



NATIONAL RESEARCH UNIVERSITY
HIGHER SCHOOL OF ECONOMICS

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**DETERMINANTS OF
CORRUPTION PERCEPTIONS:
TRANSITIONAL VS. DEVELOPED
ECONOMIES**

BASIC RESEARCH PROGRAM

WORKING PAPERS

SERIES: ECONOMICS
WP BRP 89/EC/2015

This Working Paper is an output of a research project implemented at the National Research University Higher School of Economics (HSE). Any opinions or claims contained in this Working Paper do not necessarily reflect the views of HSE

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Determinants of Corruption Perceptions: Transitional vs. Developed Economies³

In this paper we explore relationships between corruption perceptions and such characteristics as the size of shadow economy, GDP per capita, well-being, the Happy Planet Index (HPI), and quality of institutions. Special attention is paid to the comparison of transitional economies with countries that joined the European Union in 2004 and 2007, and developed countries. It is shown that irrespective of whether the economy is developed or transitional, negative dependence of corruption perceptions on shadow economy switches to positive if the size of the shadow economy increases over 15% of the official GDP. After the shadow economy passes 45%, the Transparency International Corruption Perceptions Index ceases to respond to growth of the shadow economy. Our estimates confirm that transition in countries is accompanied by growth of GDP per capita and a decrease in the level of corruption perceptions. For these reasons, transitional countries and countries where transition is over belongs to different clusters according to these indicators. This is not true for well-being and the HPI. It is not surprising that a regression analysis shows that “control of corruption” and “regulatory quality” are significant for reducing corruption perceptions both in transitional and other economies. It is interesting that “government effectiveness” and “voice and accountability” are significant only for transitional economies and insignificant in others. “Rule of law” and “political stability” are insignificant both in transitional and in developed countries.

JEL Classification: D73, O17, H11, P37

Keywords: corruption, quality of institutions, the CPI score, shadow economy, transitional economies, well-being

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³ This study was partially supported by grant No. 2014-06 from the National Research University Higher School of Economics in Nizhny Novgorod 2014 Fund Program.

Introduction

The word “*corruption*” has a very long history. There is some evidence that it was introduced by Aristotle as something wrong or broken. No doubt the phenomenon that we understand today as *corruption* existed long before Aristotle. It follows from the nice definition of necessary conditions for its origin formulated by Dong, Dulleck, and Torgler (2012) referring on Jain (2001) and Rose-Ackerman (1978): “discretionary power related to regulations, economic rents linked to power, and sufficiently low punishment”.

Despite of the long history of the phenomenon, corruption is still attractive for a lot of economists as a subject of study. In light of the continuous discussion on the question about if it is a grease or sand in economic development (Aidt, 2009), research of corruption relationships with governance and market forces in developing economies is especially current (Olken & Pande, 2012).

If we are a bit anxious about further mankind development, we have to pay attention on personal expectations, since they have great impact on behaviour. If these expectations are widely spread in society, they can have a great influence on economic development. This is one of the reasons why we devote our study to corruption perceptions.

The other reason for using perceptions but not actual corruption incidents in empirical research is that corrupted agents usually hide their participation in corrupt practices (Banerjee, Hanna, & Mullainathan, 2012). The last fact could be the cause of sample attrition and estimates bias if we use data from corruption surveys with questions about actual episodes in respondents’ lives.

It is well known that perceptions deviate from corruption itself (Treisman, 2007; Olken & Pande, 2012). The measurement of corruption via perceptions of corruption by economical agents or population usually overestimates the level and probability of grafts (Olken & Pande, 2012). At the same time Olken and Pande (2012) do not reject the fact that corruption perceptions have impact on rent-seeking behaviour. This was confirmed by high correlations of indexes of perceptions with experimental data (see, for example, Treisman, 2007). Treisman (2007), Banerjee et al. (2012), and Olken and Pande (2012) underline that surveys of corruption perceptions have the advantage of good coverage in cross-sections and time dimensions. For these reasons, indices based on this kind of data — the Transparency International (TI) Corruption Perceptions Index (CPI) is among them — are popular among economists, mass media and politicians.

In the current research we make empirical estimates of correlation of corruption perceptions on a country level with the gross product per capita and subjective well-being of population of the country, the size of the shadow economy and some institutional characteristics of the country. Special attention is paid to transitional economies in comparison with countries that joined the European Union (EU) in 2004 and 2007, and developed countries.

We realize that the above-listed pairwise relationships can be examined in detail in separate research projects. The merit of the present research is the use of multivariate approach to the problem.

In this paper we start from a review of literature (Section 1). In Section 1.1 we consider theoretical and empirical works where authors come to the conclusion that corruption can complement as well as substitute a shadow economy. The case of substitution is usual for developed countries if disproportion of control of one of the listed phenomena is observed. In Section 1.2 we review literature showing that in the long run, countries with a high level of GDP per capita and high well-being have a lower level of corruption. Some problems can arise if we use data on happiness in empirical estimates, they are discussed in Section 1.3. The main result of the discussion is that we have to control for the individual level and country level time invariant unobservables to provide consistent estimates of parameters in models of happiness and corrupt relationship.

Section 2 briefly describes data that are used in the empirical part of our paper. We use open access data from the following sources: Transparency International, Buehn and Schneider (2012b), Schneider (2013), the Happy Planet Index project, Worldwide Governance Indicators project, the World Bank.

Nonparametric estimates (presented in Section 3) are clear illustrations of transitional economies development and an easy way to make simple quantitative estimates. Section 3.1 estimates the boundaries of different relationships of shadow economy with corruption perceptions. Section 3.2 illustrates the nonlinear dependence of GDP per capita and well-being on corruption perceptions. It illustrates also that transitional countries and countries where the transition is over form separate clusters on GDP per capita and corruption perceptions, but not on the subjective well-being of residents of the countries. The last is true if we consider the Happy Planet Index (Section 3.3).

In Section 3.4 we proceed with estimates of multinomial regression models. We use models with panel data. Formal tests confirm the presence of country fixed effects. Regression analysis confirms preliminary results received nonparametrically and expands them. Particularly we confirm the negative nonlinear dependence of corruption perceptions on GDP per capita. Corruption perceptions are higher in transitional economies and lower in countries where the transition is over, in comparison with the other countries. Education expenditure reduces corruption perceptions. If we are interested in relationships between corruption perception and the size of a shadow economy, we have to split the sample not into the developed and developing countries (as it was written in the literature before this research), but according to the size of the shadow economy. In countries with a high level of shadow economy (percentage of official GDP) and countries with a lower size of shadow economy, we observe different relationships of corruption perceptions and the size of a shadow economy (they are complements in the first case but substitute each other in the last one). Governance indicators confirm almost the same tendencies in reducing corruption perceptions in transitional and in the other countries. Government effectiveness and voice and accountability are significant only in transitional economies.

1 Literature Review

For more convenience, we separate the literature review by logical items, since the usual pairwise relationships are considered in the papers.

The starting point in the review will be the interaction between corruption and a shadow economy because from the first sign their relationship seems to be clear and frequently have complementary nature. Nevertheless, they both have to be hidden by economic agents due to the illegality of such activities. The last fact could be the main reason of the controversial results in the literature.

1.1 Corruption and Shadow Economy

There are a fair number of theoretical models devoted to the relationship of corruption and shadow economy, but some of them contradict each other since they are designed on different assumptions. For this reason, empirical inference of the models still remains current.

What are the main well known results? Many authors suggest theoretical models exploring the idea of the complementary relationship of corruption and shadow economy. Some papers present empirical evidence for this. For example, Jay Pil and Thum (2005) have developed several theoretical models with unofficial and official sectors of the economy as complements. Particularly they showed that high control of entrepreneurs allows corrupt officials to charge higher bribery payments and that could push entrepreneurs into the shadow. This can be an explanation of positive correlation of the level of corruption with the size of shadow economy in a country.

Echazu and Bose (2008) explain positive impact of shadow economy on corruption in a theoretical model, supposing that corrupt officials control both the formal and informal sectors.

The results mentioned above are not indisputable. For example, Dreher, Kotsogiannis, and McCorriston (2009) developed a theoretical model where the shadow economy and corruption are substitutes. They showed theoretically that the size of the shadow market decreases with the quality of institutes, but this effect is ambiguous. It “depends on the relative effectiveness of institutional quality in the shadow and corruption markets” (Dreher et al., 2009). In other words, it depends on what institutes prefer to combat? If they are more effective in a battle against the shadow economy, institutional quality can enhance corruption. The last effect contradicts the belief of many economists that the growth of corruption is a result of weak institutes. Dreher et al. (2009) have made empirical estimates on a cross-section of countries. The data were averaged over the period of 2000–2002. The key variables were the size of the shadow economy (in % of official GDP) taken from (Schneider, 2005b, 2005a) and the (no)corruption index provided by the International Country Risk Guide (ICRG)⁴. Institutional quality was proxied by government effectiveness⁵. The main

⁴ Dreher et al. (2009) checked robustness of the results to the choice of the proxy for corruption by the use of the TI CPI score instead the (no)corruption index.

⁵ Robustness of the results to the institutional quality indicator were checked by the use of rule of law as proxy for the quality of institutes.

results are the following. Firstly, substitution of the shadow economy by corruption was confirmed empirically by 2SLS estimates of (no)corruption index equation and by 3SLS estimates of the system with the shadow economy equation.⁶ Secondly, they received higher direct than indirect⁷ effect of institutional quality on corruption. In all the cases institutional quality reduces corruption.

Dreher and Schneider (2010) showed that in low-income countries corruption grows with the shadow economy. This result was received empirically by 2SLS on a cross-section of 98 countries from 2000–2002 with the use of index of corruption based on a structural model (Dreher, Kotsogiannis, & McCorriston, 2007). Dreher and Schneider (2010) said that perceptions-based indices were not as robust as the structural model indexes, but exceptions for high-income countries where OLS estimates with perception-based indexes indicate a negative relationship of corruption with the size of shadow economy.

Buehn and Schneider (2012a) used the structural equation model to receive empirical evidence for a complementary relationship of corruption and the shadow economy (Schneider, 2006) on a sample of 51 countries (18 developed and 33 developing) from 2000–2005.

Goel and Saunoris (2014) added a spatial weight matrix in explanatory variables and an assumption of spatial autoregressive process in error term in Dreher and Schneider's (2010) empirical model. Their estimates on cross-sections and panel of 67 countries over 2000–2006 confirmed that corruption complemented the shadow economy in the shadow determinants equations, but the result was not robust when they tried to explain corruption by the shadow economy.

1.2 GDP per Capita and Well-Being vs. Corruption

As well as in the previous section, we can observe a contradiction between different authors concerning the relation between GDP per capita and its growth with corruption level in a country.

Among the empirical results based on the long time series data it is worth mentioning Brown and Shackman (2007). These authors made a cointegration analysis of a time series of 100 countries for a 20-year period. They considered the corruption level in a relationship with a large number of political, legal and economic indicators. Their optimistic conclusion is that the growth of indicators is causal to corruption level decrease. The converse is not true: variations in corruption level did not influence the considered indicators. The most interesting for us is their conclusion that GDP per capita growth causes the corruption level growth in the short-run and decreases it in the long run.

Other authors tried to find causality effects too. For example, Kalyuzhnova, Kutan, and Yigit (2009) showed that a high level of corruption has a negative impact both on GDP per capita and economic growth, but economic development, to the contrary, reduces corruption levels.

⁶ Robustness of the results to the endogeneity of the quality of institutes was checked by addition of institutional quality equation in the system.

⁷ via the size of the shadow market

Aidt (2009) has noticed divergence in the results of different authors. On the basis of a literature review, he put forward two hypotheses. The first of them was “that corruption can be efficient — or that it greases the wheels of commerce”. The second one was “that it creates rather than corrects inefficiencies”. Aidt (2009) used data on annual growth rates of real GDP per capita from 1970–2000 in a sample of 60–80 countries without the former socialist countries. Aidt’s (2009) empirical estimates confirm that the level of corruption practically does not correlate with the growth rate of GDP per capita, “. . .it is a likely source of unsustainable development.”

We have mentioned already that some authors recognize the potentially negative impact of corruption on economic growth. Ugur (2013) executed the a meta-analysis to check this statement. After an analysis of 327 empirical estimates in 29 studies, he claimed that published results can be biased because the selection of the publications by reviewers and editors. With such a remark Ugur (2013) asserts that the negative influence of corruption on economic growth is tracked in the long-run period in countries with a low-income population.

One of the recent studies concerning the influence of GDP per capita on the level of corruption was made by Goel and Ram (2013). Their empirical estimates on a large cross-country data set confirm that GDP per capita mitigates corruption. The other interesting result received by Goel and Ram (2013) is the conclusion about the higher level of corruption in countries with transitional economies.

Some authors, such as Welsch (2008), argued that GDP per capita is the unsuccessful indicator of well-being, and that it is better to use respondents’ subjective self-reports to a construct consistent indicator of population well-being. He argued that the influence of corruption on the well-being through GDP is indirect influence, and influence through non-material factors is direct. Research carried out by him has shown that the value of direct influence (in a monetary equivalent) is much above an indirect one.

We can doubt the consistency of estimates caused by the influence of unobservable individual effects when respondents’ self-reports are used, nevertheless in would be a good robustness check if we replaced GDP per capita in our models with the subjective well-being indicator.

1.3 Happy Planet Index and Corruption

Happiness is an indicator of a favourable climate in a country or region. It could be designed on the basis of a population survey. About the popularity of the approach based on respondent reports, some researchers suggest using it even in evaluations of perspectives of life in some cities (Liu, 2013). We will view happiness through the glasses of corruption.

It should be noticed that the process of parameters aggregation could be the reason of estimates bias in some research. For example, if the government sets maximization or even stabilization of a level of happiness in the country as the objective of the policy, individual reports of respondents can clash with the aggregated parameter. Divergence may be caused by an attempt to give respondents strategic answers, and by manipulations with an index at aggregation (Frey & Gallus, 2013).

As far as we can judge by the available literature, there are no precise, indisputable, empirical proofs that show a relationship between corruption and happiness. For example Fereidouni, Najdi, and Amiri (2013) have made empirical estimates for the countries of Central, East, and Northern Africa. They used random effects models on the panel of 14 countries. Corruption level control variables had a positive but insignificant effect on happiness.

The problem with evaluating the relationship between corruption and happiness is connected not only with the distortions caused by preparation of surveys and data aggregation. Some problems may be caused by the fact that different respondents have different latent scales answering a question about the level of their life satisfaction (León, Araña, & de León, 2013). Therefore Lin, Lahiri, and Hsu (2014) made an analysis of homogeneous groups of countries. They split a cross section of 116 countries in 2006 into 6 groups on the basis of the following characteristics: developed and developing, with high- and low-income inequality, former socialist and countries without socialist period. As the result, Lin et al. (2014) showed that the control for corruption (as an index of institutional quality) is significant in models that explain happiness in a country by the quality of government.

2 Data

2.1 The Transparency International Corruption Perceptions Index

Nowadays there are several well-known indicators of corruption perceptions in countries/territories that are available in open access. Due to the high correlation among them (Treisman, 2007) they give similar results when we are interested in parameters of regression models (often the sign and significance level are enough).

In the current research we use the Transparency International (TI) Corruption Perceptions Index (CPI) — the CPI score (sometimes the word “score” is omitted for simplicity). It gives empirical studies the combination of precision and country coverage (Treisman, 2007), excluding from the sample countries where less than two⁸ surveys with corruption perceptions questions were performed. The CPI ranks countries and territories according to the level of corruption in the public sector as perceived by external experts and internal observers in respect to the corresponding countries and territories.⁹ The number of involved countries rapidly grew from 42 in 1995 to around 180 in recent years (Appendix A).

According to the TI’s intentions, the CPI score “is an attempt to assess the level at which corruption is perceived by businessmen as impacting commercial life.”¹⁰ A higher score corresponds to lower perceptions of corruption in a country. The lowest scores indicate countries “where business transactions are entirely dominated by kickbacks, extortion etc.”¹¹

The CPI had 10-point score before 2012, but after 2012 the scale was increased to 100 (a

⁸ Two surveys were used for Argentina and Colombia in 1995 (see Appendix A).

⁹ http://cpi.transparency.org/cpi2013/in_detail/

¹⁰ <http://www.transparency.org/files/content/tool/1995.CPI.EN.pdf>

¹¹ <http://www.transparency.org/files/content/tool/1995.CPI.EN.pdf>

country without corruption has a score of 100). In the current research we have multiplied all the scores by 10 before 2012 to avoid numerical problems in empirical estimates.

As it was already mentioned, the CPI is constructed on the basis of several surveys, the maximum number reached 7–16 in different years (see Appendix A). Usually they cover three years before the year of index — only in 1995 the 1980 survey from Business International (New York) was used. TI says that methodology was simplified in 2012 and the CPI could be used to compare changes in dynamics for each country included in the rating after 2012. Nevertheless if we look, for example, at the surveys used in 2013 (listed in Appendix B), we can see 1–2 year lags of information which are still present in the CPI. As a result some smoothing of information still takes place. This prevents us from investigating the high frequency (annual) dynamics of changes in corruption perceptions. Only the countries' fixed effects will be included in the parametric part of our empirical research.

2.2 Shadow Economy

To check our proposition about the correlation of the CPI score and shadow economy we use data on the sizes of shadow economies (in % of official GDP) calculated by Buehn and Schneider (2012b) and Schneider (2013) by the MIMIC (Multiple Indicators and Multiple Courses) and the currency demand approach.

Table 1 shows sample sizes (the number of economies) that were considered by Buehn and Schneider (2012b) and Schneider (2013) and the common sample size that was used to plot the points in the graph on the left in Figure 1.

Table 1. Number of countries

Year	Buehn and Schneider (2012b)	Schneider (2013)	Figure 1
1999	160		
2000	161		
2001	161		
2002	161		
2003	161	36	36
2004	161	36	36
2005	161	36	36
2006	158	36	36
2007	145	36	36
2008		36	
2009		36	
2010		36	
2011		36	
2012		36	
2013		36	

The graph on the left in Figure 1 illustrates the high correlation of estimates made by Buehn and Schneider (2012b) and Schneider (2013) with small differences for some countries. For countries where the size of the shadow economy is less than 30% of the official GDP the methodology used by Buehn and Schneider (2012b) gives averaged estimates over the

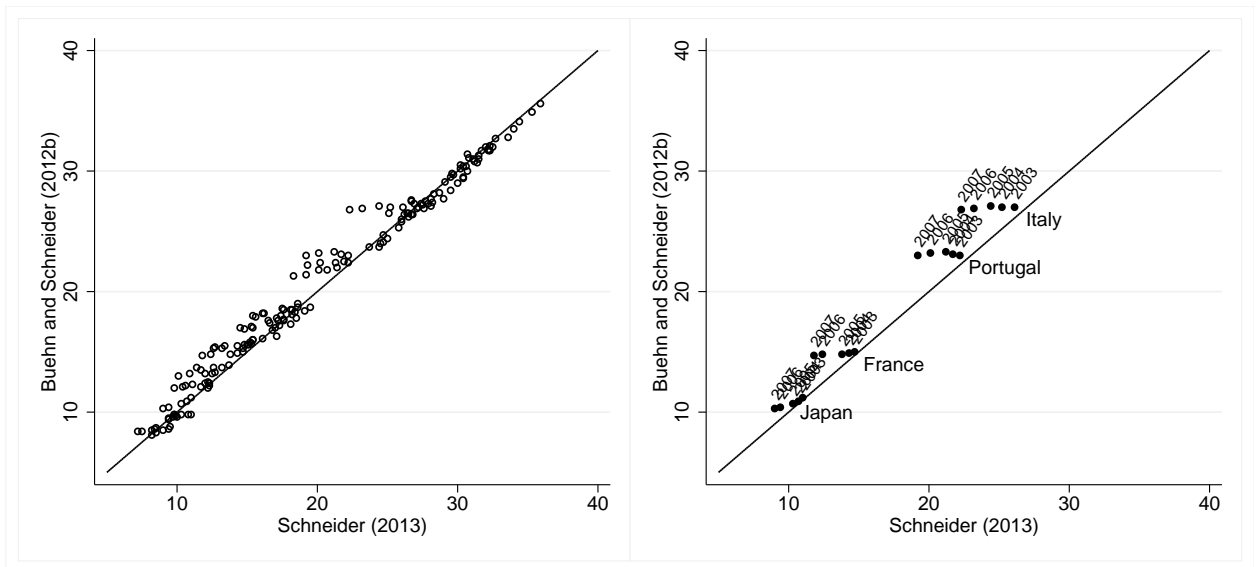


Figure 1. Estimates of the sizes of shadow economies (in % of official GDP). The results with year markers for only four countries are shown in the graph on the right to clarify the differences of the estimates in the considered two sources of data.

considered years. The graph on the right in comparison with the left evidently shows that Schneider’s (2013) methodology is better to use if we are interested in the dynamics of the sizes of shadow economies. Schneider (2013) noticed that the size of a shadow economy decreases in the most countries and Figure 1 clearly demonstrates this.

2.3 The Happy Planet Index and Well-being

In the current research we also use the Happy Planet Index (HPI). It shows “the extent to which countries deliver long, happy, sustainable lives for the people that live in them. The Index uses global data on life expectancy, experienced well-being and Ecological Footprint to calculate this”.¹²

“Well-being” is constructed as the mean value of respondent answers the questions about life satisfaction in 151 countries. A scale with 11 steps (0–10) was given to each respondent to choose the answer.

2.4 The Worldwide Governance Indicators

The Worldwide Governance Indicators (WGI) project¹³ is a source of data that we use to control for institutional quality in models with corruption perceptions as the dependent variable.

The meanings of the WGI indicators are shown in Appendix C.

Estimates of the indicators range from approximately –2.5 (weak) to 2.5 (strong).

¹² <http://www.happyplanetindex.org/about/>

¹³ <http://info.worldbank.org/governance/wgi/index.aspx#doc>

3 Empirical Results

3.1 The CPI Score and Shadow Economy

Our first idea was to check the correlation of the CPI score with the level of the shadow economy. Goods and services of a shadow economy sooner or later enter the open market and collide with bureaucratic obstacles and moral norms of consumers behaviour. Thinking in such way, it is rational to expect a positive correlation in the size of a shadow economy with the level of corruption in a country. According to the design, the CPI score should negatively correlate with the size of the shadow economy of a country. It will be empirically shown below that actually this reasoning is not always and everywhere true. The last is consistent with the theoretical model developed by Dreher et al. (2009), supposing that corruption and a shadow economy can substitute each other if efforts in struggle against these phenomena are asymmetric.

3.1.1 Nonparametric Estimates

Nonparametric estimates are very convenient to visualize the functional form of the dependence of the CPI score on the size of a shadow economy. The results are shown in Figure 2. On the left in Figure 2, estimates of shadow economies made by Buehn and Schneider (2012b) for 145–161 countries (in some years the sample was smaller than 161, see Table 1) for the period of 1997–2007 are used. On the right in Figure 2, we use estimates of the shadow economies for 36 countries (31 European countries plus Australia, Canada, Japan, New Zealand, and USA) considered by Schneider (2013) for the period of 2003–2013.

Figure 3 illustrates robustness of the results to the choice of the sample of countries. We use a common sample of countries considered both by Buehn and Schneider (2012b) and Schneider (2013) for the same period of 2003–2007. From Figure 3, we can see that, taking into account a 95% confidence interval, both sets of data show the same relationship of the CPI score with the size of the shadow economy. More so, Figure 3 explains that the upward direction of the right hand tail in the right-side graph in Figure 2 is the boundary effect of a nonparametric estimate. For this reason and taking into account confidence intervals we will discuss the relationship of the CPI score with the shadow economy in countries with a large share of shadow economy in the official GDP using only the result presented in the left-side graph of Figure 2.

Figure 2 illustrates that corruption and shadow economy can have both a complement and a substitute relationship.

First of all we can see that the CPI score decreases when the size of the shadow economy increases from about 10% to 40% of the official GDP. This means that in countries with a high share of shadow economy in their GDP, the level of perceptions of corruption in public sector is higher. This means that corruption and shadow economy are *complements* in such countries.

In countries where the size of the shadow economy is higher (more than 45% of the official GDP) the CPI score does not reflect changes in corruption perceptions with the share of

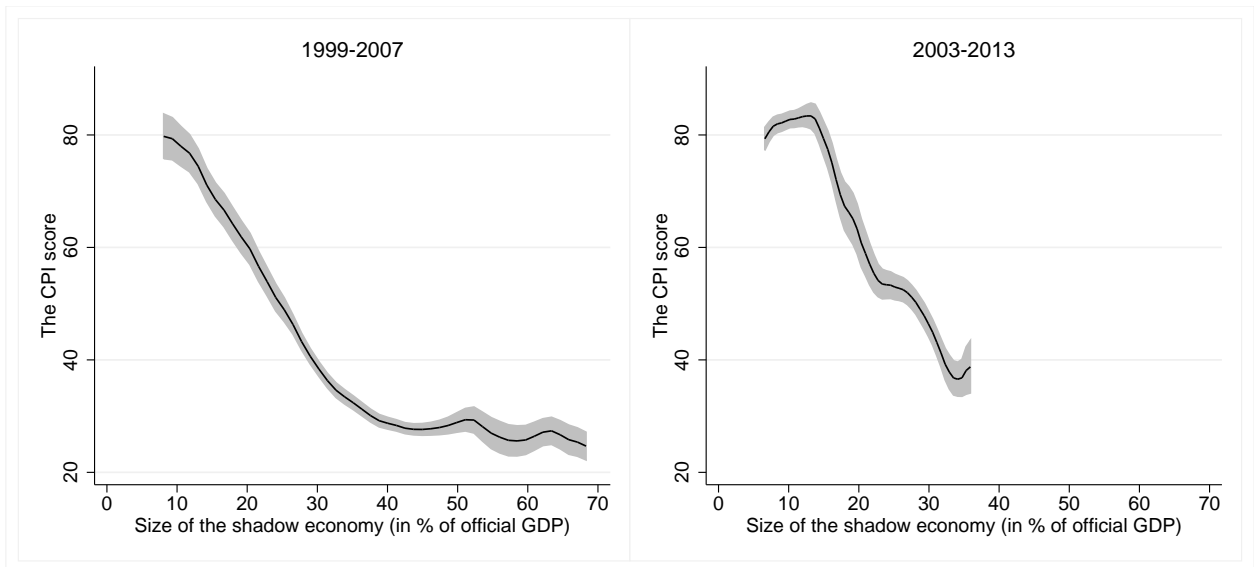


Figure 2. Nonparametric estimates of dependence of the CPI score on the size of shadow economy, 95% confidence intervals are shown in gray

shadow economy. According to the estimates made by Buehn and Schneider (2012b) the following countries had a high share of shadow economy in GDP all over the period of 1999–2007: Azerbaijan, Benin, Bolivia, Cambodia, Democratic Republic of the Congo, Gabon, Georgia, Guatemala, Haiti, Honduras, Peru, Tanzania, Thailand, Ukraine, Uruguay, and Zimbabwe. The other countries that had a share of the shadow economy greater than 45% only in some episodes of the considered period are listed in Appendix 6.

The right hand graph in Figure 2 confirms that in countries with a small size of shadow economy (less than about 15% of the official GDP) corruption could substitute the shadow economy. According to Schneider’s (2013) estimates, the following countries had a shadow economy of less than 15% of the official GDP for the period of 2003–2013: Australia, Austria, China, Japan, Luxembourg, Macao, Netherlands, New Zealand, Singapore, Switzerland, United Kingdom, United States. France has been in this list since 2004, Vietnam since 2005, and Hong Kong joined this group in 2007.

We clearly understand that it is not a causality test, nevertheless, we could not resist the temptation to change the places of the dependent and explanatory variables as it was made by Goel and Saunoris (2014) in their parametric estimates to check the robustness of the results for the explanatory variable. The results presented in Figure 2 and further in the discussion are invariant if we exchange the dependent and explanatory variables. The dependence of the shadow economy on the CPI score (reversed dependence in contrary to Figure 2) estimated nonparametrically is shown in Figure 4. It is not a surprise that we see small shadow economies in “corruption-clean ” countries (a CPI score of 85 and higher), because it is rational to expect corruption and shadow economies to be complements. But once again, we see different “tail” effects for countries that are at opposite poles in terms of corruption. The struggle against corruption in so-called clean countries could increase the size of the shadow economy a bit but it would not cause trouble, because the size is

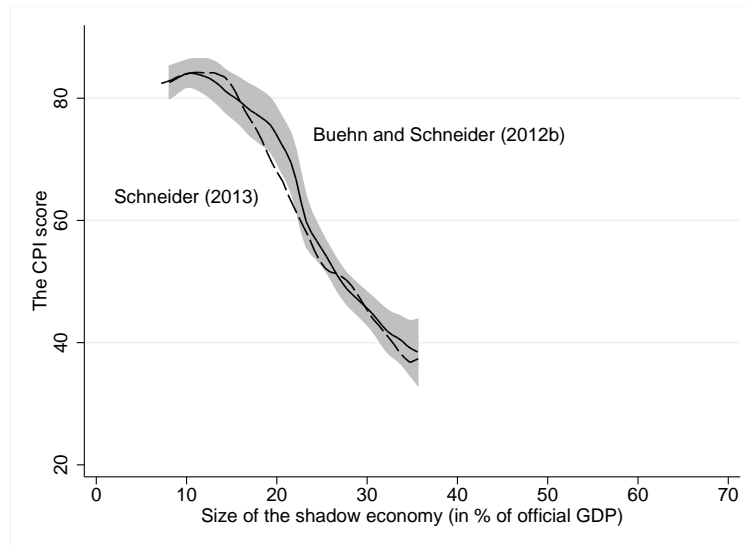


Figure 3. Nonparametric estimates of dependence of the CPI score on the size of the shadow economy on the sample of 31 European countries and Australia, Canada, Japan, New Zealand, and USA for the period of 2003–2007, 95% confidence interval is shown only for the one curve

about 15% of GDP. The left tail effect in Figure 4 confirms our previous result that in highly corrupted countries (with a low CPI score) the size of the shadow economy has high mean value and high variance.

3.1.2 Transition Economies in the “CPI score – Shadow Economy” Axes

Several clusters of countries could be discovered if we plot country characteristics in the “shadow economy” – “the CPI score” axes. The result for transitional economies is very optimistic.

As an example, Figure 5 shows general trend — a nonparametric estimate of the sizes of shadow economies¹⁴ dependence on the 2007 CPI. This is the “base line” that is shown in Figure 5 by a decreasing curve with 95% confidence interval marked with gray. To keep the clarity of the picture, only transition (by the IMF and the World Bank definitions of 2000–2010) and former transition (as of 2007) economies are shown.

In the left hand side graph of Figure 5 we can see that transition economies are characterised by a high level of corruption perceptions in the public sector (a low CPI score) with a high diversity in the size of the shadow economy. Most countries are clustered near the left hand side tail of the general trend, which is characterised by the relatively large size of the shadow economy (about 30–50% of official GDP). Only Georgia, Azerbaijan, Laos, and the small cluster of four countries (the last are small shadow economies) diverge from the common trend.

A stable opinion among economists is that the level of corruption in a country is closely connected with the quality of their institutes and the level of economic development. For example we can find a good review in Ugur (2013), from which it follows that a high level of corruption is a sign of weak institutes. If we suppose that the improvement of the quality of

¹⁴ it was used 145 shadow economies considered by Buehn and Schneider (2012b)

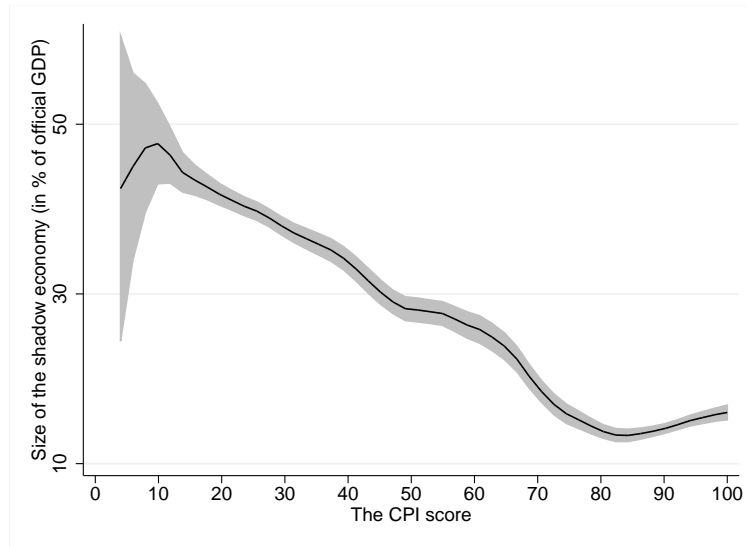


Figure 4. Nonparametric estimates of dependence of the size of shadow economy on the CPI score (1999–2007), 95% confidence interval is shown in gray

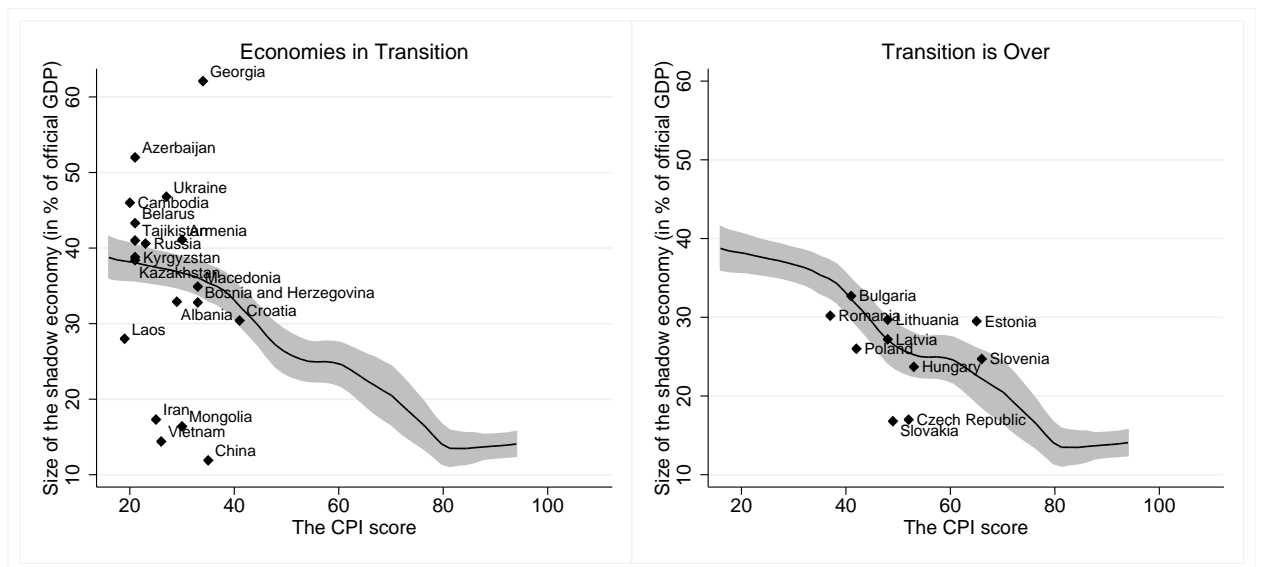


Figure 5. Countries with transition economies and countries that have completed the transition process plotted in the graphs of nonparametric estimates of dependence of the size of the shadow economy on the CPI score in 2007, 95% confidence interval for nonparametrics is gray

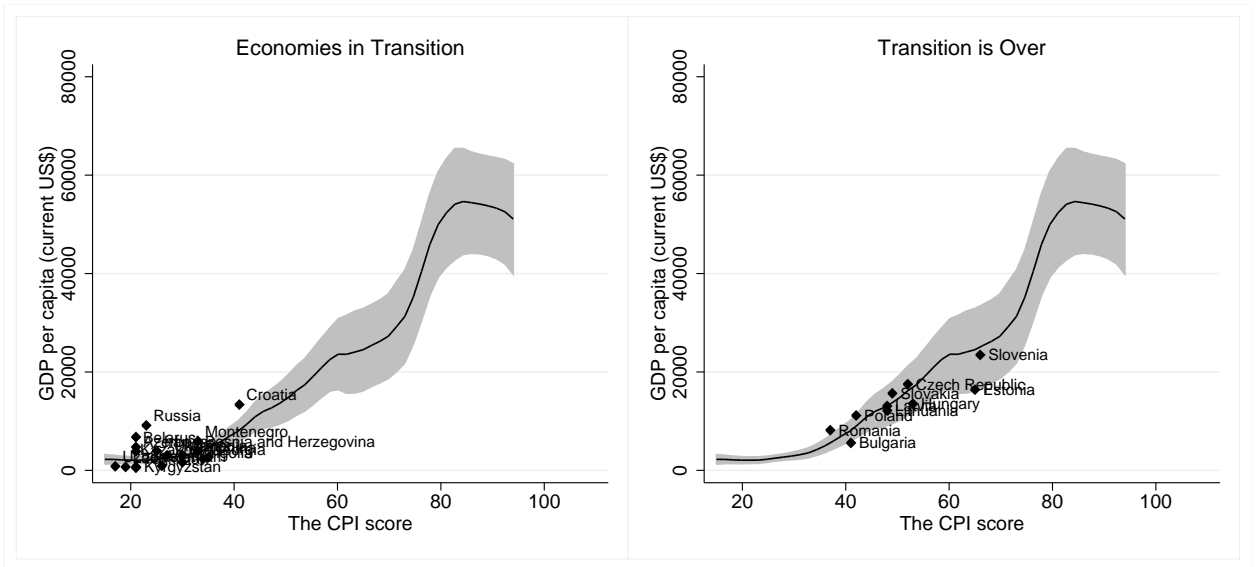


Figure 6. Countries with transition economies and countries that have completed the transition process plotted in the graphs of nonparametric estimates of dependence of GDP per capita on the CPI score in 2007, 95% confidence interval for nonparametrics is gray

institutions accompanies transition processes, then corruption perceptions should be reduced in countries where the transition is over. In the right hand graph of Figure 5, we plotted countries that joined the EU in 2004 and 2007. A comparison of the two graphs in Figure 5 is consistent with the idea that public institutions are changing for the better during transition: the CPI scores are higher in countries where transition is over.

3.2 The CPI Score vs. GDP per Capita and Well-Being

Historically, many authors use GDP per capita as an indicator of economic development. In this section we show the relation of this indicator with corruption perceptions. The results are consistent with some theoretical models and empirical estimates of other authors.

In the last part of the section we control the results by considering subjective well-being instead of GDP per capita.

Throughout the text, we continue a discussion about the situation in countries with transitional economies.

3.2.1 Nonparametric Evidence

Figure 6 shows nonparametric estimates based on CPI scores and World Bank data on GDP per capita (the last is in current U.S. dollars).¹⁵

Over the entire sample we can see on average positive correlation of GDP per capita with the CPI score (nonparametric estimates in Figure 6), indicating a negative correlation with the corruption perceptions in public sector in the cross-section of countries. This agrees with our expectations and results of the other authors (see, for example, Kalyuzhnova et al. (2009), Goel and Ram (2013), and long-run dependence considered by Brown and Shackman (2007)).

¹⁵ <http://data.worldbank.org/indicator/NY.GDP.PCAP.CD?page=1>

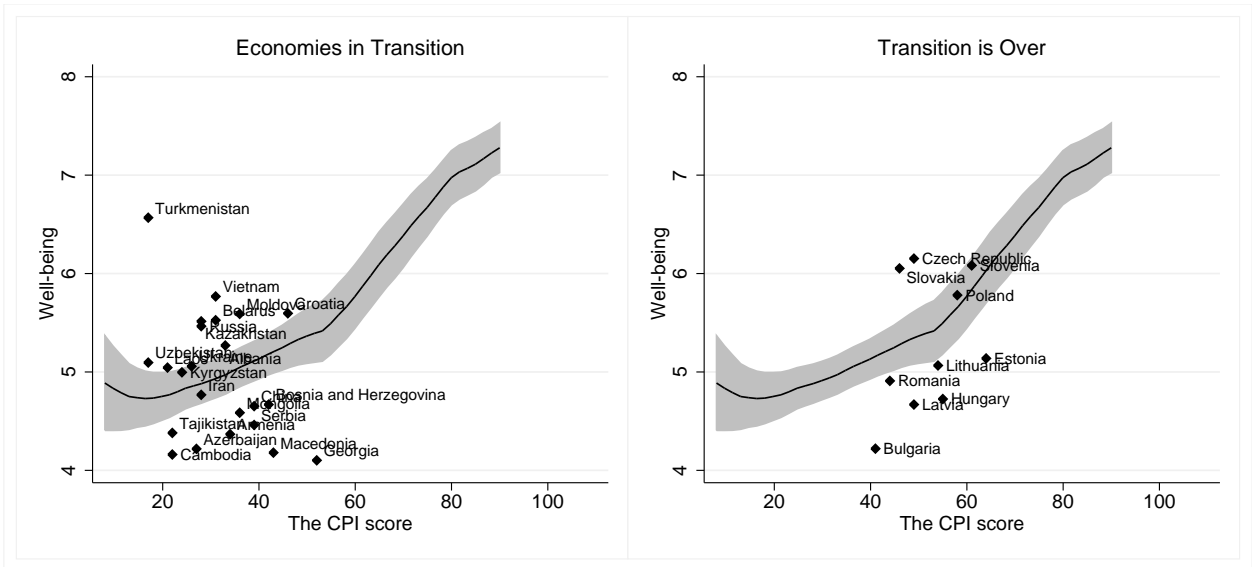


Figure 7. Countries with transition economies and countries that have completed the transition process plotted in the graph of nonparametric estimates of dependence of well-being on the CPI score in 2012, 95% confidence interval for nonparametrics is gray

In the two extreme situations — high and low corruption in countries (in the left hand side and the right hand side tails of nonparametric estimates in graphs of Figure 6) — we could not see statistically significant dependence of GDP per capita on the CPI score. This agrees with Aidt’s (2009) hypotheses about the dual role of corruption in economic development. Aidt’s second hypothesis (2009) about the “sand in the wheels” effect looks to be true for countries with CPI scores in a range of about 30–75.

Considering countries in transition and economies where transition processes are over, we can see that they are clearly separated in Figure 6. The transition process is accompanied by a decrease in corruption perceptions in the public sector and growth of GDP per capita. Before the transition is over, we do not observe dependence of GDP per capita on the CPI score. This means that for some countries, corruption could be “sand in the wheels”, but for others “it greases the wheels”.

As it was mentioned above it would be interesting to control the results by using respondents’ subjective self-reports about well-being instead of a formal indicator such as GDP per capita. In Figure 7 we use well-being instead of GDP per capita to control the results presented in Figure 6. Unfortunately only the data sets for February 2012 were available for us and they are used in Figure 7.

As it was expected, we do not see any qualitative differences in spread of well-being in transitional countries and in countries where transition is over. In the graphs presented in Figure 7 considered countries are separated only with respect to the CPI score. This can be explained by the dependence of subjective well-being on individual unobservables (country level fixed effects) that cannot be controlled in nonparametric analysis.

Table 2. The HPI statistics

Statistics	2006			2009			2012		
	All	Tran.	Over	All	Tran.	Over	All	Tran.	Over
Mean	43.18	41.32	34.18	43.38	45.70	39.79	42.24	42.46	38.03
Minimum	16.64	22.21	22.68	16.60	32.70	26.40	22.59	26.77	34.15
Maximum	68.21	61.23	44.03	76.10	66.50	44.50	64.04	60.44	42.58
Standard error of mean	0.88	2.45	2.02	1.04	1.82	1.70	0.74	1.60	1.03
Observations	178	22	10	143	22	10	151	23	10

3.3 The CPI Score and Happy Planet Index

Could corruption be like a bad drug that makes people happier? If this is true, it complicates the struggle against corruption, having transferred the main efforts of the struggle from economic to the psychological plane.

In the current section we use the Happy Planet Index (HPI)¹⁶ as a proxy for mental well-being or comfort of population in considered countries. The results are complemented by remarks about transitional economies.

3.3.1 Nonparametric Evidence

Our nonparametric estimates of dependence of the HPI on the CPI score for several years with transitional and former transitional¹⁷ economies characteristics plotted in the same axes are shown in Figure 8. Descriptive statistics that help us to discuss the results are presented in Table 2. The Table 2 column “All” means all the sample used to calculate and plot nonparametric estimates presented in Figure 8 in the corresponding years. In columns “Tran.” and “Over”, we present statistics by countries with transitional economies and former transitional countries.

Table 2 shows that on average the HPI is the same in all considered groups of countries. From Table 2 and Figure 8 we can see that in countries where the transitional processes are over, the HPI spread is a bit lower than in transitional countries. This spread decreased over time and implies that the countries became more homogeneous on the HPI.

It is remarkable that for the period before the crisis of 2008 our simple estimates confirm the results of previous research that the quality of institutes correlates with life satisfaction in countries. Figure 8 illustrates this indirectly as proportional dependence of the HPI on the CPI score in 2006 if the last is less than 40.

3.4 Regression Analysis

The nonparametric estimates given above show pairwise relationships of considered variables without control of their possible correlations with the other characteristics of the country, such as institutions, governance, etc. For this reason, the observed dependences could be

¹⁶ <http://www.happyplanetindex.org/data/>

¹⁷ joined the EU in 2004 and 2007

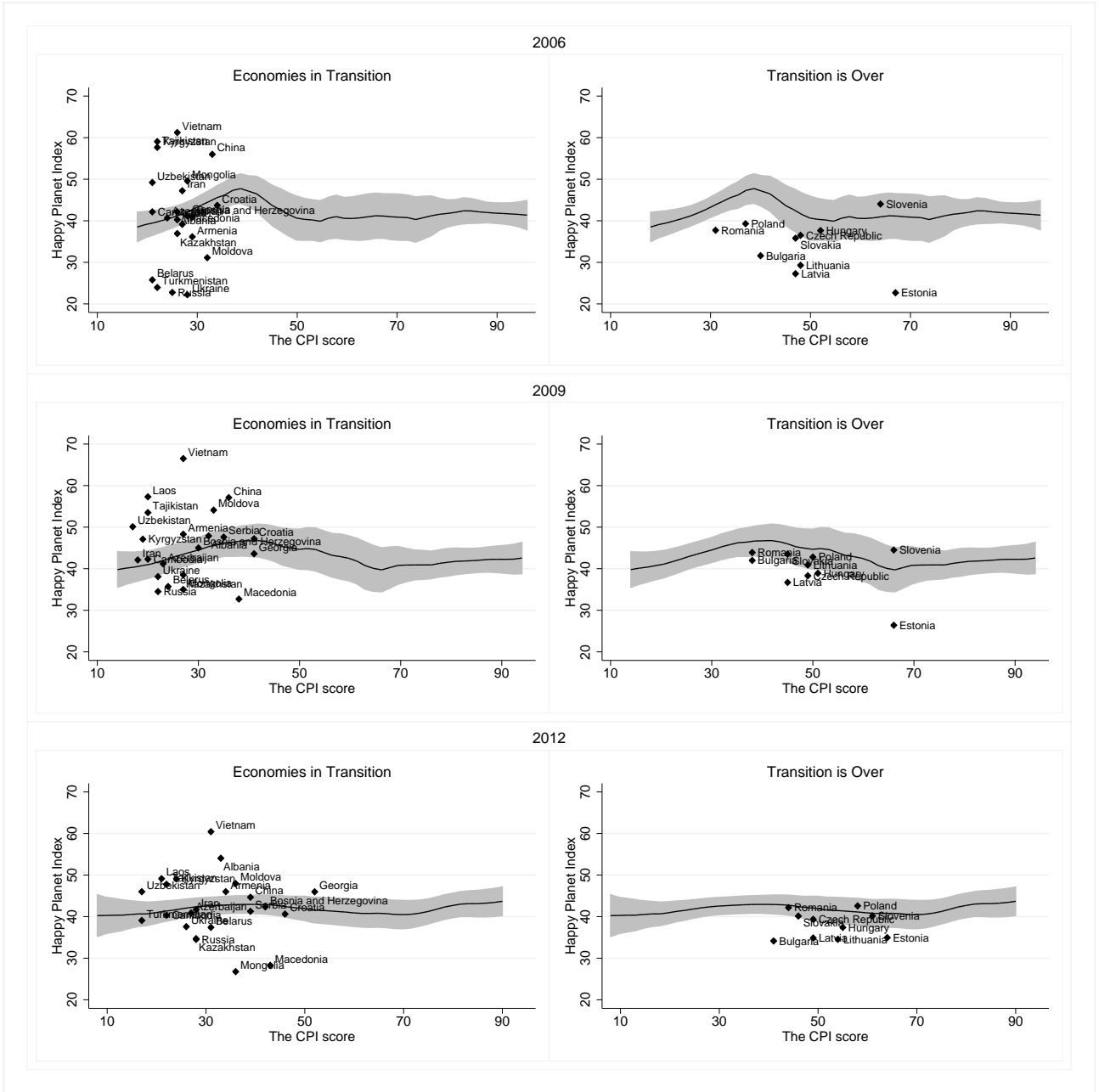


Figure 8. Countries with transition economies and countries that have completed the transition process plotted in the graphs of nonparametric estimates of dependence of the HPI on the CPI score, 95% confidence interval for nonparametrics is gray

spurious due to common cause or lurking variables. Multinomial models give us the possibility to correct this misspecification. They provide us with significant (or insignificant) relationships of the explanatory and dependent variables with the other variates included in the model being fixed. For these reasons we proceed with our research using some parametric estimates to control the results revealed nonparametrically and go further.

In our estimates we use the advantage of panel data to control for unobservable country fixed effects that could correlate with the explanatory variables. The results are presented in Tables 3 and 4.

Table 3. Models with panel data, the CPI score is dependent variable

	1999–2007			2003–2013					
	OLS	RE	FE	Cyprus, Malta, Turkey		Developed		Transitional	
				RE	FE	RE	FE	RE	FE
GDP per capita / 10000	17.55*** (0.650)	4.099*** (0.656)	1.367** (0.661)	14.46 (16.00)	-35.33** (15.03)	0.510 (1.207)	3.032*** (1.123)	19.47*** (4.523)	11.68* (5.999)
(GDP per capita) ² / 10	-14.47*** (0.967)	-3.487*** (0.686)	-1.296* (0.669)	-28.78 (32.09)	52.30** (25.16)	-0.463 (0.806)	-1.760** (0.716)	-30.70** (14.80)	-21.37 (15.75)
Transition	-6.793*** (1.021)	-10.98*** (2.647)							
Transition is over	5.190*** (1.448)	7.688* (4.093)						11.37** (4.649)	
Education expenditure (% of GNI)	2.754*** (0.234)	1.683*** (0.284)	1.117*** (0.292)	1.270 (1.914)	-2.664 (1.947)	0.100 (0.647)	-0.444 (0.591)	0.421 (1.064)	-1.766 (1.185)
Shadow economy (% of official GDP)	-0.240*** (0.0343)	-0.653*** (0.0669)	-0.251** (0.110)	-2.178* (1.240)	-6.196*** (1.490)	0.496* (0.277)	1.546*** (0.289)	0.550* (0.290)	-0.711 (0.784)
Constant	27.98*** (1.763)	55.40*** (2.955)	47.00*** (3.998)	92.02** (42.95)	280.4*** (52.82)	69.41*** (8.473)	49.19*** (8.406)	1.798 (12.15)	63.39** (26.75)
Observations	990	990	990	29	29	220	220	110	110
Groups		138	138	3	3	22	22	11	11
Adjusted R^2	0.812								
R^2 within		0.033	0.037	0.155	0.639	0.168	0.204	0.370	0.399
R^2 between		0.684	0.660	0.999	0.678	0.408	0.415	0.807	0.080
R^2 overall		0.697	0.672	0.765	0.288	0.344	0.363	0.666	0.122
F	714.66		8.05		9.72		12.44		15.77
Breusch and Pagan $\bar{\chi}^2$		1928.74				351.46		71.23	
Fixed effects F			55.27		19.80		94.00		21.98
Hausman χ^2			1701.47		43.05		110.39		15.71

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

Most variables in the regressions presented in Tables 3 and 4 have self-explanatory names.

In columns “1999–2007” and “2003–2013” in Table 3 different data were used as explanatory variable named “Shadow economy”. The left side columns (1999–2007) have data on shadow economies published by Buehn and Schneider (2012b). The right side columns (2003–2013) have Schneider’s (2013) data. The samples of countries that are used in the columns are the same as in Buehn and Schneider (2012b) and Schneider (2013). Different time periods and samples of the countries are similar to a robustness check of our results to the data.

Data on GDP per capita in Tables 3 and 4 are the same as in Section 3.2.1.

Binaries “Transition” and “Transition is over” represent countries with transitional economies and countries where the transition is over according to the IMF and the World Bank definitions as it was in Section 3.1.2 and thereafter.

In the models presented in Tables 3 and 4, the variable “Education expenditure” contains estimates made by the World Bank, that is “the current operating expenditures in education including wages and salaries and excluding capital investments in buildings and equipment” as a percentage of Gross National Income (GNI).¹⁸ We included this information as an explanatory variable in regressions because we sincerely believe that education increases the human and social capital of a population and makes citizens more law-abiding, thus reducing corruption.

The following countries are “Developed” in Table 3 and Figure 9: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, Luxembourg, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and the United States.

Breusch and Pagan and fixed effects F -tests confirm the presence of unobservable time-invariant country characteristics in models presented in Tables 3 and 4.¹⁹ For this reason pooled OLS estimates are at least inefficient and underestimate standard errors. We show OLS models (where the width of the page allows) just to illustrate the differences in pooled and the corresponding panel data estimates.

Hausman’s tests formally reject random effects (RE) models in favour of fixed effects (FE) models both in Table 3 and Table 4. This means that if we are interested in within-groups relationships of a dependent variable with the explanatory variables, we have to use a FE model. However, contrary to the results of formal tests, RE models sometimes²⁰ help us to understand between-groups relationships of the explanatory and dependent variables. According to the methods that are used, RE models estimate long-run effects, FE models show the short-run dynamics.

Let us first discuss the results presented in Table 3. Comments on Table 4 will be presented a bit later.

Table 3 illustrates the relationship between the size of a shadow economy and how the CPI score varies among groups of countries. Corruption and shadow economies could substitute each other and could be complements, as it was mentioned in Sections 1.1 and 3.1.1.

They are complements in average if we consider estimates on a rather large sample of countries. We can say that looking on the negative relationship between the size of the shadow economy and the CPI score presented in the FE column of “1999–2007” estimates in Table 3. Considering this model we have to notice that estimates for the size of shadow economy made by Buehn and Schneider (2012b) for the period of 1999–2007 have very small

¹⁸ <http://www.econstats.com/wdi/wdiv.736.htm>

¹⁹ Breusch and Pagan test for zero variance of the unobservables is not shown in Table 3 in column with three countries, because it is not meaningful.

²⁰ in comparison with FE estimates when RE models are rejected by Hausman’s tests as inconsistent

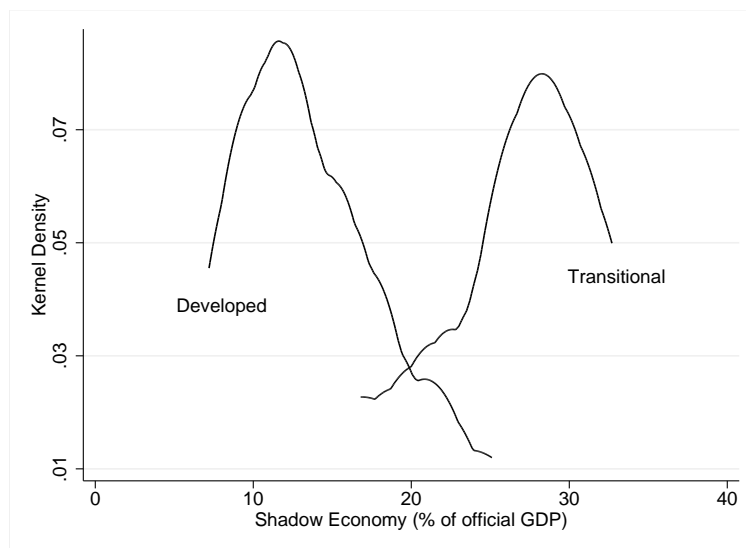


Figure 9. Kernel density (Epanechnikov kernel function) estimates of the size of shadow economy in 2007

variation in time. These estimates are more similar to the average values over the period of observation for each country. This makes it impossible to trace dynamics. To feel the differences between 1999–2007 and 2003–2013, estimates were illustrated in Figure 1. Due to the small within-countries variation of the size of the shadow economy used in columns “1999–2007”, R^2 -within is relatively small there. It is considerably smaller than R^2 -between. This means that according to the data used and the results presented in columns “1999–2007” in Table 3, it would be better to talk about between countries comparisons. In countries with higher levels of shadow economy (in percentage of official GDP), *ceteris paribus* defined by regressors in model, corruptions perceptions in the public sector have a tendency to be higher.

The same result is observed for Cyprus, Malta, and Turkey, where the share of shadow economies is rather high (26.5%, 26.4%, and 29.1% of official GDP in 2007, respectively). This result is shown in the FE column for Cyprus, Malta, Turkey for the period of 2003–2013 in Table 3. This is already within group dynamics (estimates of the shadow economy made by Schneider (2013) are used). That means that in such countries, growth of the shadow economy is accompanied by corruption perceptions growing in the public sector.

The last is not true in developed countries with a relatively low share of shadow economy in their GDP (Figure 9). Estimates presented in the FE column for those countries for the period of 2003–2013 confirm that corruption could go in a shadow from the public sector, so they are substitutes.

Considering estimates made on the sample of transitional countries (Table 3), we cannot say anything definite about the relationship of the shadow economy and corruption perceptions. The within-groups effect is insignificant but RE estimates (with the between groups part in them) confirm the presence of substitute effect in the relationship.²¹ An accurate conclusion could be the following. Every economy in transition has its own way; in some of

²¹ The substitution is observed in developed countries with the low size of shadow economy.

Table 4. Models with panel data, the CPI score is dependent variable (2000–2012)

	All			Not transitional			Transitional		
	OLS	RE	FE	OLS	RE	FE	OLS	RE	FE
GDP per capita / 10000	2.207*** (0.247)	2.599*** (0.346)	1.797*** (0.417)	1.968*** (0.259)	2.173*** (0.373)	0.593 (0.452)	-0.303 (1.575)	0.221 (1.889)	0.693 (2.222)
(GDP per capita) ² / 10	-1.597*** (0.270)	-2.141*** (0.349)	-1.784*** (0.393)	-1.421*** (0.279)	-1.807*** (0.368)	-0.841** (0.414)	21.40*** (6.857)	18.80** (7.950)	17.01* (8.853)
Transition	-0.510 (0.389)	-1.621* (0.935)							
Transition is over	-1.017* (0.591)	-1.887 (1.491)					0.144 (1.017)	-1.373 (1.796)	
Education expenditure (% of GNI)	-0.0968 (0.0784)	0.292** (0.132)	0.416** (0.177)	-0.185** (0.0844)	0.261* (0.144)	0.361** (0.184)	0.383* (0.211)	0.583* (0.334)	0.544 (0.547)
Control of corruption	17.28*** (0.443)	11.89*** (0.598)	8.321*** (0.719)	17.60*** (0.475)	12.24*** (0.644)	8.621*** (0.747)	15.29*** (1.338)	10.14*** (1.674)	5.549*** (2.073)
Government effectiveness	1.724*** (0.530)	3.375*** (0.698)	2.730*** (0.811)	2.199*** (0.569)	3.213*** (0.753)	1.298 (0.860)	-1.732 (1.498)	2.879 (1.825)	6.814*** (2.165)
Regulatory quality	0.993** (0.400)	1.731*** (0.586)	2.754*** (0.704)	0.810* (0.445)	1.776*** (0.658)	2.039*** (0.765)	2.887*** (1.046)	2.437* (1.343)	4.312** (1.807)
Rule of law	0.0560 (0.524)	1.809** (0.748)	0.903 (0.899)	-0.224 (0.556)	1.865** (0.813)	-0.102 (0.965)	0.969 (1.566)	1.493 (2.027)	0.963 (2.571)
Political stability and abs. of violence/terror.	0.314 (0.216)	0.589* (0.330)	0.470 (0.405)	0.218 (0.236)	0.456 (0.366)	0.366 (0.434)	0.629 (0.553)	0.994 (0.782)	0.875 (1.028)
Voice and accountability	-1.386*** (0.242)	-1.017** (0.456)	-0.642 (0.745)	-1.337*** (0.258)	-1.021** (0.508)	-1.031 (0.785)	-1.810** (0.749)	-1.153 (1.109)	4.887** (2.148)
Constant	40.41*** (0.414)	38.73*** (0.688)	38.86*** (0.822)	40.92*** (0.440)	39.21*** (0.743)	41.88*** (0.894)	36.40*** (1.320)	34.89*** (1.900)	33.43*** (2.282)
Observations	1595	1595	1595	1276	1276	1276	319	319	319
Groups		155	155		126	126		29	29
Adjusted R^2	0.956			0.960			0.880		
R^2 within		0.211	0.216		0.168	0.178		0.402	0.433
R^2 between		0.967	0.957		0.968	0.965		0.946	0.893
R^2 overall		0.952	0.942		0.956	0.953		0.874	0.823
F	3141.00		43.77	3424.02		27.36	233.98		23.83
Breusch and Pagan $\bar{\chi}^2$		717.01			610.93			60.20	
Fixed effects F			8.70			9.92			5.64
Hausman χ^2			98.72			131.45			37.79

Standard errors in parentheses

* $p < .1$, ** $p < .05$, *** $p < .01$

them the shadow economy and corruption in public sector are complements; in others they may be substitutes. More precise conclusions require more research.

RE models presented in Table 3 for the period of 1999–2007 and for transitional economies for the period of 2003–2013 confirm that in countries where the transition is over the CPI score is higher than average on a sample (*ceteris paribus*). Education expenditures reduce corruption too (1999–2007 columns in Table 3).

Considering the results presented in Table 4, we have to notice that explanatory variables in the models have relatively small time fluctuations inside the countries. For this reason we received rather high explanatory power of the regressions in the between dimension in comparison to the within dimension according to R^2 criterion. Nonetheless, tests have rejected RE models as inconsistent. For this reason, as already mentioned above, we will use

Table 5. Mean values of governance measured by the group of the WGI project for 2012 year (standard error of mean in parentheses)

	All		Not transitional		Transitional	
Control of corruption	0.045	(0.085)	0.140	(0.100)	-0.337	(0.115)
Government effectiveness	0.117	(0.079)	0.156	(0.094)	-0.043	(0.125)
Regulatory quality	0.150	(0.075)	0.159	(0.086)	0.112	(0.142)
Rule of law	0.035	(0.081)	0.089	(0.095)	-0.183	(0.133)
Political stability and abs. of violence/terror.	-0.042	(0.075)	-0.065	(0.089)	0.048	(0.123)
Voice and accountability	0.047	(0.076)	0.098	(0.085)	-0.160	(0.170)

RE estimates only as illustrations of between effects (between countries comparisons); however, the signs of FE and RE parameters are the same. The last means that the correlation of countries time invariant unobservables with observable countries characteristics that are used as explanatory variables in the models are not strong enough to affect signs of the parameters estimates.

In the models presented in Table 4, we refused to use information about the size of the shadow economy in countries aiming to increase sample size making estimates on the most recent data.

According to the idea of Shleifer and Vishny (1993) about “the grabbing hand”, authorities and bureaucrats seek rents under restriction of economic and political institutions. As was said by Banerjee et al. (2012), “Corruption exists because there are not enough monitoring and incentives to eliminate it.” Following these ideas in the current research we reveal factors that are valuable in reducing corruption in transitional economies by comparison of the results with other countries. To achieve the goal, six indicators from the WGI project²² were added as explanatory variables in the models instead of the size of the shadow economy.

An example of the descriptive statistics of the WGI project indicators for 2012 is shown in Table 5. The results are rather expected, especially the extremely low control of corruption in transitional economies.

Table 4 presents estimates of the CPI score equation on different samples. The first three columns (“All”) represent estimates on the sample of the largest size. The only restriction was that the dependent and explanatory variables should have non-missing values. This sample was split in two subsamples: “Transitional” and “Not transitional”. Columns “Transitional” show estimates for former transitional economies (countries that joined the EU in 2004 and 2007) and transitional economies. “Not transitional” is the remainder of the “All” sample.

Taking into account between effect, partially captured by RE estimates (column “RE” for “All” countries), we can say that the mean value of the CPI score in transitional economies is significantly lower (at 10% level of significance) than in other countries, *ceteris paribus*.

Education expenditures positively correlate with the CPI score in within dimension,

²² <http://info.worldbank.org/governance/wgi/index.aspx#doc>

transitional economies excepted.

The insignificance of FE estimates of “Government effectiveness” and “Voice and accountability” in “Not transitional” countries can be explained by the small within variation of these indicators in that countries over time. The same is observed for the “Rule of law” and “Political stability.”

A very optimistic result is that democracy partially captured by the “Voice and accountability” indicator has a significant positive influence cleansing corruption in countries with transitional economies.

In conclusion for the current section, we have to notice that as it was predicted by the preliminary nonparametric estimates, the HPI is insignificant in parametric models too. We have made the decision not to show regressions with it. It will be a theme for the separate research paper.

Conclusion

In the paper we considered the Transparency International (TI) Corruption Perceptions Index (CPI) as an indicator of corruption perceptions in the public sector in the corresponding countries. Cross-countries comparison reveals some peculiarities concerned with transitional economies.

Among them are empirical estimates of boundaries of different relationships (positive, negative or lack of correlation) of shadow economies with corruption perceptions. Previous authors usually wrote about complementary relationships (see, for example, Buehn and Schneider (2012a); Goel and Saunoris (2014), and references in Section 1 of the current paper). The positive correlation of the size of the shadow economy with corruption can be explained, for example, by high control over entrepreneurs that push entrepreneurs into the shadow and allows corrupt officials to charge higher bribery payments (Jay Pil & Thum, 2005). The other explanation is the ascertainment of the fact that corrupt officials control both formal and informal sectors (Echazu & Bose, 2008). Some authors wrote about the substitution effect. This takes place in countries with high but unequal control of corruption and the shadow economy (Dreher et al., 2009). The last is often observed in high income countries (Dreher et al., 2009; Dreher & Schneider, 2010). In this paper we showed that the complementary effect turns into substitution when the size of the shadow economy drops lower than 15% of the official GDP.

Another result that could not be found in the literature yet is our estimate that in countries where the size of the shadow economy is greater than 45% of the official GDP, the CPI score does not feel changes in the size of the shadow economy in the country. This means that the public sector is so corrupted and the shadow economy so large that respondents and experts mark extreme answers in survey questions about how they perceive corruption, and their perceptions do not change with the size of the shadow economy.

Taking into account the fact that GDP per capita positively correlates with CPI scores (Goel & Ram, 2013), we have made a nonparametric estimate of this dependence and used it

as a “base-line” to consider the movement of transitional economies in the global economic development. The given approach confirms that they are “on a proper way”: they get in the 95% confidence interval of the mentioned dependence after the transition.

The situation develops in another way when we consider the population life satisfaction (well-being) in the corresponding countries. That well-being positively correlates with the CPI score but not with success in transition. This corresponds to Welsch’s (2008) results telling us that the influence of corruption on well-being is a direct effect and through GDP is an indirect effect — the last is smaller than the first one. In our case we observe both the growth of GDP per capita and the CPI score during the transition, but because of the small time period we did not observe significant changes in well-being in time in transitional countries.

Almost the same result, but with additional remarks in explanation, is observed when we use the index of happiness from the well-known project, Happy Planet Index. It does not feel changes for the better after the transition process. The index is weighted average of life expectancy, well-being and footprint (gha per capita). The first and the last components of the index do not correlate with corruption perceptions (it is doubtful that someone can put forward convincing arguments in favour of correlation). Moreover they have a small evolution in time. For these reasons the Happy Planet Index does not reflect changes in countries during the transition periods.

The above result is in agreement with Fereidouni et al. (2013) who found that the governance indicator “control of corruption” has a positive but insignificant relationship with happiness.²³

To identify institutional factors that decrease the level of corruption perceptions in a country we estimated parameters of multiple regression models. In this way we got rid of spurious relationships (we revealed *ceteris paribus* effects) and controlled for country-level time-invariant unobservables (we used panel data models). As a result we found a relationship between shadow economies and corruption perceptions that corresponds to our previous nonparametric estimates described above. Among the institutional factors in an equation for corruption perceptions in transitional economies, only the following are significant: “control of corruption”, “government effectiveness”, “regulatory quality”, and “voice and accountability”. “Rule of law” and “political stability” are insignificant.

The results agree with the review made by Treisman (2007). He concluded that “highly developed, long-established liberal democracies, with a free and widely read press. . . , and a history of openness to trade, are perceived as less corrupt.”

In conclusion, it would be desirable to say that this research confirms that successful completion of a transition improves formal indicators associated with GDP per capita and corruption perceptions in countries. Nevertheless, within the scope of the research the criteria

²³ Fereidouni et al. (2013) used governance indicators from the Worldwide Governance Indicators project, happiness was obtained from prosperity index developed by the Legatum Institute (<http://prosperity.com/#!/>), random effects panel data estimates were made for 14 the Middle East and North Africa countries over the period of 2009–2011.

of transition completion in some countries was the fact that they joined the EU in 2004 and 2007. This could be an endogenous phenomenon: only the countries with good formal indicators could be put together. For this reason, our results could be a bit biased and have to be checked in further research, controlling for potential endogeneity.

Acknowledgement

We are grateful to Transparency International and the University of Goettingen for the possibility of the use of the CPI in the current research.

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Appendix A

Number of CPIs with different number (N) of surveys aggregated for each index

Year \ N	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	CPIs
1995	2	2	28	2	0	8	0	0	0	0	0	0	0	0	0	42
1996	0	0	11	3	23	6	1	7	3	0	0	0	0	0	0	54
1997	0	0	8	11	28	5	0	0	0	0	0	0	0	0	0	52
1998	0	21	10	3	6	1	4	19	14	4	3	0	0	0	0	85
1999	0	11	17	9	9	3	4	11	14	6	10	4	1	0	0	99
2000	0	10	24	3	2	6	19	8	6	12	0	0	0	0	0	90
2001	0	24	5	7	7	13	8	10	6	7	4	0	0	0	0	91
2002	0	10	18	11	9	7	10	5	13	11	7	1	0	0	0	102
2003	0	17	11	16	15	14	9	11	4	7	16	9	3	0	1	133
2004	0	14	13	22	10	25	7	9	11	12	7	4	5	6	1	146
2005	0	20	17	17	18	20	15	13	15	10	5	4	5	0	0	159
2006	0	25	15	30	28	42	12	9	2	0	0	0	0	0	0	163
2007	0	17	24	25	43	33	27	9	1	1	0	0	0	0	0	180
2008	0	14	24	30	51	31	20	8	2	0	0	0	0	0	0	180
2009	0	26	19	27	44	35	19	9	1	0	0	0	0	0	0	180
2010	0	25	19	27	46	32	18	10	1	0	0	0	0	0	0	178
2011	0	20	15	13	28	24	25	19	18	10	9	2	0	0	0	183
2012	0	19	15	24	30	36	32	15	5	0	0	0	0	0	0	176
2013	0	18	15	24	31	35	29	20	5	0	0	0	0	0	0	177
Total	2	293	308	304	428	376	259	192	121	80	61	24	14	6	2	2,470

Appendix B

Surveys used for the CPI 2013²⁴

1. African Development Bank Governance Ratings 2012
2. Bertelsmann Foundation Sustainable Governance Indicators 2014
3. Bertelsmann Foundation Transformation Index 2014
4. Economist Intelligence Unit Country Risk Ratings
5. Freedom House Nations in Transit 2013
6. Global Insight Country Risk Ratings
7. IMD World Competitiveness Yearbook 2013
8. Political and Economic Risk Consultancy Asian Intelligence 2013
9. Political Risk Services International Country Risk Guide
10. Transparency International Bribe Payers Survey 2011
11. World Bank — Country Policy and Institutional Assessment 2012
12. World Economic Forum Executive Opinion Survey (EOS) 2013
13. World Justice Project Rule of Law Index 2013

²⁴ http://www.transparency.org/files/content/pressrelease/2013_CPISourceDescription.EN.pdf

Appendix C

The WGI indicators²⁵

- *Control of corruption* reflects “perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as ‘capture’ of the state by elites and private interests”
- *Government effectiveness* reflects “perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government’s commitment to such policies”
- *Regulatory quality* reflects “perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development”
- *Rule of law* reflects “perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence”
- *Political stability and absence of violence/terrorism* reflects “perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism”
- *Voice and accountability* reflects “perceptions of the extent to which a country’s citizens are able to participate in selecting their government, as well as freedom of expression, freedom of association, and a free media”

Appendix D

Table 6. Countries with share of shadow economy greater than 45% are marked by ‘x’ in the corresponding years

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007
Angola	x	x	x	x	x	x			
Armenia	x	x	x						
Azerbaijan	x	x	x	x	x	x	x	x	x
Belarus	x	x	x	x	x	x	x		
Belize	x								
Benin	x	x	x	x	x	x	x	x	x
Bolivia	x	x	x	x	x	x	x	x	x
Cambodia	x	x	x	x	x	x	x	x	x
Central African Rep.					x	x	x	x	x

Table 6. (continued on next page)

²⁵ <http://info.worldbank.org/governance/wgi/index.aspx#faq>

Table 6. (*continued*)

Country	1999	2000	2001	2002	2003	2004	2005	2006	2007
Chad	x	x	x	x					
Cote d'Ivoire				x	x	x	x	x	x
Democratic Republic of the Congo	x	x	x	x	x	x	x	x	x
El Salvador	x	x	x	x	x				
Gabon	x	x	x	x	x	x	x	x	x
Gambia	x	x		x	x				
Georgia	x	x	x	x	x	x	x	x	x
Guatemala	x	x	x	x	x	x	x	x	x
Haiti	x	x	x	x	x	x	x	x	x
Honduras	x	x	x	x	x	x	x	x	x
Liberia						x			
Moldova	x	x							
Myanmar	x	x	x	x	x	x	x		
Nicaragua	x	x	x	x					
Nigeria	x	x	x	x	x	x	x	x	
Panama	x	x	x	x	x	x	x	x	
Peru	x	x	x	x	x	x	x	x	x
Republic of the Congo	x	x	x	x	x	x			
Russia	x	x	x						
Senegal		x		x					
Sierra Leone	x	x	x	x					
Sri Lanka	x								
Tanzania	x	x	x	x	x	x	x	x	x
Thailand	x	x	x	x	x	x	x	x	x
Ukraine	x	x	x	x	x	x	x	x	x
Uruguay	x	x	x	x	x	x	x	x	x
Zambia	x	x	x	x	x	x	x		
Zimbabwe	x	x	x	x	x	x	x	x	x

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