ukrainian speakers. A further explanation for the support of the old elite could be the preservation of the privileged economic situation that the Russophone population continued to experience even after the fall of the Soviet Union (see Constant, Kahanec and

Zimmermann, 2012). Eastern Ukrainians may therefore prioritize their concerns about the oppression of the Russian language and economic motives (justified/manipulated or not) over the necessity to punish political misbehavior, which may also favor the spread of corruption and informal practices in business life and therefore match the results of this paper.

Whatever drives the regional differences in the levels of perceived corruption in our data, it is remarkable that, at the same time, corruption is apparently not considered to be a larger problem for business operations in regions where it is stated to be high. In fact, Ukrainian companies throughout the country judge the problem to be similarly severe, which points to the possibility that corruption is largely considered to be 'part of the (business) system' (cf. Svensson, 2005; Ledeneva, 2013). This suggests that Ukrainian business practices (like other parts of Ukrainian society) have not (yet?) embraced the fight against corruption, one of the major demands of the Euromaidan movement. In countries with endemic corruption – and Ukraine is one of them – the mitigation of corruption can only begin with the self-reflection of all involved actors, from school students to business and political elites, on their own behavior. Otherwise, the fight against corruption will remain nothing but a nice slogan.

Appendix

A.1 Tables

Table A.1:
Probit models of the propensity to be in the east vs. each other region - main survey

	east vs. north			east vs. south			east vs. w.centr			east vs. west		
variable	coef.	s.e.	p-value	coef.	s.e.	p-value	coef.	s.e.	p-value	coef.	s.e.	p-value
number of employees	-	-	-	0.000	0.000	0.230	0.001	0.000	0.007	0.001	0.000	0.004
20-50 employees	-0.968	0.631	0.125	-	-	-	-	-	-	-	-	-
51-100 employees	-1.029	0.619	0.096	-	-	-	-	-	-	-	-	-
101-250 employees	-1.224	0.637	0.055	-	-	-	-	-	-	-	-	-
251-500 employees	-1.418	0.617	0.021	-	-	-	-	-	-	-	-	-
501-1000 employees	-1.761	0.814	0.030	-	-	-	-	-	-	-	-	-
foreign ownership	1.643	0.972	0.091	-	-	-	-	-	-	2.640	0.911	0.004
sector: mining	-	-	-	-	-	-	0.447	0.319	0.161	-	-	-
sector: agriculture	1.004	0.430	0.020	-	-	-	-	-	-	-	-	-
sector: manufacturing	0.411	0.253	0.104	0.587	0.264	0.026	-	-	-	-	-	-
sector: wholesale	0.839	0.344	0.015	0.705	0.377	0.061	-	-	-	-	-	-
sector: transport	0.747	0.376	0.047	-	-	-	-	-	-	-	-	-
share of fulltime employees	-	-	-	-	-	-	0.456	0.424	0.282	0.938	0.486	0.054
share of females	-0.460	0.391	0.240	-0.549	0.431	0.203	-	-	-	-0.954	0.460	0.038
share of employees with bachelor degree	-	-	-	0.894	0.599	0.135	-	-	-	-	-	-
share of employees with master degree	1.792	0.472	0.000	1.912	0.602	0.001	0.948	0.388	0.015	1.978	0.517	0.000
share of employees in the administration	-	-	-	-	-	-	-	-	-	-7.025	2.236	0.002
share of workers	-	-	-	1.389	1.027	0.176	3.283	1.288	0.011	-	-	-
share of middle management	-	-	-	1.668	1.310	0.203	2.763	1.449	0.057	-	-	-
share hr	-	-	-	2.614	1.555	0.093	-	-	-	-	-	-
share of employees in sales	3.309	1.366	0.015	1.761	1.475	0.233	2.083	1.132	0.066	-	-	-
share of employees in financial services	-	-	-	-	-	-	-	-	-	9.056	3.568	0.011
share of employees in R&D	6.084	2.988	0.042	30.329	7.718	0.000	-	-	-	17.393	5.105	0.001
share of employees in production	3.026	0.828	0.000	2.260	0.983	0.021	1.002	0.591	0.090	-	-	-
share of employees in security services	12.476	2.734	0.000	-	-	-	-	-	-	4.735	2.871	0.099
exporter	1.458	0.433	0.001	-	-	-	-	-	-	0.602	0.393	0.126
share of exports of total sales	-0.025	0.011	0.020	-	-	-	-	-	-	-0.031	0.010	0.003
with cust mis	1.509	0.510	0.003	-	-	-	-	-	-	2.139	0.682	0.002
gross revenue: up to 5 mio hryvnias	-0.689	0.296	0.020	-	-	-	-	-	-	-	-	-
gross revenue: 5 to 20 mio hryvnias	-0.635	0.332	0.055	-	-	-	-	-	-	-	-	-
gross revenue: 20 to 50 mio hryvnias	-0.743	0.453	0.101	-	-	-	-	-	-	-	-	-
gross revenue missing	-	-	-	1.104	0.534	0.039	-	-	-	1.320	0.476	0.005
has debts	-	-	-	-	-	-	0.745	0.321	0.020	-1.399	0.385	0.000
ratio debts to total assets	-	-	-	-	-	-	0.024	0.008	0.002	0.030	0.010	0.002
ratio debts to total assets missing	-0.958	0.242	0.000	-	-	-	0.017	0.234	0.941	-0.507	0.322	0.115
training activities	-	-	-	-0.656	0.246	0.008	0.439	0.190	0.021	-0.663	0.237	0.005
new products	-	-	-	0.325	0.260	0.212	0.292	0.193	0.130	-0.972	0.225	0.000
acquired patents	1.144	0.593	0.054	-	-	-	-	-	-	1.549	0.858	0.071
registered patents	0.581	0.469	0.216	-	-	-	-	-	-	0.773	0.391	0.048
development over last 3 years	-0.299	0.112	0.008	-0.297	0.126	0.018	0.336	0.111	0.003	-0.547	0.135	0.000
in regional center (large city)	-0.381	0.236	0.106	-0.640	0.257	0.013	-	-	-	-	-	-
constant	-0.940	0.965	0.330	-2.473	1.262	0.050	3.569	1.258	0.005	1.265	0.668	0.058
Pseudo R2		0.275			0.280			0.132			0.405	
N		250			200			250			250	

Table A.2:
Probit models of the propensity to be in the east vs. each other region - BEEPS survey

	east vs. Kyiv			east vs. north			east vs. south			east vs. west		
variable	coef.	s.e.	p-value	coef.	s.e.	p-value	coef.	s.e.	p-value	coef.	s.e.	p-value
city > 1 mio	0.802	0.193	0.000	-	-	-	0.041	0.194	0.833	-1.051	0.221	0.000
city 250k to 1 mio	2.878	0.462	0.000	-0.882	0.152	0.000	-0.105	0.184	0.566	-0.697	0.232	0.003
sector: textile	0.002	0.283	0.995	0.089	0.236	0.706	-0.212	0.237	0.370	0.131	0.252	0.602
sector: chemicals	1.078	0.715	0.132	0.309	0.669	0.644	0.348	0.590	0.555	0.616	0.744	0.407
sector: metal processing	-0.155	0.523	0.766	-0.413	0.419	0.324	0.055	0.451	0.903	0.903	0.533	0.090
sector: machinery	0.088	0.288	0.761	0.064	0.245	0.795	-0.334	0.244	0.172	-0.001	0.268	0.998
sector: construction	0.761	0.500	0.128	0.463	0.465	0.319	0.422	0.445	0.343	0.852	0.487	0.080
sector: services	0.135	0.415	0.744	0.485	0.350	0.166	0.253	0.343	0.461	0.597	0.360	0.097
sector: wholesale	0.323	0.435	0.458	-0.331	0.424	0.435	0.234	0.420	0.577	0.638	0.492	0.195
sector: retail	0.075	0.344	0.828	0.273	0.304	0.370	0.161	0.305	0.598	0.618	0.326	0.058
company publicly listed	-0.592	0.321	0.065	-0.216	0.258	0.402	-0.148	0.249	0.551	-0.224	0.302	0.458
company with limited liability	-0.149	0.188	0.428	0.351	0.172	0.041	0.254	0.168	0.129	0.038	0.176	0.831
number of full time employed	0.000	0.001	0.738	-0.001	0.001	0.321	0.000	0.001	0.858	-0.001	0.001	0.390
number of full time employed squared	0.000	0.000	0.765	0.000	0.000	0.326	0.000	0.000	0.650	0.000	0.000	0.769
gross revenue	0.000	0.000	0.462	0.000	0.000	0.227	0.000	0.000	0.655	0.000	0.000	0.338
gross revenue squared	0.000	0.000	0.818	0.000	0.000	0.101	0.000	0.000	0.569	0.000	0.000	0.084
gross revenue missing	0.563	0.202	0.005	0.195	0.172	0.259	-0.119	0.153	0.439	0.766	0.204	0.000
share of employees in production	6.248	5.853	0.286	3.079	3.986	0.440	4.678	4.001	0.242	-1.080	5.479	0.844
share of employees in production squared	-4.424	4.109	0.282	-2.258	2.809	0.421	-3.312	2.879	0.250	0.259	3.771	0.945
share of employees in production missing	2.165	2.070	0.295	0.671	1.435	0.640	1.264	1.404	0.368	-1.394	1.997	0.485
share with university degree	-0.006	0.011	0.603	0.013	0.011	0.239	-0.013	0.010	0.167	0.021	0.010	0.043
share with university degree squared	0.000	0.000	0.978	0.000	0.000	0.606	0.000	0.000	0.253	0.000	0.000	0.047
share with university degree missing	0.885	0.434	0.041	0.635	0.285	0.026	0.644	0.321	0.045	1.074	0.333	0.001
introduced new products	-0.065	0.191	0.733	0.158	0.160	0.322	0.229	0.155	0.140	0.079	0.171	0.645
discontinued product line in last 3 yrs	0.293	0.207	0.157	-0.024	0.184	0.895	-0.022	0.178	0.901	0.193	0.202	0.339
outsourced parts of production	-0.260	0.264	0.324	-0.577	0.259	0.026	0.240	0.289	0.407	-0.526	0.297	0.076
constant	-2.678	2.069	0.196	-1.053	1.413	0.456	-1.476	1.399	0.292	0.926	1.989	0.642
Pseudo R2		0.323			0.159			0.066			0.192	
N		327			345			331			325	

Table A.3

How often do companies like yours make additional payments/gifts?

	mean	raw differences to east				diff. after matching			
	east	Kyiv	north	south	west	Kyiv	north	south	west
...in general (786 obs.)	3.148	-0.304	-0.660	-0.859	-1.209	-0.313	-0.920	-0.902	-1.02
(p-values)		(0.084)	(0.000)	(0.000)	(0.000)	(0.232)	(0.000)	(0.000)	(0.013)
obs. on support (off support)						265 (44)	317 (14)	298 (9)	292 (12)
...to deal with taxes (772 obs.)	2.844	-0.521	-0.454	-0.708	-1.184	-0.341	-0.556	-0.752	-0.964
(p-values)		(0.002)	(0.007)	(0.000)	(0.000)	(0.159)	(0.025)	(0.000)	(0.000)
obs. on support (off support)						264 (41)	310 (9)	289 (6)	286 (8)
...to deal with customs/imports (693 obs.)	2.233	-0.131	-0.325	-0.460	-0.825	-0.058	-0.541	-0.766	-0.636
(p-values)		(0.478)	(0.057)	(0.006)	(0.000)	(0.877)	(0.022)	(0.010)	(0.112)
obs. on support (off support)						201 (23)	283 (3)	244 (17)	253 (22)
...to deal with with courts (696 obs.)	2.376	-0.338	-0.472	-0.526	-0.950	-0.289	-0.712	-0.815	-0.732
(p-values)		(0.069)	(0.005)	(0.002)	(0.000)	(0.329)	(0.000)	(0.000)	(0.020)
support (off support)						234 (32)	286 (3)	261 (5)	254 (20)

Note: P-values are provided in brackets and are based on 999 bootstrap draws. Outcomes range from 1 (never) to 6 (always).

Table A.4

Further questions from the BEEPS

	mean	raw differences to east				diff. after matching			
	east	Kyiv	north	south	west	Kyiv	north	south	west
obstacle: corruption (786 obs.)	2.311	0.551	0.150	0.121	-0.172	0.052	0.406	0.289	-0.281
(p-values)		(0.001)	(0.358)	(0.451)	(0.275)	(0.893)	(0.176)	(0.229)	(0.280)
support (off support)						263 (32)	306 (7)	282 (8)	287 (6)
obstacle: informal competitors (786 obs.)	2.106	-0.190	-0.370	-0.183	-0.837	-0.006	-0.151	-0.008	-0.888
(p-values)		(0.293)	(0.036)	(0.307)	(0.000)	(0.983)	(0.653)	(0.980)	(0.000)
obs. on support (off support)						263 (34)	299 (17)	295 (2)	296 (6)
courts are fair/uncorrupted (761 obs.)	1.944	-0.164	-0.304	0.038	-0.186	0.066	-0.226	-0.013	-0.243
(p-values)		(0.082)	(0.000)	(0.706)	(0.035)	(0.784)	(0.221)	(0.936)	(0.107)
obs. on support (off support)						253 (43)	298 (16)	300 (3)	263 (11)

Note: P-values are provided in brackets and are based on 999 bootstrap draws. The first and second outcomes range from 1 (no obstacle) to 5 (very severe obstacle). The last outcome ranges from 1 (strongly disagree) to 4 (strongly agree).

A.2 Formal discussion of the identifying assumptions outlined in Section 3

As in Section 3, let $D \in \{1,2,...,R\}$ denote a discrete variable indicating in which of the 1 to *R* different historical regions a firm is situated, Y the observed outcome, $Y^1, Y^2, ..., Y^R$ the potential outcomes that would be realized if a firm was (re-)located to regions *D*=1,2,...,*R*, and *X* the vector of observed firm characteristics. The conditional independence assumption (CIA) for multiple treatments of Imbens (2000) and Lechner (2001) is formally stated as follows:

Assumption 1 (conditional independence)

$Y^d \coprod D \mid X = x, D = 1, d$ for all *x* in the support of *X* and $d \in \{2,..., R\}$

"$\coprod$" denotes statistical independence and "$D = 1, d$" is a shorthand notation for "*D*=1 or *D*=*d*".

As second identifying assumption, we impose a common support restriction within each subgroup with *D*=1 or *D*=*d*, stating that no value *x* in the support of *X* perfectly predicts that firms are located in the east:

Assumption 2 (common support)

$\Pr(D = 1 \mid X = x, D = 1, d) < 1$ for all *x* in the support of *X* and $d \in \{2,..., R\}$

Therefore, the conditional probability (or propensity score) to be located in the east must be smaller than 1 for any value of the firm characteristics. As in Sections 3 and 4, we will use $p^{1d}(x) = \Pr(D = 1 \mid X = x, D = 1, d)$ as shorthand notation for the propensity score.

Under Assumptions 1 and 2, the average regional effect on firms in the east is identified by

$$\theta^{1d} = E[Y \mid D=1] - E_X\left[E[Y \mid D=d, X] \mid D=1\right]$$
$$= E[Y \mid D=1] - E_{p^{1d}(X)}\left[E\left[Y \mid D=d, p^{1d}(X)\right] \mid D=1\right], \quad d \in \{2,...,R\}.$$

The first equality follows from (i) $E[Y \mid D=1] = E\left[Y^1 \mid D=1\right]$, (ii) Assumption 1, implying that $E[Y \mid D=d, X] = E\left[Y^d \mid D=d, X\right] = E\left[Y^d \mid D=1, X\right]$, (iii) Assumption 2, implying that we can take the expectation of $E[Y \mid D=d, X]$ over *X* given *D*=1, and (iv) the law of iterated expectations, implying that $E\left[Y^d \mid D=1\right] = E_X\left[E\left[Y^d \mid D=1, X\right] \mid D=1\right]$. The second equality follows from Rosenbaum and Rubin (1983) who prove that controlling for $p^{1d}(X)$ is (asymptotically) as good as controlling for *X* directly, because $Y^d \coprod X \mid p^{1d}(X)$ given our assumptions.

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