IS CORRUPTION HARMFUL TO ECONOMIC GROWTH? EVIDENCE FROM UKRAINIAN FIRMS

by

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Abstract

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Exploiting unique and reliable data on bribes paid by the Ukrainian firms and controlling for endogeneity between the key variables, this thesis researches an effect of corruption on development of the economy. The research results in the conclusion that corruption is detrimental and should be restricted by tax liberalization and deregulation of the economy. Bribery damages competition because the younger and smaller firms tend to pay more sizable and frequent bribes. A one-year increase in the age of an enterprise corresponds to decrease in a bribe by 0.84-0.88%, whereas a one-employee increase relates to 0.04% decrease in the probability to bribe. Corruption impedes trade, as engaging in intermediary activity dramatically increases the probability of bribing. Bribery is involved with a stealing of the tax revenues, as it promotes tax avoidance. A one-percentage point increase in the bribe rate corresponds to decrease in the overall tax rate by 5.74-10.91%. Moreover, corruption distorts incentives and promotes inefficient usage of the resources of the society. Bribing an official, a businessman can extract high net profit (15.13-17.32%) that is comparable to the profit gained from increase in sales (13.24-24.66%).

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

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GLOSSARY

Corruption. An abuse of public power for private benefit.

UAH. The Ukrainian national currency unit, hryvnia.

TUAH. Thousand of the Ukrainian hryvnia.

Chapter 1

INTRODUCTION

Since 1990s a lot of the economists' attention throughout the world has been focused on corruption and its effect on economic growth. In different countries powerful politicians have had to resign from their posts, and governments have fallen because of accusations of corruption. However, corruption is not a new phenomenon. Two thousand years ago Kautilya, the prime minister of an Indian kingdom, devoted his book, Arthahastra, to a discussion over corruption. Seven centuries ago Dante represented the medieval attitude to corrupt behavior by locating bribers in the deepest parts of the hell. Two centuries ago the creators of the American Constitution mentioned bribery and treason as crimes that must result in the impeachment of a U.S. president [Noonan (1984)]. Nowadays, the public interest to the corruption has been even amplified.

The growing interest in the corruption issue can be explained by the several reasons. First, as the Cold War has finished, the corrupt regimes in such countries as Indonesia, Nicaragua, Zaire and etc. were deprived from the unconditional support of their more developed countries-protectors. Second, in the beginning of the political thaw in the early 1990s there was a tendency to ignore the issue of corruption in the centrally planned economies caused by lack of information and by reluctance even to talk about it. Donor countries also tended not to pay a lot of attention to the corruption in the recipient countries even if there was a danger of misuse of foreign aid. However, the attitude has changed considerably due to the following reasons. Growing democracy in many countries and strengthening free mass media has created an environment, in which discussion of corruption is no longer a taboo. Third, accelerated globalization of the world economy has resulted in more frequent contacts of businessmen from less corrupt countries with the ones from the more corrupt countries. These contacts have resulted in increase in

the international attention to corruption. In some cases, public opinion was attracted by the companies' allegations that they were deprived from the government contracts due to the corrupt acts of the competitors. Fourth, nongovernmental organizations such as Transparency International and international financial institutions such as IMF and World Bank have been playing a more active role in the anticorruption movement.

Apart from the global tendency of the growing attention to corrupt activities, there are some particular interests in focusing on corruption in Ukraine. First, the results of the recent polls[1] suggest that 53-78% of the Ukrainians believe that corruption is widespread in the public and government institutions. Taking into account the social resonance, the problem of corruption in Ukraine cannot be ignored and must be researched. Second, the issue becomes even more important, as there is an opportunity to restrict corruption considerably by introducing appropriate norms in the new Tax Code. It is to be adopted in the nearest feature by the Ukrainian parliament. However, the specialists' attention is mainly focused on decrease in the tax rates, whereas the problem of limitation of the bureaucracy discretion over business regulation is almost neglected. Therefore, determining the influence of the corruption on the growth of the Ukrainian enterprises will help in providing the right emphasizes into the new legislation.

Having unique and reliable data on bribes paid by the Ukrainian firms, I research whether bribery is really harmful to the growth of the enterprises. The main research question is subdivided in the supplementary ones. First, what determines the size of a bribe? Second, who pays bribes? Third, how does bribery affect profitability? Fourth, does corruption promote tax avoidance?

Further, two hypotheses are tested. First, bribery impedes economic growth of the enterprises. Second, the smaller and newly established firms have to pay the higher bribes.

[1] The results of the surveys provided by Transparency Intl. in April-March 2002 are available at the web-site www.prozorist.org.ua

Definition and nature of corruption

There are a lot of different definitions of corruption, however each one is lacking in some aspect. In most cases, corruption is attributed to an abuse of public power for private benefit [Tanzi (1998b)]. However, the private benefit may be regarded more broadly because the abuse of public power may be beneficial for one's party, tribe, family and so on. The most renowned example is a "Mr. Ten Percent's bribe" extracted by the officials in favor of the dictator Sucharto's family in Indonesia [Wei (1997b)]. In some countries, the incomes from corruption used to finance the activities of political parties, i.e. the General Prosecutor of Ukraine alleged that the electoral company of the "Gromada" party was partly financed by Pavlo Lazarenko [Missura (2002)], the former Ukrainian prime minister accused in corruption.

Corruption has a lot of diverse faces. Therefore, acts of corruption can be classified in different categories. The most comprehensive classification [Tanzi (1998b)] comprised the following forms of corruption: a) bureaucratic or political acts; b) cost-reducing or benefit enhancing acts; c) briber-initiated or bribee-initiated acts; d) coercive or collusive acts; e) centralized or decentralized acts; f) predictable or arbitrary acts; g) acts involved with cash payments or provided in the non-monetary form.

As it is available only information on bribes involved with receiving permits, licenses and other types of authorizations to engage in any legal activity, and provided in cash, I focus my attention on the bureaucratic bribes and neglect the political corruption.

Sources of corruption

Having numerous forms, corruption may be induced by various factors. Corruption is often attributed to the monopoly and discretionary power of the state over the business regulation. This point of view has spread due to the growing role of the government in economy for the last decades. Recent studies of Tanzi and Schuknecht (1997), and Wei (1997a, 1997b) have

demonstrated that since the 1930s the dominant tendency in the economic environment has been a large increase in the level of taxation and public spending, as well as, a considerable growth in regulations and controls over the economic activities. Concerning the more active role of the government, Gary Becker pointed out "if we abolish the state, we abolish corruption" [(Tanzi (1998b), p.566]. However, Tanzi (1998b) opposed to Becker's argument that some least corrupt countries in the world have the largest public sector measured as a share of tax revenue or public spending in GDP. In particular, Denmark, Finland, Sweden, Canada, and the Netherlands are posed correspondingly on the first, second, third, sixth, and ninth places in the rating of the least corrupt countries in 1998. As a result, Tanzi reasonably inferred that the root of the corruption may be not in the size of the taxes or public spending, but in the way the state operates and carries out its functions. One of the most important sources of corruption are the government regulatory measures, such as licenses, permits, visas, and authorizations of various sorts, which are often required to engage in many activities. Tanzi (1998a), Bardhan (1997) and Wei (1997a) noted that especially in the developing and transitional countries regulations are non-transparent and hardly publicly controllable. Furthermore, the authorization often has to be obtained from a specific office or individual. As a result, there is no competition in granting of the authorizations, and officials obtain discretion in regulation and a good opportunity to extract bribes.

Besides the areas mentioned above, the public officials often have a discretion over important decisions related to the provision of the tax incentives, restrictions of the land usage, authorization of foreign investments, privatization, rights to extract natural resources, and providing monopoly to particular activities. Concerning these decisions, Tanzi (1998b) argued that the bribes might be paid to the public officials whose salaries may be too low in comparison with the benefits brought by the favorable decision to the bribers. The other source of corruption is involved with taxation because, paying taxes, firms have to contact frequently the state officials. As a result, the

general conditions of tax paying can determine the level of corruption in the country. Thus, Tanzi (1998b) distinguished the most important aspects of the tax system fostering corruption. The most important one are vague and imprecise laws. They often result in a need of a constant assistance to be in compliance with them, require frequent contacts between taxpayers and tax officers, and provide a large field of discretion for the tax administrators over determination of the tax liabilities, provision of the tax incentives, selection for the auditing, litigation, and so on. Furthermore, the tax system may be even more corrupt, if in addition to the above stated conditions the administrative procedures are not transparent and publicly controlled, as well as, if the tax officers are poorly paid.

The sources of corruption are often related with lack of transparency and effective institutional control over the public spending. Thus, investment projects and spending on purchase of goods and services on the part of government may be a fertile ground for the flourishing of corruption. Thus, public projects often have been carried out to extract "commissions" from those who are chosen to execute the projects [Wei (1997a)]. The most renowned example in this area was a court hearing in the case of the construction firm "Mobitex" charged by Carla del Ponte, the International Tribunal prosecutor, with grafting Boris Yeltsin's family to obtain the contract to reconstruct the Moscow Kremlin. As well, the imposition of non-budgetary fees (i.e., fees to the state innovation and road funds in Ukraine in 1997-2000) and appliance of non-budgetary special accounts by a government are generally accompanied with less transparent and weakly controlled spending than the money channeled through the budget. As a result, some money can be spent on private expenses or illegal acts, as it happened with near one million of US dollars of foreign aid, which disappeared leaving no trace from the Angolan government accounts in 2001[2].

[2] The information was reported in the BBC radio-news on 11 October 2002 with the reference to the unpublished IMF investigation report.

Further, in many countries the government is engaged in the provision of goods at below-market prices, i.e. foreign exchange, credits, access to public land, public housing, access to the educational and health facilities [Tanzi (1998b)]. As the supply is limited, queuing and rationing becomes unavoidable. Having the right to distribute rationed resources, the officials may be bribed by the interested parties to get access to the supplied good.

Besides the factors that promote corruption directly, other factors can stimulate corruption indirectly. One of them is a quality of a bureaucracy, which is connected by Tanzi (1998b) with transparency and absence of politically motivated patronage in hiring and promoting of public officials. The other indirect factor influencing corruption is a wage level in the public sector. The intuition that high wages raise the opportunity cost of losing one's job and prevent from corruption acts is supported by Van Rijckeghem and Weber (1997). Haque and Sahay (1996) also researched empirically this issue and found significant negative relationship between the wage of public officials and corruption. Aside with a wage level of officials, a penalty system may also influence corruption. Thus, according to Becker (1968), given the probability that the perpetrator of a crime would be caught, the penalty imposed plays an important role in determining the probability that criminal or illegal acts would take place. However, although the higher penalties may reduce the number of corrupt acts, they may lead also to demands for higher bribes per corrupt acts that can still take place [Tanzi (1998a)].

Having clarified the definition and possible sources of corruption, I am going to research its impact on the economic growth. Thus, the first part is devoted to the literature review in the field; the second part contains the applied estimation methodology; the third part describes the used data and sources; the fourth part represents the obtained results; and the fifth one draws the inferences and offers possible policy implications.

Chapter 2

LITERATURE REVIEW

Having various faces, corruption can affect enterprises in different ways. Despite long debates, unanimous attitude to the issue has not been reached yet. However, the number of supporters of the negative approach considerably exceeds the number of the positivists.

The majority of the researchers explored bribery effects using the perception indices of corruption and cross-country analysis. This can be explained by the difficulties of obtaining data on the illegal corrupt relations on the firm level.

Mauro (1995) found a statistically significant, negative association between corruption and private investment, and thereby growth. He explained the negative effect by the higher costs and uncertainty that corruption creates. Mauro also recognized the possibility of endogeneity in evaluating the influence of the bureaucratic efficiency on economic growth, because bureaucratic efficiency does not only affect economic growth, but also economic environment can affect institutions. Therefore, he used an index of ethnolinguistic fractionalization (which measures the probability that two persons drawn randomly from a country population will not belong to the same ethnolinguistic group) as an instrument for controlling endogeneity, and concluded that corruption lowers private investment, thereby reducing economic growth.

Having found a negative association between perceived corruption and public spending on education and health, Mauro (1997) and Bardhan (1997) inferred that corruption results in reduction of expenditures on education and health because in this field the corrupt practice can be detected with higher probability than in costly and often useless defense expenses or public investment in infrastructure. In the last cases a corrupt official may easily hide bribes by purchasing of goods with the prices considerably exceeding the market ones. Tanzi and Davoodi (1997) provided evidence that corruption actually increases public investment, especially investment in unproductive

projects, and squeezes expenditure allocations for operations and maintenance: this lowers the productivity of the public Capital stock, because in this case the choice of investment expenditure is not justified by the objective criteria of a cost-benefit analysis, but by the opportunity of manipulations of high-level officials to get bribes.

On the other hand, Tanzi and Davoodi (1997) demonstrated that corruption reduces tax revenues. Connecting with tax and customs officers, the bribers are often aimed at tax evasion or at obtaining exemptions in their favor. Thus, corruption reduces public revenue on the one hand, and increases public spending on the other one. Hence, it may result in the fiscal deficit and difficulties for the government to run a sound fiscal policy.

Wei (1997a) found negative associations between FDI and corruption, and its variance proxied by the variance in the perception indices in every country. He inferred that corruption reduces investment because it acts like a random and unpredictable tax. The higher the variance of corruption, the less predictable is its level, and the greater is the impact on FDI. Wei (1997b) inferred that increases in corruption and its unpredictability could be compared to the additional tax on enterprises. Using regression analysis, he concluded that raising the index of corruption from the Singapore level (0.74 in 1995) to the Mexican one (6.82 in 1995) is equivalent to the increase in the marginal tax rate on firms by 20 percentage points.

Baumol (1990) and Murphy et al. (1991) argued that corruption distorts incentives and results in inefficient usage of human and material resources, because it stimulates entrepreneurs, the most active social elements, to concentrate their forces and talents on rent-seeking rather than productive investment, which becomes less profitable than bribing.

Regressing the Gini coefficient on such factors as the perception indices of corruption, natural resource endowment, Capital productivity, educational attainment, and the distribution of land, Gupta et al. (1998) provided evidence that corruption increased income inequality and poverty through reduced economic growth; biased the tax system favoring the rich and well-connected;

lead to the poor targeting of social programs; fostered the use of wealth to lobby the government for the favorable policies; lowered social spending; enhanced unequal access to education; and increased the investment risks of the poor. These findings held for the countries with different growth experiences and at different stages of development.

Tanzi (1998a) emphasized the damageable effect of corruption on providing the public functions of the government. First, bribery levels down the ability of the government to impose necessary regulatory controls over banks, insurance companies and other important economic institutions to correct market failures. On the contrary, bribing is often aimed at creating entry barriers and monopolization of markets [Bardhan (1997)] that is likely to add to the existing market failures. Second, corruption distorts the fundamental role of the government in the enforcement of contracts and the protection of property rights, because people obtain opportunity to buy a mode of fulfilling a contract or refusal from the contractual obligations, to purchase exemption from exercising of the property rights legislation. Third, corruption of high-level officials (especially if they are engaged in election procedures) may undermine the trust in the ruling elite and in the state institutions. As a result, the movement toward democracy and a market economy may be blocked by the unsatisfied part of the society.

All above-mentioned researchers provided cross-country analyses of corruption and explained it as a function of countries' policy-institutional environment. However, macro cross-country studies raise the concerns of heterogeneity in the data and perception bias that may undermine the soundness and sensibility of the obtained conclusions. Thus, every country is unique in its nationalities mix, historical progress, economic development, and cultural traditions. Therefore, providing cross-country analyses on particular set of data, a researcher can be faced with a problem of unobservable heterogeneity across the data points. The macro determinants also cannot satisfactory explain the within-country variation in corruption. Second, due to the aggregate nature of the data the cross-country analysis tells us a little about

the effect of corruption on individual firms. In particular, the negative relationship between growth and corruption at the country level may derive from inefficient provision of the public goods or weak infrastructure rather than from the corruption itself. Moreover, the widely used perception indices are typically constructed from the experts' assessments of the overall corruption in a country [Fisman and Svensson (2002)]. Consecuently, the perception of corruption can be heavily affected by the public relations actions initiated by the interested, by the recent corruption scandals that can exaggerate the existing situation or reflect rather particular corruption acts than the general bribing practice. As a result, the perception of corruption may differ significantly from the real situation.

Given the drawbacks of cross-country macro analysis, I focus my attention on micro level analysis. One of the approaches is involved with the mathematical modeling of the economic agent's behavior and represented by the researches elaborated by Leff (1964), Myrdal (1968), Huntington (1968), Basley (1993), Lui (1985), Shleifer and Vishny (1993), and Basu and Li (1996).

Leff (1964) and Huntington (1968) argued that corruption can promote efficiency and growth because it dismantles the government-imposed rigidities that impede investment, and thereby economic growth. This reasoning was often used to explain the high rates of growth in such East-Asian countries as Thailand, Indonesia, China, and etc., where the fast economic growth was associated with the highly perceived level of corruption. However, Wei (1997a) and Tanzi (1998b) noted that corruption in these countries, especially in Indonesia, was associated with a low degree of uncertainty and highly institutionalized bribery, which made corruption less damaging than random corruption. This view corresponds to the theoretical approach offered by Shleifer and Vishny (1993). They argued that a decentralized bureaucracy is more detrimental to business than a centralized one because in this case weak central government allows the bureaucratic agencies to impose independent bribes on the private agents. Having a free entry into regulation, the agencies tend to impose the cumulative bribe burden

on private agents to infinity. Furthermore, Myrdal (1968) noticed that the rigidities are not exogenous and unchangeable, but created features, which may be intentionally maintained by the public officials to extract more bribes. Therefore, gaining from acceleration of the received public services, bribing firms may lose more and bear the higher bribery costs to overcome new regulations.

Lui (1985) developed the queuing model of bribery with decentralized decision-making and refuted mathematically the opinion that the bureaucrats may deliberately cause delays for attracting more bribes given that bribery is legally allowed. Thus, those ones for whom time is most valuable will offer bribes to the officials to jump in front of the queue. Ranking the customers by their bribe payments, the queue's server would be unlikely to slow down the allocation process. The Nash equilibrium formed by the bribing strategies of customers would minimize the average value of time costs of the queue, and thereby reduce the inefficiency in public administration. However, Bardhan (1997) limited Lui's model and claimed that the model was based on too unrealistic assumptions that both sides in the corrupt transaction are stuck to a deal, and that the waiting clients do not offer new bribes after the new agents have entered the system. According to Myrdal (1968), in case of bribery prosecuted by law, bribes might induce bureaucrats to change order and to reduce speed of supplying public services to extract more bribes.

Beck and Maher (1986) and Lien (1986) asserted that corruption promote the distribution of licenses and government contracts among the most efficient producers with the lowest marginal cost of the production or servicing at the market, because only the most efficient one can afford to pay the highest bribes. However, opposing to the pro corruption economists, Bardhan (1997) criticized the model's basic assumptions that the information about the illegal bribes offered by the competitors is available to any market operator. Tanzi (1998a) added another critical argument that the highest bribes may be not necessary paid by the most economically efficient, but rather the most successful operator at rent seeking.

Warning about possible opposite effects on firms' performance, Shleifer and Vishny (1993) distinguished two types of bribes. Thus, in the case of bribery without theft the corrupt official turns back the official price of the good to the government. Acting as a monopolist and having the marginal cost of the good equal to the government price, the official tends to create a shortage of the public good at the official price in order to collect the bribes as a tool of clearing the market. As a result, the total price with a bribe is always higher than the government price and bears the higher cost to firms for public goods and services. In contrast, bribery with theft implies that the official hides the sale and does not turn anything back to the government that results in the marginal cost of the good to the official equal to zero. Therefore, the price of good is equal to the paid bribe, may be even lower than the official price and beneficial to the buyer of the public service.

Basu and Li (1996) proved theoretically that, although steady-state corruption always impedes growth, a short-lived burst of corruption can increase the likelihood that economic reform in transitional country will succeed. This research was focused on informational imperfectness, as the political leadership is unable to observe directly the productivity of offices and to determine, which office should be closed. Thus, Basu and Li proved that a one-time increase in corruption can provide appropriate incentives for the bureaucrats to reveal the necessary information. On one hand, extracting "sponsorship" fee from the firms, the bureaucrats can have incentive to set up new firms. On the other hand, the retired government officials tend to become major managers of the "sponsored" companies. As a result, the official long-term stake is secured. Also, as the official retires, the control span of the bureaucracy is reduced, since the spun-off company becomes more independent and operates according to the market principles.

Waller et al. (2002) researched the damaging impact of corruption depending on the levels of its centralization and coordination among the bribe-setters. Their proof shows that under decentralized corruption the uncoordinated bureaucrats tend to impose higher bribes on the businessmen than the

coordinated ones because in the uncoordinated case the official fails to take into consideration how his bribe affects other bureaucrat's bribe choice, overuse the available bribe "resources" of an enterprise, and reduces the expected bribe income for all other bureaucrats. Consequently, the size of the formal economy is larger in the coordinated case. In contrast, acting as a monopolist in the case of the centralized corruption, the bureaucracy levies the higher bribe per entrepreneur than in the decentralized one. However, the total amount of bribes paid to the government in the centralized corruption equilibrium is lower than in the decentralized one because in the first one the total number of entrepreneurs applying for permits falls even more to offset the increase in bribe payments per entrepreneur. As a result, the size of formal economy is smaller in the centralized regime than in the decentralized one. Moreover, Waller et al. (2002) drew the striking conclusion that the sign of correlation between corruption and private investment depends on how corruption is measured. Thus, in the centralized bribe-setting equilibrium, bribes per investment project are the lowest hence there is more private sector investment. As a result, the decentralized corruption should exhibit a negative correlation with a private sector activity, while centralized corruption should be positively correlated with private activity. Taking into account the ambiguous impact of corruption on investment, the researchers emphasized necessity to study empirically the correlation between corruption and private activity and to find the aggregate effect of corruption.

All above-mentioned researchers elaborated different mathematical models that were often severely criticized for using unrealistic assumptions. Hence, the different approaches should be empirically proved by applying micro level data. Therefore, I focus on the empirical papers at the firm level in order to direct my steps towards this field.

Kaufman and Wei (1999) used data from three worldwide firm-level surveys and examined the relationship between bribe payment, management time wasted with bureaucrats, and the cost of Capital. They found that firms paying more bribes were more likely to spend more management time on

negotiation of regulations with officials, and face higher cost of Capital. Thus, the obtained results of the firm level research rejected the "efficient grease" hypothesis proposed by Leff (1964) and Lui (1985) that corruption can improve economic efficiency in cases of excessive government regulation and queue in supply of the public services.

Using the data on the actual bribes reported by the managers of around 2000 enterprises in 21 countries of the Eastern Europe and Central Asia (including Ukraine), Clarke and Xu (2000) focused on how the characteristics of firms paying and receiving bribes affect the equilibrium level of bribes in the utility sector. They found that bribes paid to utilities are lower in countries with greater capacity and competition in the utility sector and in the countries where the utility has been privatized. On the other hand, more profitable firms, enterprises with the greater overdue payments, and recently established firms appeared to pay higher bribes.

Fisman and Svensson (2002) provided analyses based on a survey of the Ugandan firms on bribery payments, taxes and growth over the period 1995-1997. Using industry averages as instrumentals for paid bribes and taxes to circumvent potential measurement error and endogeneity problem, the researchers regressed growth in sales on instrumental variables for bribes and taxes, age, firms' shares possessed by the foreigners, and dummies for the export orientation of the enterprise, and found significant negative correlation between bribery and growth. According to the results of the regression the detrimental effect of corruption was even three-times greater than the effect of taxation. Consequently, Fisman and Svensson inferred that corruption retards the development process to even greater extent than taxation.

Further, regressing corruption incidence on the bundle of qualitative and quantitative parameters of the Ugandan firms from the above-mentioned survey, Reinikka and Svensson (2002) revealed that a large part of the variation in bribes across the graft-reporting firms can be explained by variation in regulatory policies at the industry level, by "ability to pay" proxied by the current or expected future profitability, and by their "ability to refuse

to pay" proxied by the expected cost of reallocation. According to these results, Reinikka and Svensson inferred that the public officials tend to act as price (bribe) discriminators, demanding higher bribes from firms that can afford to pay, and demanding lower bribes from firms that can exit the market. The researchers found as well that non-bribing firms tend to have characteristics suggesting that they are operating in the sectors with little or no contact with the public officials, receive significantly less public services, pay fewer types of taxes, and less involved in the foreign trade. These findings suggested that firms typically have to pay bribes when dealing with the public officials, whose actions could have large effects on the firm' business operations.

Realizing the high quality of the provided research Fisman and Svensson (2002), and Reinikka and Svensson (2002), I apply their general approach to the available data on the business practices of the Ukrainian enterprises to answer the key research questions.

Chapter 3

EMPIRICAL METHODOLOGY

The applied empirical strategy is aimed at comprehensive investigation of the available data and on econometric modeling to answer the stated research questions.

There are three possible econometric issues involved with the effects of corruption: a) an endogeneity issue, b) measurement error problems, c) selection bias.

The endogeneity problem arises due to the fact that both growth and corruption are likely to be jointly determined [Fisman and Svensson (2002)]. First, a rational and profit maximizing bureaucrat would try to extract as high a bribe as possible. He is subjected to the economic constraints that the firm might face and that he might be caught. A bribe discriminating bureaucrat is expected to demand higher bribes from more prospective firms producing the good with a favorable demand forecast and with higher ability to pay. On the other hand, having good market forecasts and higher expected profits, managers can offer higher bribes. Thus, two firms in the same industry may need to pay different amounts of bribes. The difference may correlate with unobservable features, i.e. one firm can obtain competitive advantage after invention of the brand new good. To recapitulate, if the forecast can influence on firm's willingness to invest and expand, there is likely a positive relationship between growth and corruption.

Second, the problem of endogeneity can arise if firms specialize in rent seeking as a means of growth. Thus, some firms are eager to succeed in the bureaucrats' preferences, while the others focus on improving productivity and investing in new capital. Both strategies may lead to growth, and in equilibrium, it is not clear which firm will grow more rapidly. The stated difficulties will tend to mask any direct negative effect that corruption can have on growth. Therefore, the Hausman specification test including two-equation structural model [Berndt (1991)] is applied to test endogeneity in relations between sales and bribes paid.

$$S_i = a + bB_i + cA_i + u_i \quad (1a)$$

$$B_i = d + eS_i + fT_i + w_i \quad (1b)$$

Where S_i is a sales growth; B_i is a bribe payment; A_i is an age of an enterprise; T_i is time spent by the businessmen on negotiation with the officials about regulatory issues; u_i and w_i are error terms. The endogeneity implies that there are correlations between B_i and u_i, S_i and w_i. Consequently, the OLS estimation of the equations would yield biased and inconsistent estimates. Therefore, to provide estimation by OLS and to answer the endogeneity question, two reduced form equations (2a) and (2b) are estimated separately.

$$S_i = a_0 + a_1T_i + a_2A_i + v_i \quad (2a)$$

$$B_i = \beta_0 + \beta_1T_i + \beta_2A_i + \omega_i \quad (2b)$$

The coefficients and the error term in the full structural system and the reduced forms are connected by the following equations.

$$\alpha_0 \equiv \frac{ae+d}{1-eb}, \alpha_1 \equiv \frac{ce}{1-eb}, \alpha_2 \equiv \frac{f}{1-eb}, \nu_i \equiv \frac{\varpi_i + eu_i}{1-eb}$$

$$\beta_0 \equiv \frac{a+bd}{1-eb}, \beta_1 \equiv \frac{c}{1-eb}, \beta_2 \equiv \frac{bf}{1-eb}, \omega_i \equiv \frac{u_i + bw_i}{1-eb}$$

Then, the fitted values of B_i and S_i (B'_i and S'_i correspondingly) obtained from equations (2a) and (2b) are plugged as regressors in the models (3a) and (3b).

$$S_i = a + bB_i + cA_i + hB'_i + u_i \quad (3a)$$

$$B_i = d + eS_i + fT_i + gS'_i + w_i \quad (3b)$$

The null hypotheses that B_i and u_i, S_i and w_i are uncorrelated boil down to a tests that h and g equal to zero. However, having strong theoretical reasoning stated-above, I expect rejection of the null hypotheses and revealing of endogeneity between sales and bribes paid.

The revealed endogeneity may be mitigated by providing an instrument for bribes. First of all, the relationship between firm growth (γ_{ij}), corruption (b_{ij}), firm's growth potential (p_{ij}), and a firm-specific unobservable factor (θ_{ij}) may be represented as follows [Fisman and Svensson (2002)].

$$\gamma_{ij} = f\,[b_{ij}(\theta_{ij}), p_{ij}, \theta_{ij}] \quad (4)$$

In (4) firm-specific unobservable factor (i.e., invention of a new brand good, favorable demand forecast, expected higher profits, and etc.) may affect both bribes and the firm's growth. The firm's growth potential (p_{ij}) can be decomposed in the following way.

$$p_{ij} = X'_{ij}\delta + \eta_{ij} \qquad (5)$$

In (5) X_{ij} is a vector of observable parameters, and η_{ij} is a zero-mean error term. The linearized model of the growth may be represented as follows:

$$\gamma_{ij} = \beta_0 + \beta_b b_{ij} + X'_{ij}\delta + \beta_\theta \theta_{ij} + \eta_{ij} \qquad (6)$$

According to the previous discussion, the omitted variable θ_{ij} is correlated with growth and bribery. Further, the corruption term may be decomposed into two parts (7).

$$b_{ij} = B_j + B_{ij} \qquad (7)$$

The first part (B_j) is amount of bribes inherent to the particular industry j and determining to what extent the bureaucrats can extract bribes. The second one (B_{ij}) is an idiosyncratic bribe-component reflecting the specific of the particular firm. Hence, an industry-specific part of bribery is assumed to be determined by the general level of technology and the rent-extraction talents of bureaucrats. Consequently, the industry component can be accepted as exogenous to a firm, and uncorrelated with unobservable firm's variable (θ_{ij}). Therefore, B_j can be used as an instrument for b_{ij} that correlates with θ_{ij} [Fisman and Svensson (2002)].

The other significant estimation problem is involved with the impact of the "noisy" micro-level data that is resulted from using the data from a wide range of the enterprises and bribes of different sizes. The measurement error is to be solved by appliance of the grouped averages as an instrument that is a common technique to curb the measurement error [Wald (1940)]. In the particular case, the industry-location averages will be used as grouped averages. Furthermore, scaling and appliance of the data in log-transformed form may mitigate the heterogeneity of the data and resultant heteroscedasticity in the model. Log transformation is quite effective and widespread remedy on heteroscedasticity [Gujarati (1995), p.386]. This

measure compresses the scales in which the variables are measured, thereby reducing the tenfold difference between two values to a twofold difference. Therefore, these approaches are applied to the data used in the model: the researched variables of bribes and taxes paid are scaled on sales; the controlled variables are used in log-transformed form.

The possible selection bias cannot be captured properly and consequently cannot be adjusted applying Heckman correction procedure, because there is no reasonable way to formalize the selection equation. First, non-answering on bribery questions, 341 respondents are highly likely did bribe, but were afraid of admitting this fact. Otherwise, they would have nothing to conceal and frankly report zero bribes. To test this hypothesis, I run two Probit regressions. The first one applies the only observations, in which the respondents answered the bribe questions. The second regression uses the whole sample assuming that all non-respondents were bribers. If the difference between the coefficients is not significant, then the assumption is true, and the whole sample can de used for the research. The other possible selection bias may arise in the case, when only 246 firm managers out of 359 respondents admitting the fact of bribing reported the exact sum of the given bribe. However, in both cases the respondent's reluctance to answer can be likely involved with unsystematic and idiosyncratic fear.

1. Who pays bribes?

Acting as bribe discriminators and taking into account the specific features of the firms, corrupt officials can extract different bribes. To determine the bribee characteristics, I run a Probit model with dummy dependent variable $\text{BRIBE}^{\text{dummy}}$ equal to one if a manager bribed, and zero if one did not.

$$BRIBE^{dummy*}_i = \beta_0 + X'_{1i}\beta_1 + \eta_i \qquad (10)$$

$$\text{where } \eta_i \sim iid\, N(0,\sigma^2) \text{ and } \text{BRIBE}_{\text{i}}^{\text{dummy}} = \begin{cases} 1 & \text{if} \quad BRIBE_i^{dummy*} > 0 \\ 0 & \text{otherwise} \end{cases}$$

The vector X_1 of explanatory variables includes 5 location dummies, 6 industry dummies, dummy for hiring a mediator to solve any regulatory issues, labor employed in 2000, age of a firm, and time spent on negotiations of the regulatory issues, the shares owned by the foreigners, the state and by the managers; sales, profitability, gross cost price, available capital, and advertising expenditures in 2000.

2. What determines the size of bribe?

To determine the factors influencing the size of bribe, I run a Tobit model with a dependent variable BRIBE in monetary units. The choice of a Tobit model is motivated by two reasons. First, it is applied to research the factors increasing probability to bribe. Second, the sample is censored, as the regarded bribe can only be more than zero.

$$BRIBE_i^* = \beta_0 + X'_{2i}\beta_3 + \beta_4 Sales_{ins} + \beta_5 Pofitability_{ins} + \eta_i \qquad (11)$$

$$where\ \eta_i \sim iid\ N(0,\sigma^2)\ and\ BRIBE_i = \begin{cases} BRIBE^* & if\ BRIBE^* > 0 \\ 0 & if\ BRIBE^* = 0 \end{cases}$$

The vector of explanatory variables (X_2) includes 5 location dummies, 6 industry dummies, dummy for hiring a mediator to solve any regulatory issues, labor employed in 2000, age of a firm, and time spent on negotiations of the regulatory issues, the shares owned by the state, foreigners, and managers, gross cost price of the output, available capital, and advertising expenditures in 2000. If the Hausman tests detect reverse causality either between bribe and sales, or between bribe and profitability, the variables of sales and profitability in 2000 are used in the form of the industry-location averages as instruments to circumvent endogeneity.

3. Is bribery harmful for sales growth?

To answer the main research question, I apply two empirical models. One of them is a pooled OLS model.

$$\gamma_{Si} = \beta_0 + X'_{4i}\beta_6 + \beta_b BRIBE_{iins} + \eta_i \qquad (12.1)$$

$$where\ \eta_i \sim iid\ N(0,\sigma^2)$$

As there is highly likely reverse causality between sales growth (γ_{Si}) and bribes ($BRIBE_i$), the bribe variable is used in the form of industry averages as instruments ($BRIBE_{iins}$) to mitigate the endogeneity issue.

The second variant of the model is involved with appliance of the dummy for the bribe payment ($BRIBE_i^{dummy}$) to use more available binary data (359 answers in comparison with 246 answers about particular sums of bribes):

$$\gamma_{Si} = \beta_0 + X'_{5i}\beta_6 + \beta_b\, BRIBE_i^{dummy}{}_{ins} + \eta_i \qquad (12.2)$$

$$where\ \eta_i \sim iid\ N(0,\sigma^2)$$

To solve the endogeneity issue, I apply the fitted values of the probability to bribe as instruments for bribery dummy. The fitted values are found in the Probit model (10) that was applied to answer the question "Who pays bribe?".

In both variants the dependent variable of growth is represented by the difference in the log of sales in 2000 and 2001. The vectors of explanatory variables (X_4 and X_5) consist from the of the taxes scaled on the sales in 2000, age of a firm, the shares owned by state, foreigners, and managers, labor in 2000, change in the cost-price and fixed assets, changes in the number of employees, 5 location dummies, 6 industry dummies, dummy for hiring a mediator to solve any regulatory issues, labor employed in 2000, age of a firm, time spent on negotiations of the regulatory issues, and advertising expenditures in 2000.

4. Does corruption damage profitability?

To answer the question, I apply two OLS models (13.1) and (13.2) to research the relations either between bribe ($BRIBE_i$) and profitability growth ($\gamma_{\pi i}$) or between fact of bribing ($BRIBE_i^{Dummy}$) and profitability growth ($\gamma_{\pi i}$).

$$\gamma_{\pi i} = \beta_0 + X'_{6i}\beta_7 + \beta_b BRIBE_{iins} + \eta_i \qquad (13.1)$$

$$\gamma_{\pi i} = \beta_0 + X'_{6i}\beta_8 + \beta_b BRIBE_i^{Dummy}{}_{ins} + \eta_i \qquad (13.2)$$

$$where\ \eta_i \sim iid\ N(0,\sigma^2)$$

As there is likely a reverse causality between profitability growth ($\gamma_{\pi i}$) and bribes with the same reasoning as for the sales growth, the industry-location averages of bribes ($BRIBE_{iins}$) can be applied as instruments to mitigate the endogeneity issue in the model (13.1). For the same purpose, the fitted values of the probability to bribe found in the Probit model (10) are used as instruments for bribery dummy.

The vector of explanatory variables (X_6) includes the same explanatory variable as vector (X_4) in the model (12.1) and profitability in 2000.

5. Does bribery steal tax revenues?

To determine the relations either between bribe ($BRIBE_i$) and tax change[3] (τ_i) or between fact of bribing ($BRIBE_i^{Dummy}$) and tax rate change (τ_i), I run two OLS models (14.1) and (14.2) to research the relations. The dependent variable tax rate change (τ_i) is defined as a difference between taxes rate in 2001 and 2000.

$$\tau_i = \beta_0 + X'_{7i}\beta_{10} + \beta_b BRIBE_{iins} + \eta_i \qquad (14.1)$$

$$\tau_i = \beta_0 + X'_{7i}\beta_{11} + \beta_b BRIBE_{i\,ins}^{Dummy} + \eta_i \qquad (14.2)$$

$$where\ \eta_i \sim iid\ N(0,\sigma^2)$$

The vector (X_{7i}) includes the same explanatory variables as the vector (X_{6i}) in the models (13.1) and (13.2), taxes paid and profitability in 2000. Expecting higher taxes paid, a businessman can pay higher bribes to avoid taxation. Hence, the reverse causality between a bribe and tax rate growth is likely to be detected by the Hausman specification test. In case of rejection of the null hypothesis, the bribery variable ($BRIBE_i$) is used in a form of the industry-location averages as an instrument to mitigate possible endogeneity issue, whereas bribery dummy ($BRIBE_i^{Dummy}$) is instrumented by the fitted values of the probability to bribe found in the Probit model (10).

[3] In this research tax rate is paid taxes scaled on sales for the same year and implies the effective tax rate that a firm actually experiences for that year.

Chapter 4

DATA ANALYSIS

The micro level data used in the paper are originated from two different sources, i.e. the Regulatory Cost Surveys of 2000 and the financial statements of the firms. The data on bribery, date of the registration, location, sector of the economy, labor employed in 2000, time spent by the management on dealing with the regulatory bodies and binary data on hiring the mediator to negotiate with the officials during the registration were obtained from the results of the Regulatory Cost Surveys (RCS) of 2000. RCS were funded by the USAID project "Regulatory reform" and conducted by the project "Brain for Ukraine" during January-June 2001 to study the cost structure and particularities of the Ukrainian business practice. Although the agricultural sector was not taken into account, the distribution of the firms in the sample generally corresponds to the structure of the Ukrainian economy in accordance with the statistics of the State Statistics Committee of Ukraine (express-report No.455 dated Dec. 10, 1999). The survey comprised a total of 700 enterprises in 6 different sectors of the Ukrainian economy and in 10 towns (70 firms per town) representing 5 main geographical locations. The interviewed firms were engaged in the manufacture (29%), trade (23%), intermediary (18%), services (9%), science and innovation (5%), and in the other activities (16%). The majority of the firms in the sample (71.7%) are small enterprises with the number of employees up to 50 persons. The detailed description of the data in the sample and the methodology of the data collection are represented in Appendix A.

Concerning the data on bribery, there are two types of bribes in Ukraine, which are joined in the general term "total bribe". One of them is an "individual" bribe given to the official as a personal remuneration. The other one is a "collective bribe" that is a payment to the accounts of a firm or a fund controlled by the head of the state agency at the local or state power level. Although these payments are usually called "voluntary contributions",

they are mostly obligatory for obtaining licensees or permissions. Refusal from payment to the non-budgetary accounts can result in such red-tape impediments as long-time delays, unnecessary check-ups and formal refusals, which bear additional expenses to the firms. Therefore, according to the Ukrainian business practice, firms have to pay the "voluntary contributions" in order to save time and money. The financial resources accumulated on the non-budgetary accounts are usually distributed in correspondence with the personal orders of high-top bureaucrats (the information was proved by Oleksandra Kuzhel, the head of the State Committee on Entrepreneurship and Support of the Small Business [Grygorenko (2001)]).

The primary concern related with the data is the issue of reliability of the bribery data. The empirical strategy utilized to collect the information on corruption gives the confidence in reliability of the data. First, in Ukraine the majority of the population has a deep distrust in the state bureaucratic establishments regulating the economy or interfering in the business activity in any way. According to the poll provided by the Transparency International in April-March 2002[4], 53%-78% of the Ukrainians believe that corruption is widespread in the public and government institutions. As 56-75% of the population perceived non-government organizations as non-corrupted institutions, the surveys were conducted by the non-government research organization that did not related to any Ukrainian official establishment to avoid any negative prejudice or reluctance from the side of the interviewed managers. Second, the questions on corruption were phrased in such a way to avoid implicating the respondent of wrongdoing. Thus, the questions about paying bribes were a part of the general question whether a respondent paid and how much for any ordinary business procedure and were located after the list of the official and other necessary payments. For example, in the question No.4: "Did you pay and how much during the registration process?" the columns "voluntary contributions" and bribes are posed in the final columns

[4] The results of the survey "Partnership for a Transparent Society" are available at the web-site www.prozorist.org.ua

after the columns with the official fees, notary fees, other official payments, and expenses on hiring a lawyer[5]. Third, seven multiple questions and four simple questions about corruption in the various fields of business activity were located in the different sections of the questionnaire. The bribery questions were involved with grafting during registration (No.4), obtaining permits on construction and renovation of the premises (No.10), obtaining permits on exploitation (No.13 and No.16), licensing (No.19), certification of the equipment (No.31), obtaining permission on import (No.43), custom clearing of the goods (No.46), obtaining permission on export of the goods (No.53), certification of the production and services (No.65), inspections provided by any control agencies (No.69). The bribe data for the research were obtained by summing up of all quantitative answers on corruption question. Fourth, the interviewers visited each firm at least twice to accommodate the manager's time schedule. The data collection efforts were also aided by the fact that the issue of corruption has been widely discussed in the Ukrainian society. The public concern on corruption has been flurried by the corrupt scandals involved with the Ukrainian high-top officials and highlighting of corruption practice at the local mass media.

The RCS researchers were able to collect the following bribery data. The top managers of 359 out of 700 enterprises answered the general questions whether they bribed the officials (implying "yes" or "no" answers). Only 246 firm managers declared the sum of paid bribes. Concerning the reluctant respondents, the non-grafting managers can have frankly and sincerely answered "no" and declared zero-bribe, as they have had nothing to conceal. To test this hypothesis, I run two nested Probit models. The one applies the observations, in which the bribe questions were answered (Models II, III, and IV in Table 4.1), and the other one uses all observations assuming that all non-respondents are bribers (Model I in Table 4.1).

[5] Due to the sizable volume of the poll questionnaire (114 questions), it is not attached to the thesis, but it can be submitted upon request. The detailed description of the inquiring technology is provided in the subsection Data sources in Data description (Appendix A).

Table 4.1. The results of the Probit analysis with the bribery dummy as a dependent variable

Independent variables	Specifications of the nested models			
	I	II	III	IV
Constant	0.894 (0.919)	0.702 (1.015)	-0.526 (1.739)	0.311 (1.749)
Center	7.479*** (0.232)	8.075*** (0.227)	8.216*** (0.331)	7.574*** (0.258)
East	0.833*** (0.306)	0.591** (0.298)	1.002** (0.457)	0.795* (0.444)
West	-	-	0.209 (0.315)	-
Capital	1.091*** (0.327)	0.965*** (0.365)	1.168*** (0.470)	0.964** (0.424)
South	0.253 (0.185)	-0.057 (0.220)	-	-0.210 (0.318)
Manufact	-0.380 (0.397)	-0.183 (0.230)	-0.340 (0.324)	-0.762** (0.350)
Trade	-0.188 (0.375)	0.112 (0.218)	0.452 (0.398)	-
Service	-0.248 (0.383)	-0.205 (0.221)	-	-0.490 (0.406)
Intermed	6.848*** (0.398)	7.873*** (0.186)	7.850*** (0.438)	7.009*** (0.460)
Science	-0.419 (0.661)	-0.232 (0.708)		
Other	-	-	0.042 (0.570)	-0.344 (0.572)
Mediator	1.058*** (0.317)	0.884*** (0.268)	0.974*** (0.359)	1.000*** (0.351)
Lage	0.019 (0.110)	-0.080 (0.132)	-0.005 (0.194)	-0.030 (0.205)
Ltime	0.097 (0.092)	0.167 (0.110)		0.140 (0.198)
Llabor_2000	-0.109*** (0.044)	-0.028 (0.045)	0.081 (0.093)	0.082 (0.118)
Lsales_2000				0.102 (0.104)
Profit_2000			-0.005*** (0.002)	-0.004 (0.002)
Lcost_p_2000				-0.099 (0.064)
Log-likelihood	-156.83	-136.23	-60.368	-59.895
LR	70.224	50.828	31.508	32.058
McFadden R^2	0.182	0.157	0.206	0.211
Observations	637	357	162	161

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) level.

Although the coefficients do not differ significantly at first sight, the formal tests reject the null hypothesis of equal coefficients in two competing models at any sensible significance level in the vast majority of cases. Therefore, the hypothesis that reluctant respondents are bribers cannot be accepted; and the complete sample of 700 firms cannot be used in the regression analysis.

The detailed bribery data description per type and per region is provided in Table A.3 (Appendix A). Thus, the highest average individual bribe was UAH 4495.00 and was observed in the Central region; the lowest one was UAH 870.92 in the Southern region. The leader in the collective bribes was Kiev with UAH 2051.59 in average, whereas the least-grafting region is the Western Ukraine with UAH 470.97. The highest average total bribe is UAH 4495.00 and is observed in Kiev, while the lowest one is UAH 870.92 in the Southern region.

In order to investigate the dissimilarities between two groups of the answered and non-answered respondents, I apply two methods. First, I test whether the differences between the group means are significant. Second, I apply a Probit regression analysis with a dummy dependent variable ANSWER to determine, if the difference in features of answering and reluctant respondents is significant. First, the tests on significance of the differences between the group means (Appendix A.2) demonstrate that the differences in age of the firms and labor employed in 2000 are statistically significant, whereas the difference in time spent on negotiations with the officials is insignificant at any sensible level of significance. Thus, the smaller enterprise the more reluctant it is to answer the questions on bribes. This may have happened because the small firms may be less confident in their stable position and may be more scared of any revenge from the side of the bureaucrats.

Second, the Probit analysis of the probability of response to the questions on bribery (Table A.2, Appendix A) demonstrates that labor employed as a proxy of a firm size, age of the firm and location at the Western region are

significant predictors of the answers. Thus, the marginal effects of logs of age and labor on probability to answer vary from –2.4% to –8.5% and from 2.6% to 9.1% correspondingly (Table A.2. and Table A.2.1., Appendix A). The absolute effects of the unit growth in age and labor are even less considerable and correspond to –0.024% and -0.085%, 0.026% and 0.091% respectively. The marginal effect of being located in the Western Ukraine is significant one and equals 3.3%-8.4% (Table A.2. 1, Appendix A).

These results suggest that the bigger and the younger enterprise the less it is reluctant to answer the bribery questions. The bigger firm may possess more stable market share and financial position than the smaller one, and, consequently, the managers are more confident in the firm's forces to counteract to any bureaucratic pressure. On the other side, the younger firm may be more willing to answer, as it may have the fewer contacts with the corrupt officials to save them or have not had the large experience in grafting to conceal. The significant association between location in the Western region and answering the bribery questions may be involved with the difference in the historical and institutional development of the West in comparison with the rest of Ukraine. Although the Western Ukraine was joined to the USSR in 1940, the Soviet ruling was introduced there only after the Second World War in 1945 that is 23 years less than in the main part of Ukraine. The local population actively opposed to the collectivization and repressions provided by the new power; the partisan war and the sabotage continued up to 1964. As a result of the differences in the regional development, the Western people can be more resistant to any bureaucratic pressure and more responsive to the discussions of the corrupt issue.

Although the above-mentioned coefficients were significant in the regression analysis, the possible selection bias cannot be captured properly, because there is no reasonable way to formalize the selection equation. The respondent's reluctance to answer can be likely involved with unsystematic and idiosyncratic fear. Therefore, the possible selection bias has to be ignored (the

extended discussion on this issue is provided in Empirical methodology, Chapter 3).

Concerning the second source of the data, the financial statements of only 163 firms out of 359 answered ones were obtained from the database "Phenix" and from the web sites originated from the State Committee of Ukraine on Securities and Derivatives (www.smida.gov.ua and www.corporation.com.ua). The data for another 196 firms were unavailable because of the following reasons. First, the applied database and the web sites contain the data of near 140,000 enterprises, whereas there were 211.1 thousand of the enterprises at the end of 1999 (express-report No.455 of the State Statistics Committee of Ukraine dated 10 December 1999). Second, the data of the firms were searched by the name of the firms in correspondence with the spelling used by the RCS interviewer because the official registration code was not inquired in the surveys. Therefore, the interviewers might have mistaken in the precise writing of the firms' name and in this way impeded the search for the financial statements. However, the data of 151 firms on labor employed (2001), sales, capital, cost price, payroll expenses, profit, taxes, and the stake owned by the firm management, state and by foreigners (all data for 2000 and 2001) were obtained from the financial statements. In the models the data were used mainly in log-transformed form or in the "growth" form that is a difference between the log-transformed data for 2001 and 2000.

The research sample is constituted from 359 observations corresponding to the top managers having generally answered the questions on bribery ("yes" or "no"); 246 firms out of the total declared the sum of the paid bribes. The sales growth and profitability growth are chosen as indicators of the firm growth. As can be seen from the correlation matrix (Table A.6, Appendix A), there are weak positive correlations between the bribes and sales growth (0.299), bribes and profitability growth (0.135). In contrast, there is a stronger and positive correlation between taxes paid and sales growth (0.427); as well, there is a negative correlation between taxes and profitability growth (-0.190).

Defining the outliers

In general, the size of a bribe should not exceed the sales in the same period. Otherwise, bribes would be more than returns from bribery that can be economically inefficient. Meanwhile, there may be a "long-term" effect of grafting on sales because possible growth may occur not exactly in the period of giving bribe but in the next one. However, the principle of unordinary large size of bribe in comparison with sales for the same period was chosen as a rule for defining the outliers in the bribery data.

In correspondence with Graph A.1 and Graph A.2 (Appendix A) the majority of total bribes scaled on sales concentrate within the interval from 0 to 0.06 (detailed descriptive statistics are provided in Table A.4, Appendix A). However, there are only three observations with the scaled bribes equal to 1160, 125 and 0.68. They may be characterized as "unusual" scaled bribes for the given sample. In the first two cases the briber had too lean sales in 2000 (TUAH 0.10 TUAH 0.001 correspondingly), whereas in the third case the bribe amounts to more than a half of the sales in the same period, TUAH 17.1 and TUAH 25.6 correspondingly. Hence, the observations with the scaled bribes equal to 1160 and 125 are outliers and excluded from the sample. In contrast, the observation with the bribe rate at 0.68 is not accepted as an outlier, as it does not exceed the two-standard-deviation margin from the mean of the bribe sample.

Applying the economic reasoning and principle of unordinary size, three observations with the profitability values (profit scaled on sales) of -12,390.00, -372.50 in 2000 and -295.76 in 2001, and corresponding effective tax rates (taxes scaled on sales) 410.00, 83.17 and 27.35 are accepted as outliers and excluded from the researched sample.

As a result, statistic characteristics of the sample are improved. The summary statistics of the key variables before and after sample correction are represented in Table A.5.1 and in Table A.5.2 (Appendix A).

Chapter 5

RESULTS

What determines the size of bribe?

The Hausman test detected endogeneity in relations between bribes in monetary units and sales in 2000 (Appendix B.3). In contrast, the reverse causality was not found in relations between bribes and profitability in 2000 (Appendix B.4). Therefore, the instrument technique is applied only to sales in 2000 to circumvent endogeneity. The coefficient of correlation between applied instrument of industry-location average and log of sales in 2000 is 0.2912.

The Tobit regression analysis without the instruments for log of sales and with the instruments (Table 5.1) revealed strong relations[6] between the size of a bribe and locations in the West and South, and an age of a firm. Thus, a firm located in the Western Ukraine tends to pay lower bribe by 0.67% than one in the Center and by 0.91% than one in the Capital. A bribe given by a firm in the South is lower by 0.53% than one in the Center and by 0.75% than in the Capital. A new spin-off tends to pay higher bribes than the older one. The increase in the age of an enterprise corresponds to the decrease in the size of a bribe by 0.0023-0.0024% per one more day or by 0.84%-0.88% per one more year.

A weak relationship was found between the size of a bribe and engagement in intermediary activity, and profitability in 2000. An intermediary, wholesale firm tends to give higher bribes than one engaged in the retail trade.

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[6] To avoid too frequent references on the level of significance, hereafter I use the following implication. A statistically strong relationship implies the significance of the coefficients at 1% and 5% either in the vast majority of specifications of the nested model or in a few regressions applying the larger samples. In case of insignificant coefficients in some regressions, they must have the same sign as in regressions with the significant coefficients to keep significance of the relationship. A statistically weak relationship implies significance of the coefficients either at the 10% in the majority of the model specifications or significance at 1% and 5% in a few regressions using smaller samples.

Table 5.1. The summary[7] on the Tobit regression analysis with the bribe in monetary units as a dependent variable from Table B.2 and Table B.3, (Appendix B).

Variables with the significant coefficients	Coefficients within the bounds		Marginal effects within the bounds		Significant in/out of models
	Lowest	Highest	Lowest	Highest	
West	-1.684*** (0.624)	-2.271*** (0.604)	-0.6736	- 0.9084	2 / 5
South	-1.333** (0.656)	-1.879*** (0.630)	-0.5332	- 0.7516	3 / 5
Log of Age	-0.584** (0.268)	-0.601** (0.270)	- 0.0023	- 0.0024	2 / 6
Intermediary	2.144* (1.194)		0.8576		1 / 5
Profitability in 2000	-0.949* (0.572)	-1.291* (0.791)	-0.3796	- 0.5164	2 / 3
Profitability in 2000 after controlling for endogeneity (Table B.3)	-1.114 (1.033)	0.046 (0.133)	Insignificant		0 / 3
LR	31.508	70.224	-	-	-
Akaike info criterion	4.406	5.687	-	-	-
Observations	41	244	-	-	-

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.

More profitable enterprises tend to give lower bribes in the same year (2000) than the less profitable ones. However, the association between the size of a bribe and profitability in 2000 becomes insignificant after controlling for the endogeneity between a bribe and sales in 2000 (Table 5.1).

[7] Hereafter, the summaries introduce the significant coefficients found in the sizable regression analyses completely represented in Appendix B. The analysis is based on applying of the nested models with the different sets of the independent variables.

Who pays bribes?

The Probit analysis discovered strong relations between the probability to bribe and locations in the Capital, Center, East; engagement in the intermediary activity; shares owned by the foreigners, the state and by the managers; hiring a mediator, and a firm size proxied by the labor employed in 2000. According with Table 5.2, the probability of bribing increases by 38.6-162.8%, 323.0-434.0%, and by 23.6%-82.8% for the firms located correspondingly in the Capital, Center and in the East in comparison with ones in the West and in the South. The huge difference in the probability corresponds to the inferences from the raw data analysis provided in Data Analysis, Chapter four.

An intermediary firm tends to have the highest probability to bribe that is greater by 314.9-319.8% than the other firms. The intermediary firms are mainly engaged in export-import operations and in the wholesale. Therefore, they have to contact frequently with a large number of the regulatory bodies like customs, quality and medical authorization agencies, banking operations control and etc. The results of the regression analysis can suggest that the higher frequency of contacts with the officials relates to the higher probability of grafting.

The regression analysis discovered that the larger part of the shares owned by the foreigners, the less the enterprise is engaged in relations with the corrupt officials. A one-percent increase in the stake owned by the foreigners corresponds to 1.5-1.7% decrease in the probability to bribe. Perhaps, caring about their image in Ukraine and abroad, the foreign entrepreneurs tend to comply with the Ukrainian and their domestic legislations and try to avoid illegal relations. On the contrary, a one-percent increase in the shares owned by the managers relates to the increase in probability of grafting by 1.0-1.1%. It can imply that the managers motivated in the higher future profit as owners tend to use wider the corrupt relations.

Hiring a mediator to negotiate with officials on the regulatory issues increases dramatically the probability of bribing from 35.3% to 481.0%. Thus, being likely involved with direct bribing, a contact man can be personally interested in extracting as high bribe as possible from a businessmen to take an extra fee for his job.

The Model I (Table B.1, Appendix B) applying maximum available data (357 observations) revealed strong negative relationship between the probability to bribe and the size of a firm, which was proxied by the labor employed. A one-employee increase corresponds to 0.04% decrease in the probability to bribe. This result can suggest that a smaller enterprise tends to bribe more often than a bigger one. As long as, it was not found the significant relationship between a bribe and the size of a firm in the Tobit analysis given above, a smaller firm can pay higher bribes in total than a bigger one.

The weaker relations were found between probability of bribing and engagement in manufacture, trade and science; time spent on the negotiations with officials and profitability in 2000. Manufacturing firms tend to bribe less than the ones engaged in other activities. The associations between bribing and trade, bribing and innovation activity are ambiguous. Concerning the trade, the relationship was positive in one specification with 161 observations; it was negative in two other models with 84 observations, while the relationship was insignificant in the majority of the models applying the bigger samples. The coefficient at the science dummy is strongly positive in the regression applying the sample of 162 observations, whereas the coefficient is negative and insignificant in the regressions using the larger sample with 357 observations.

The Probit analysis revealed that time spent on negotiations with officials over the regulatory issues has a weakly negative relationship with the probability of bribing. A one-percentage increase in time spent on officials corresponds to decrease in probability of bribing from 0.47% to 0.41%. Thus, a businessman pays by his own time to avoid a bribe extorted by a corrupt official.

Table 5.2. The summary on the Probit analysis with a bribe rate as a dependent variable (Table B.1, Appendix B).

Variables with the significant coefficients	Coefficients within the bounds		Marginal effect within the bounds		Significant in/out of models
	Lowest	Highest	Lowest	Highest	
Center	8.075*** (0.227)	10.849*** (1.102)	3.230	4.340	6 / 6
East	0.591** (0.298)	2.070*** (0.730)	0.236	0.828	4 / 5
West	-2.618*** (1.056)	-0.985** (0.422)	-1.047	-0.394	2 / 4
Capital	0.965*** (0.365)	4.069*** (1.181)	0.386	1.628	5 / 5
South	-2.330*** (0.867)	-1.172*** (0.468)	-0.932	-0.468	2 / 4
Manufacture	-2.363** (0.230)	-0.762** (1.038)	-0.945	-0.305	3 / 5
Trade	-2.057* (1.098)	0.773** (0.353)	-0.823	0.309	3 / 5
Intermediary	7.873*** (0.186)	7.994*** (0.412)	3.149	3.198	5 / 5
Science	6.737*** (0.523)		2.695		1 / 2
Mediator	0.884*** (0.268)	12.025*** (1.606)	0.354	4.810	6 / 6
Foreigners' Owning	-0.038** (0.016)	-0.043*** (0.017)	-0.015	-0.017	2 / 2
Managers' Owning	0.024*** (0.009)	0.027*** (0.011)	0.010	0.011	2 / 2
Log of time on negotiation	-1.170** (0.570)	-1.053** (0.507)	-0.468	-0.412	2 / 5
Profitability	-0.005*** (0.002)	-0.004* (0.002)	-0.002	- 0.0016	2 / 5
Log of labor in 2000	-0.109*** (0.044)		-0.044		1 / 6
LR	31.508	70.224	-	-	-
McFadden R^2	0.157	0.522	-	-	-
Observations	84	357	-	-	-

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) level.
The marginal effect for the non-binary variables is calculated for one-unit increase.

As profitability in 2000 weakly negatively relates with probability of bribing, the more profitable firms in 2000 tend to bribe less often. It can suggest that the less successful entrepreneur can use bribing to enhance their profitability.

Does corruption steal tax revenues?

As in this case the Hausman test did not detect the reversal causality between bribe and tax rate change calculated as a difference in paid taxes scaled on sales (Appendix B.5), the instrument technique is not applied to bribe rate to circumvent endogeneity. The regression analysis summarized in Table 5.3 does not reveal a significant relationship between the fact of grafting and the tax rate change. Meanwhile, there are permanently negative signs at the bribery dummy, which differs from zero at 14-17% level of significance. However, the extended regression analysis including paid bribe rate (the bribes scaled on the sales) as an explanatory variable (Table 5.3) discovered the strongly negative relationship between bribery and the effective tax rate. Hence, a one-percent increase in the bribe rate in 2000 relates to 6.50-11.67% decrease in the overall tax rate since 2000 to 2001.

The found estimate of the "tax stealing effect" may be biased because aside with the tax avoidance the firms can use legal opportunity of tax evasion being available since 2000. The window of opportunities was opened by the liberalization of the tax system provided in correspondence with Ukaz of the President of Ukraine "On the simplified system of taxation" on 19 September 1999. The legal act enables small and medium firms with the number of employees no more than 50 and with the year sales turnover up to 500 TUAH in 2000 (1,000 TUAH in 2001) to switch from more complicated and excessively regulated acting tax system to more simple and liberal one. It provides simplified rules of taxation, decreases the number of taxes, shrinks the overall tax rate, and absolves from the strict regulatory procedures. According to the one scheme, a firm can choose to pay one

unified turnover tax at 10% instead of the conventional 26 taxes, i.e., VAT with the rate of 20%, profit tax at 30%, payroll taxes at 48% in total and etc. The other scheme enables the firms to pay unified tax at 6% with VAT at 20% instead of the usual taxes. Thus, the small and medium firms were able to decrease taxes in a legal way. To capture a tax evasion effect, I accept the coefficient at the log of sales in 2000 as a proxy for the size of a firm. The negative coefficients at the sales variable can partially grab the extent, to which the firms actually use the available opportunities of tax evasion. According with the regression analysis summarized in Table 5.3, a one-percent increase in the sales in 2000 corresponds to the decrease in the effective tax rate by 0.62-0.76%.

Table 5.3. Summary on the key variables from the regression analysis with a tax change as a dependent variable (Table B.10 and Table B.11, Appendix B)

Independent variables	Specifications of the nested model					
	I	II	III	IV	V	VI
Table B.10 (Appendix B)						
Bribery dummy	-1.068 (0.732)	-0.926 (0.671)	-0.671 (1.619)	-0.749 (0.685)	-0.898 (0.725)	-1.026 (0.731)
Log of sales in 2000		-0.763*** (0.181)		-0.618*** (0.175)		
R^2	0.900	0.919	0.978	0.916	0.900	0.906
F-statistic	77.063	75.242	337.77	62.893	65.579	55.508
Observations	115	115	117	115	116	115
Table B.11 (Appendix B)						
Bribe	-11.672*** (3.571)	-11.470*** (3.585)	-7.109* (3.732)	-6.796** (3.506)	-6.502* (3.541)	-6.629* (3.551)
R^2	0.993	0.993	0.995	0.995	0.995	0.995
F-statistic	805.26	745.28	880.40	822.38	787.59	684.83
Observations	81	81	81	81	80	80

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) level.
The coefficients at dummy of bribe in the 1st, the 2nd, and 6th models are significant at 14%, 17%, and 16% level correspondingly.
The coefficients at the bribe rate in the 6th, 5th, and 3rd equations are significant at 6% level.

To find the unbiased estimate of the tax avoidance effect of bribery, the estimate of the coefficient at the bribe rate is adjusted on the proxy for tax evasion effect. Thus, the pure tax avoidance effect of bribery can be estimated at the level of 5.74-10.91%.

Does bribery impede sales growth?

The regression analysis with a bribery dummy does not discover the significant relationship between sales changes and bribing (Table 5.4). On the contrary, the extended regression analysis revealed strongly positive relations between bribe rate and sales growth. The one-percent growth in bribe rate corresponds to 7.9-12.7% increase in sales (Table 5.4). However, the coefficients at the bribe variable become insignificant firstly after dropping the outliers and stay insignificant further after controlling for endogeneity (Table 5.4). First, two outliers with bribe to sales rate 1160 and 125 demonstrate the considerable sales growth from TUAH 0.1 and TUAH 0.001 in 2000 to TUAH 61227.40 and TUAH 2.00 in 2001 correspondingly. The idiosyncratic effects of two outliers result in the significant positive bias, whereas relations between bribes and sales in the basic sample are insignificant. The outliers can be hardly involved with the mistakes during the poll because of two reasons. First, both bribes can be interpreted as "successful investments", as they are associated with the consequent huge increase in sales. Second, the poll procedure included a detailed data check and a series of measures aimed on promotion of frankness and sympathy of a respondent to the interviewer and to the poll program at all (see Data Analysis, Chapter Four). Furthermore, as the Hausman test (Appendix B.9.) rejects the hypothesis of non-endogeneity in relations between the bribe rate and sales growth, the industry-location averages are applied as an instrument to circumvent endogeneity. The correlation coefficient between the applied instrument and the raw bribe rate is 0.4758. The results of the regression analysis with a control for endogeneity do not reveal the significant relations between the bribes and the sales growth.

Table 5.4. Summary on the key variables from the regression analyses with a sales growth as a dependent variable from Table B.4, Table B.5 and Table B.6 (Appendix B).

Independent variables	Specifications of the model					
	I	II	III	IV	V	VI
Table B.4, Appendix B						
Bribery dummy	0.993 (0.913)	0.929 (0.815)	0.061 (0.670)	0.027 (0.698)	0.027 (0.701)	0.008 (0.719)
R^2	0.025	0.110	0.724	0.724	0.724	0.724
F-statistic	0.353	1.400	16.230	15.128	14.156	13.139
Observations	161	161	116	116	116	115
Table B.5, Appendix B (with the outliers in the bribe rate)						
Bribe	0.120*** (0.005)	0.127*** (0.005)	0.118*** (0.009)	0.118*** (0.009)	0.079*** (0.008)	0.082*** (0.008)
R^2	0.785	0.819	0.862	0.862	0.933	0.935
F-statistic	27.227	20.261	25.440	23.585	48.918	47.005
Observations	119	83	82	82	82	82
Table B.6, Appendix B (without the outliers in the bribe rate)						
Bribe instrumented	-1.682 (2.435)	0.830 (3.954)	-0.049 (4.905)	0.033 (4.974)	1.466 (3.491)	0.539 (3.552)
R^2	0.089	0.114	0.318	0.318	0.670	0.678
F-statistic	0.724	0.567	1.868	1.732	7.005	6.783
Observations	118	81	81	81	81	81

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) level.

To summarize, the significant positive bias affected by the outliers can suggest that bribery has a discriminatory positive impact on sales growth because only a small number of firms succeeded in sales growth resultant from the grafting, whereas the vast majority of firms bares spare bribe expenses in terms of sales.

How does bribery affect profitability?

The regression analysis with a bribery dummy revealed weak positive relationship between the profitability growth and the fact of bribing (Table 5.5). In three models the coefficients were significant at 6% (in the fifth and sixth models) and at 10% significance level (in the fourth model), whereas in the other three regressions the coefficients were significant only at 16%. However, the regression analysis with the bribe rate as an explanatory variable gives another evidence of the positive association. In a sample with the outliers a one-percentage point increase in the bribe rate relates to increase in the profitability by 301.32-335.3% (Table 5.5). This effect is excessively and unrealistically high that is involved with idiosyncratic impact of the outliers in the profit observations. Exclusion of three outliers with the profitability values of –12390.12 and –372.36 in 2000, -295.76 in 2001 results in more realistic and reliable outcome. A one-percent increase in bribe rate corresponds to 15.13-17.32% growth in profitability. Thus, bribery can affect profitability even higher than sales, i.e. one-percent increase in sales is associated with 13.24-24.66% increase in profitability (Table 5.4). The striking effect of corruption can be partially explained by the "tax-stealing" effect of bribery that is estimated at 5.74-10.91%. Bribing officials, the firms can avoid taxation and boost the after-tax profit. However, the coefficients at the bribe rate were insignificant in two models applying the larger samples with 116 observations, while the coefficients were significant in four regressions with the smaller samples with 80-81 observations. It can suggest many firms extract huge profits by bribing, while the others neither gain profits, nor use corrupt relations at all.

Table 5.5. Summary on the key variables from the regression analyses with a profitability growth as a dependent variable from Table B.10 and Table B.11 (Appendix B).

Independent variables	Specifications of the model					
	I	II	III	IV	V	VI
Table B.7, Appendix B						
Bribery dummy	3.039 (7.172)	9.651 (6.774)	9.552 (6.784)	11.413* (7.146)	13.575* (7.288)	12.815* (7.395)
Sales growth	24.663*** (3.431)	13.425*** (3.258)	13.238*** (3.270)			
R^2	0.323	0.722	0.724	0.675	0.678	0.683
F-statistic	4.918	17.215	16.139	13.881	12.913	11.408
Observations	159	115	115	116	115	114
Table B.8, Appendix B (with outliers)						
Bribe	3.426 (12.308)	2.964 (12.436)	301.32*** (95.616)	335.32*** (97.723)	329.10*** (94.213)	329.59*** (94.954)
Tax in 2000			-20.138*** (2.403)	-21.424*** (2.519)	-20.948*** (2.377)	-20.884*** (2.411)
R^2	0.926	0.926	0.967	0.968	0.970	0.970
F-statistic	84.528	78.098	138.17	113.63	130.18	120.68
Observations	118	117	82	81	81	81
Table B.9, Appendix B (without outliers)						
Bribe	0.582 (1.191)	0.453 (1.200)	15.134* (9.087)	16.939* (9.777)	17.317* (9.876)	17.301* (9.956)
Tax in 2000			-1.396*** (0.270)	-1.488*** (0.263)	-1.500*** (0.266)	-1.497*** (0.269)
R^2	0.944	0.944	0.972	0.974	0.974	0.974
F-statistic	98.044	92.530	131.80	141.44	131.88	122.94
Observations	116	116	81	80	80	80

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) level.
Regarding the results from Table B.7, coefficients at the bribery dummy are significant at 16% level of significance in the 2nd and 3rd models, whereas in the 5th and 6th models ones are significant at 6% level.
Concerning the outcomes from Table B.9, the coefficients at the bribe rate are significant at 8% in 6th, 7th and 8th equations, and at 10% in 3rd equation.

Chapter 6

CONCLUSIONS

The results of the conducted research lead to the conclusions that corruption destructively affects the growth of the enterprises and economic growth of Ukraine at all.

First, bribery impedes competition, as corruption imposes high time and monetary costs on the firms, and fines more heavily the new spin-offs than the others. Thus, the younger and smaller firms bear the higher bribe costs than the older and the bigger ones. A one-year increase in the age of an enterprise corresponds to the decrease in the size of a bribe by 0.84-0.88%, whereas the one-employee increase relates to 0.04% decrease in the probability to bribe. Since it was not found the significant relationship between a bribe and the size of a firm, the smaller firm can pay higher bribes than the bigger ones, given the higher probability to bribe. Aiming at saving on the bribery costs to a firm, a businessman can hire a mediator. However, employment of the contact person results in the opposite outcome, as it relates to more frequent bribing by 35.3% to 481.0%. As well, weakly negative relationship between time spent on negotiations with officials over the regulation and probability of bribing can suggest that a businessman tends to pay by his own time to avoid a bribe squeezed by a corrupt official.

Second, corruption can hinder trade, as engaging in export-import operations and in wholesale dramatically increases the probability to bribe up to 314.9-319.8% in comparison with the other types of business activities. The intermediary firms have frequently to comply with the strict regulatory legislation in the field and need to contact with a great number of the state agencies controlling foreign trade, customs clearing and quality of the goods. This result can confirm the hypothesis that the more frequent contacts with authorizing officials relate to the higher bribes.

Third, bribery is involved with a stealing of the budgetary incomes, as it promotes tax avoidance. A one-percentage point increase in the bribe rate corresponds to decrease in the overall tax rate paid by a firm by 5.74-10.91%.

Fourth, corruption distorts incentives and promotes inefficient usage of the human and financial resources of the society. Bribing an official, a businessman can extract even higher net profit than by increasing the sales. The one-percentage point increase in the bribe rate can relate to increase in the profitability by 15.13-17.32%, whereas the one-percentage growth in sales corresponds only to 13.24-24.66% increase in profitability. The high profitability of a bribe can be involved with the tax avoidance effect connected with corruption.

Furthermore, corruption has a discriminatory impact on sales. Only a small number of firms benefit by bribing, while the majority does not gain much in terms of sales growth. Consequently, a businessman can prefer to bribe and succeed in rent seeking rather than to invest in less profitable production and in enlargement of sales[8].

Policy implications

As corruption is harmful for the Ukrainian economy, it should be suppressed by further liberalization of the tax legislation and deregulation of the economy.

The tax reform should be aimed at creation of favorable tax climate for the small and medium firms, and for the new entrants, because these enterprises mainly suffer from the discretionary power of the officials. Aside with diminishing of the overall tax rate, the number of taxes should be reduced, and the procedure of taxation should be simplified. On one hand the official will be deprived from the wide discretion over business regulation. On the other hand, the firms will have no need to contact frequently officials to

[8] The further researches based on the non-parametric methods (DEA) also found negative effect of bribery on the production efficiency of the Ukrainian enterprises [Yankovskyy (2003)].

comply with the tax legislation. As well, aiming at maximizing profit, the businessmen will have less incentive to use corrupt relations to avoid excessive taxation, because they will be able to evade it in a legal way.

The deregulation reform should be aimed at diminishing of the monitored activities, reducing a number of the controlling bodies, simplification of the regulatory procedures, and enhancing of transparency in decision making over regulation. Consequently, a number of contacts between the officials and the businessmen will decrease, whereas the probability for the corrupt officials to be detected and caught will increase. As a result, the opportunity for the corrupt activities will be reduced.

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Appendix A

DATA DESCRIPTION

Data sources

The survey objects were small, medium, and large business entities operating in all basic economic sectors, except the agriculture. Taking into account the survey object consisted of several subgroups that were defined by various features (size of the enterprise, type of activity, form of ownership, etc.), the researchers endeavored to construct a representative sample and chose a number of employees as a quoting indicator and a type of business activity as a control indicator. It was provided a following reasoning behind their choice. First, choosing more than one quoting parameter could lead to a shift in the sample to so-called "dead" enterprises, which are registered but are not working. Second, the choice of more than one control criteria would lead to creation of statistically insignificant sub-samples; and consequently error control would be impossible. The quoting was aimed at the number of employees rather than a type of activity to collect in the sample as more "alive" firms as possible. The sampling calculations were mostly based on the unified complete official data concerning the state in the real sector and provided by the State Statistics Committee, the Licensing Chamber, Ministry of Economy and Tax Administration.

The obtained sample has the following features. First, the client (the USAID project "Regulatory reform") defined the quantitative parameters of the sample. The survey comprised a total of 700 enterprises in 6 different sectors of the Ukrainian economy and in 10 towns (70 firms per town) representing 5 locations. The cities were selected by the client taking into account the regional specialization. They are located in all main economic regions of Ukraine. However, their geographic distribution is uneven. Four cities (Ternopil, Lutsk, L'viv, and Chernivtsi) represent the Western Ukraine; two towns (Kharkiv and Donetsk) are located in the eastern

region; two cities (Odessa and Simpheropil) represent the southern region; Khmelnitskiy is from the central region; and Kiev is defined as a separate region as a Capital of Ukraine.

Second, taking into account the data of the State Statistics Committee of Ukraine (express-report No.455 dated Dec. 10, 1999), there are 211.1 thousand enterprises of all forms of ownership in Ukraine (except for farms) and 151.4 thousand or 71.7% of those are small enterprises (the number of employees less than 50), hence, 70% or 49 of the surveyed enterprises represent small business in each city. Therefore, survey comprises 21 enterprises with over 50 employees each and 49 enterprises with less than 50 employees in each town.

Third, using a type of activity as a control indicator, the data in the sample were collected in correspondence with the structure of the Ukrainian economy (express-report of the State Statistics Committee of Ukraine No. 455 dated Dec. 10, 1999). The firms in the sample represented the basic economic sectors in the following shares: the processing industry and construction (joined in the category "manufacture") is 29%; the retail trade (trade) is 23%; the wholesale and intermediary (joined in term "intermediary") is 18%; the real estate transactions, rent and services to legal entities (joined in term "services") is 9%; science and innovation (joined in "science") is 5%; and the other activities is 16%. "Other" includes mining; production of energy, gas and water; hotel and restaurant businesses; transport; financial activity; collective public and private services.

Data description

LSALES_2000 is a log of sales in UAH according to the financial statements of the firms.

SALES_GROWTH is a sales growth over the period 2000-2001 that is defined as [log(sales in 2001) – log (sales in 2000)].

LAGE is a log of a number of days from the day of the official registration of a firm till the 31st December 2001.

BRIBE is a reported bribe in UAH.

BRIBE_sc is a reported total bribe (BRIBE_TOT_SC) in UAH scaled on the sales in 2000 (bribe rate), which is a sum of bribes paid individually to a official (BRIBE_IND_SC) and collective bribes paid to the non-budgetary accounts of the state agencies (BRIBE_COL_SC).

BRIBE_INS is an average bribe rate at the location-industry level that is calculated manually.

D_BRIBE is a dummy equal to 1 if a manager reported about bribing and 0 if did not.

TAX is reported taxes paid in the UAH and scaled on the sales in 2000.

TAX_INS is an average tax ratio at the location-industry level.

TAX_GROWTH is a growth in the tax rate for the period 2000-2001 that is defined as [(tax in 2001/sales in 2001) – (tax in 2000/sales in 2000)].

LLABOR_2000 and LLABOR_2001 are logs of the labor employed in 2000 and 2001 correspondingly.

CAPITAL_GROWTH is a growth in capital for the period 2000-2001 that is defined as [log(capital in 2001) – log (capital in 2000)]. The capital in the particular year is determined as a book value of the fixed assets (free of depreciation).

COST_P_GROWTH is a growth in the cost prices of the produced goods for the period 2000-2001 that is defined as [log (cost price in 2001) – log (cost price in 2000)].

ADV_EXP_GROWTH is a growth in the expenditures on advertising for the period 2000-2001 that is defined as [log (advertising expenses in 2001) – log (advertising expenses in 2000)].

PROFIT_2000 is a profit in UAH reported in the financial statements of the firms and scaled on the sales in 2000.

PROFIT_GROWTH is a growth in profitability of the firms for the period 2000-2001 that is defined as [(profit in 2001/sales in 2001) – (profit in 2000)/sales in 2000)].

LTIME is a log of the managers' estimate of time spent that is obtained as an answer on the question IV of the questionnaire "What per cent of working time management deal with regulatory requirements?"

MANAG_OWN is a stake in the charter fund of the firm that is owned by the mangers.

FOREIGN is a stake owned by the foreigners.

STATE is a share in the charter fund of a firm that is owned by the state.

MEDIATOR is a dummy for the presence of the middleman in negotiations with officials. This dummy is obtained from the answer on the question No.2 of the questionnaire "Did you hire middlemen (negotiator) for registration your business entity?" Despite the fact that the question referred only to the registration process, the answer highly likely reflects the general attitude of the firm management towards the usage of the middlemen in negotiations with the officials. Therefore, it is used as a proxy for the general usage of the negotiators in the cases involved with regulatory authorities.

There is a set of five dummies reflecting the location of the firms in the geographical regions. The groups of respondents from the different towns are joined in the larger groups in correspondence with the geographical position of the towns.

EAST equals to 1 if a firm is from the Eastern towns Kharkiv and Donetsk and 0 if otherwise.

WEST equals to 1 if a firm is from Ternopil, Lutsk, L'viv, and Chernivtsi and 0 if otherwise.

CENTRE equals to 1 if a firm is from Khmelnitskiy and 0 if otherwise.

CAPITAL equals to 1 if a firm is from Kiev, and 0 if otherwise.

There is a set of six dummies reflecting the sectors of the Ukrainian economy, which the firms are mainly engaged in. This set is obtained from

the answers of the firms on question II of the questionnaire about major type of activity. However, 23 firms declared that they are engaged in some types of activity. In order to be complied with the nature of the dummy variable, the data for these firms were reclassified in correspondence with the dominant type of activity stated in the financial documents, registration codes, or interviewers' notes.

MANUFACT equals to 1 if a firm is engaged in a production of any goods or construction and 0 if otherwise.

TRADE equals to 1 if a prime activity of a firm is a retail trade or a wholesale of low scale and 0 if otherwise.

SERVICE equals to 1 if a firm provided services for the population or business and 0 if otherwise.

INTERMED equals to 1 if a main activity of a firm is an intermediary or a wholesale and 0 if otherwise.

SCIENCE equals to 1 if a firm is engaged in an innovations or technology development and 0 if otherwise.

OTHER equals to 1 if a firm is engaged in mining; production of energy, gas and water; hotel and restaurant businesses; transport; financial activity; and 0 if otherwise.

Table A.1. Descriptive statistics of non-binary variables available from the Regulatory Cost Survey (RCS)

Statistics	The refusing respondents			The answering respondents		
	AGE	LABOR_ 2000	TIME	AGE	LABOR_ 2000	TIME
Mean	1822.36	13.04	30.43	1583.93	100.35	32.34
Median	1461.00	4.00	25.00	1460.00	3.00	30.00
Maximum	15341.00	332.00	100.00	16040.00	3998.00	100.00
Minimum	306.00	1.00	0.00	92.00	1.00	1.00
Std. Dev.	1710.15	29.37	22.27	1316.31	322.31	22.16
Observations	323	341	315	359	359	359

Notes:

AGE is an age of the enterprise in days since the date of the registration till the 31st December 2001.

LABOR_2000 is the labor employed in 2000 in persons.

TIME is the time spent on negotiation of the regulatory issues with the officials in the percentage of the whole working time of the management.

Appendix A.2. Tests on significance of the difference in means of the parameters of the answered and non-answered groups

The null hypothesis to be tested is whether the difference between the means of the non-answered ($\overline{X}_{n.a.}$) and answered ($\overline{X}_{a}$) groups is significant.

H_0: $\overline{X}_{n.a.} \equiv \overline{X}_{a}$

H_1: $\overline{X}_{n.a.} \neq \overline{X}_{a}$

$$t_{calc} \equiv \frac{\overline{X}_{n.a.} - \overline{X}_{a}}{se(\overline{X}_{n.a.})/\sqrt{n}} \sim t_{\alpha/2}$$

Decision rule is to reject H_0 if $t_{calc} > t_{\alpha/2}$.

1) The test on significance of the difference between the means for the age of the enterprises (AGE):

t_{calc} = (1822.36 – 1583.93)/(1710.15/$\sqrt{323}$)= 2.506

H_0 cannot be rejected at significance level of 1% and is rejected at 5% and 10% levels of significance. The difference is significant.

2) The test on significance of the difference between the means for the labor employed in 2000 (LABOR_2000):

t_{calc} = (13.04 – 100.35)/(29.38/$\sqrt{341}$)= - 54.863

H_0 is rejected at 1% level of significance. The difference is significant.

3) The test on significance of the difference between the means for the time spent on negotiations with the officials (TIME):

t_{calc} = (30.43 – 32.34)/(22.27/$\sqrt{323}$) = - 1.525

H_0 cannot be rejected at any significance level from 1% to 10%. The difference is insignificant.

Table A.2. The results of the Probit analysis with the dependent variable ANSWER equal to one if the respondent answered the questions on the bribes and zero otherwise.

Independent varibles	Specification of the models					
	I	II	III	IV	V	VI
Constant	0.687 (0.545)	0.715 (0.584)	0.949 (0.645)	1.291** (0.621)	0.410 (0.678)	0.737 (0.654)
Centre	0.084 (0.196)	-			0.138 (0.199)	-
East	-	-0.075 (0.201)			-	-0.115 (0.204)

West	0.485*** (0.137)	0.450** (0.184)			0.529*** (0.140)	0.443** (0.185)
Capital	0.064 (0.193)	-0.070 (0.228)			0.086 (0.195)	-0.089 (0.231)
South	0.037 (0.158)	-0.034 (0.202)			0.049 (0.161)	-0.069 (0.205)
Manufact			0.021 (0.416)	-0.280 (0.278)	0.032 (0.429)	-0.153 (0.285)
Trade			0.319 (0.407)	-0.007 (0.265)	0.358 (0.422)	0.145 (0.272)
Service			-0.009 (0.411)	-0.333 (0.271)	-0.027 (0.427)	-0.236 (0.277)
Intermed			0.121 (0.474)	-0.256 (0.360)	0.157 (0.487)	-0.101 (0.367)
Science			-	-0.367 (0.473)	-	-0.243 (0.494)
Other			0.227 (0.464)	-	0.122 (0.482)	-
Mediator	-0.135 (0.115)	-0.163 (0.118)	-0.160 (0.114)	-0.187 (0.117)	-0.162 (0.117)	-0.188 (0.119)
Lage	-0.169** (0.073)	-0.186** (0.075)	-0.199*** (0.072)	-0.214*** (0.074)	-0.163** (0.074)	-0.186** (0.076)
Llabor_2000	0.206** (0.033)	0.206*** (0.034)	0.224*** (0.036)	0.217*** (0.037)	0.233*** (0.037)	0.226*** (0.037)
Ltime		0.071 (0.062)		0.049 (0.061)		0.066 (0.063)
Log-likelihood	-428.78	-404.42	-434.49	-411.79	-423.33	-399.47
LR	64.80	67.578	54.65	54.02	75.72	77.49
McFadden R^2	0.070	0.077	0.059	0.062	0.082	0.088
Observations	667	637	668	638	667	637

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The likelihood ratio tests (LR tests) reject the null hypothesis that the slope coefficients are equal to zero in all specifications at any sensible level of significance.

Table A.2.1. The marginal effects for the significant coefficients from the Probit analysis provided in Table A.2.

Independent varibles	Marginal effects in the models (for increase in the magnitude)					
	I	II	III	IV	V	VI
West	0.0325	0.0717	-	-	0.0844	0.0706
Lage	- 0.0241	-0.0740	- 0.0793	-0.0852	-0.0649	-0.0741
Llabor_2000	0.0257	0.0796	0.0873	0.0837	0.0909	0.0876

Table A.3. Description of the data on paid bribes per region

Parameters	Capital	Central Region	Eastern Region	Western Region	Southern Region	Whole Sample
Total number of respondents	70	70	140	280	140	700
Number of refusals to answer	35 (50%)	39 (56%)	79 (56%)	111 (40%)	78 (56%)	341 (49%)
Number of answers	35 (50%)	31 (44%)	61 (44%)	169 (60%)	62 (44%)	359 (51%)
Declared individual bribes in UAH						
Mean	2396.47	4495.00	1865.48	934.00	870.92	1406.36
Median	1000.00	850.00	400.00	0.00	115.00	200.00
Maximum	16800.00	20000.00	30000.00	23500.00	17500.00	30000.00
Minimum	0.00	60.00	0.00	0.00	0.00	0.00
Std. Dev.	4193.65	7261.18	5461.87	2974.53	2848.71	3954.78
Observations	17	8	31	75	38	169
Declared collective bribes in UAH						
Mean	2051.59	2015.00	725.50	470.97	576.51	873.16
Median	1147.50	400.00	200.00	0.00	35.00	190.00
Maximum	10100.00	12025.00	7650.00	6500.00	10300.00	12025.00
Minimum	0.00	80.00	0.00	0.00	0.00	0.00
Std. Dev.	2445.96	3607.39	1584.70	1184.72	1728.49	1967.14
Observations	22	19	40	72	43	196
Declared bribes in total in UAH						
Mean	3180.56	3093.54	1772.45	1130.00	1071.94	1661.85
Median	1800.00	850.00	300.00	100.00	225.00	300.00
Maximum	18490.00	20000.00	30000.00	25700.00	17500.00	30000.00
Minimum	0.00	80.00	0.00	0.00	0.00	0.00
Std. Dev.	4609.91	5167.97	4933.47	3069.77	2806.79	3921.19
Observations	27	24	49	92	54	246

Table A.4. Descriptive statistics of the scaled bribes

Statistic	BRIBE_IND_SC	BRIBE_COL_SC	BRIBE_TOT_SC
Mean	1.613129	0.002209	1.059034
Median	5.10E-05	6.51E-05	0.000125
Maximum	125.0000	0.051206	125.0000
Minimum	0.000000	0.000000	0.000000
Std. Dev.	14.15245	0.007305	11.45810
Skewness	8.660637	5.148287	10.77025
Kurtosis	76.00880	31.27826	117.0017
Observations	78	91	119

Table A.5.1 Summary statistics for the key variables before exclusion the outliers in bribes and in profitability

Variables	Mean	Standard deviation	Observations
SALES_GROWTH	0.124	1.514	162
BRIBE	10.716	106.409	120
TAX_2000	26.880	249.004	120
LLABOR_2000	2.458	1.996	359
LAGE	7.141	0.696	359
CAPITAL_GROWTH	-0.164	0.899	164
LABOR_GROWTH	0.086	0.475	164
COST_P_GROWTH	0.003	2.655	164
PROFIT_GROWTH	0.664	36.673	161
MANAG_OWN	41.826	37.363	156
FOREIGN	4.295	15.368	192
STATE	3.741	15.056	192
LTIME	3.214	0.798	359
PROFIT_2000	-1471.232	17861.39	164

Table A.5.2. Summary statistics for the key variables after exclusion of the outliers

Variables	Mean	Max	Min	Standard deviation	Observations
SALES_GROWTH	0.027	5.676	-5.915	0.891	161
BRIBE	0.008	0.667	0.000	0.062	120
TAX_2000	0.267	3.146	0.019	0.303	115
TAX_2001	0.242	1.043	-0.007	0.127	114
LLABOR_2000	2.464	8.293	0.000	1.997	359
LAGE	7.141	9.682	4.521	0.695	359
CAPITAL_GROWTH	-0.162	0.870	-9.769	0.904	162
LABOR_GROWTH	0.116	1.762	-2.576	0.445	118
COST_P_GROWTH	-0.106	12.040	-15.597	2.275	162
PROFIT_GROWTH	0.667	370.881	-278.41	36.788	160
MANAG_OWN	41.826	100.000	0.000	37.362	156
FOREIGN	4.339	97.500	0.000	15.443	192
STATE	3.779	100.00	0.000	15.130	192
LTIME	3.212	4.605	0.000	0.795	359
PROFIT_2000	-0.139	1.805	-7.625	0.750	159
PROFIT_2001	-0.049	3.981	-6.726	0.734	158

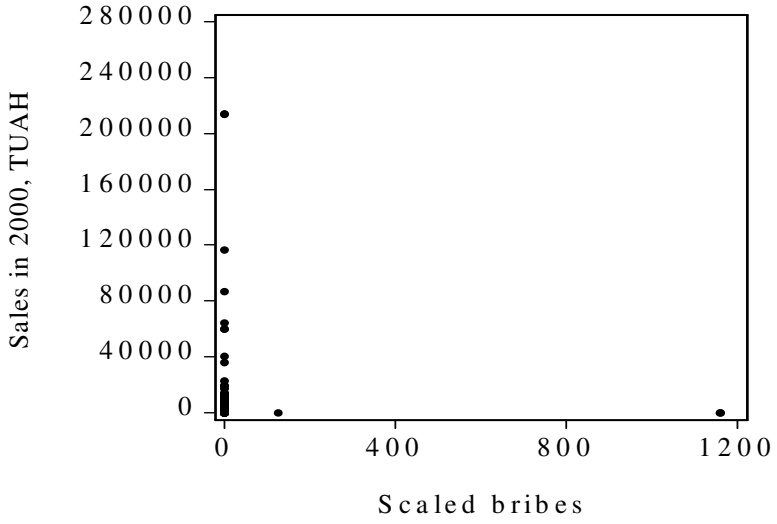
Table A.6. Correlation matrix for the key variables

	SALES_GROWTH	BRIBE	TAX_2000	LLABOR_2000	LAGE	CAPITAL_GROWTH	LABOR_GROWTH
SALES_GROWTH	1.000	0.299	0.425	-0.080	0.067	0.111	0.377
BRIBE	0.299	1.000	0.427	-0.489	0.040	-0.392	0.041
TAXES_2000_SC	0.425	0.427	1.000	-0.205	-0.050	0.007	0.020
LLABOR_2000	-0.080	-0.489	-0.205	1.000	0.057	0.209	-0.432
LAGE	0.067	0.040	-0.050	0.057	1.000	-0.222	-0.130
CAPITAL_GROWTH	0.111	-0.392	0.007	0.209	-0.222	1.000	0.126
LABOR_GROWTH	0.377	0.041	0.020	-0.432	-0.130	0.126	1.000
COST_P_GROWTH	0.875	0.091	0.044	-0.011	0.134	0.116	0.419
PROFIT_GROWTH	0.701	0.134	-0.190	0.004	0.151	-0.010	0.335
MANAG_OWN	-0.127	0.019	-0.151	-0.072	0.296	0.115	-0.205
FOREIGN	0.085	0.029	-0.093	0.125	0.022	0.079	0.017
STATE	0.088	0.062	-0.016	0.228	0.087	0.108	-0.011
LTIME	-0.044	-0.022	-0.089	0.207	0.048	-0.103	-0.018
PROFIT_2000	0.112	-0.144	0.433	-0.052	-0.100	0.163	0.038

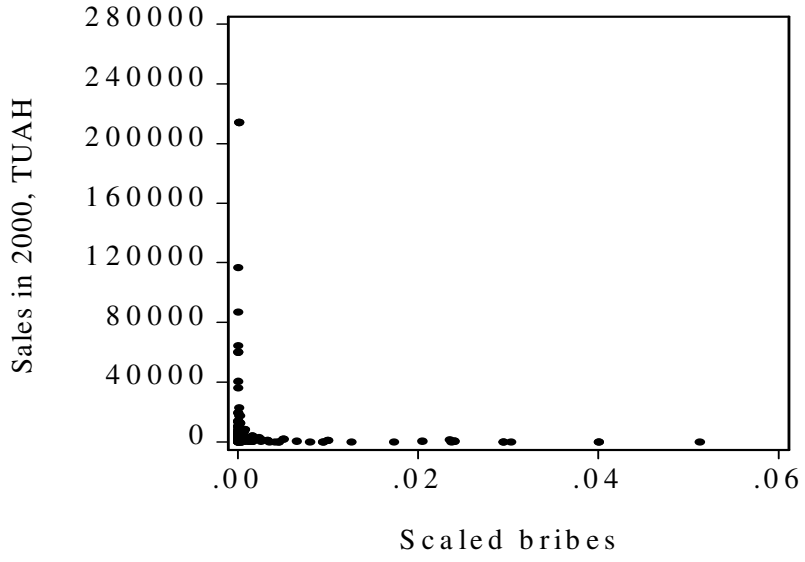
Table A.6. Correlation matrix for the key variables (continuation)

	COST_P_GROWTH	PROFIT_GROWTH	MANAG_OWN	FOREIGN	STATE	LTIME	PROFIT__2000
SALES_GROWTH	0.875	0.701	-0.127	0.085	0.088	-0.044	0.112
BRIBE	0.091	0.134	0.019	0.029	0.062	-0.022	-0.144
TAX_2000	0.044	-0.190	-0.151	-0.093	-0.016	-0.089	0.433
LLABOR_2000	-0.011	0.004	-0.072	0.125	0.228	0.207	-0.052
LAGE	0.134	0.151	0.296	0.022	0.087	0.048	-0.100
CAPITAL_GROWTH	0.116	-0.010	0.115	0.079	0.108	-0.103	0.163
LABOR_GROWTH	0.419	0.335	-0.205	0.017	-0.011	-0.018	0.038
COST_P_GROWTH	1.000	0.867	-0.046	0.081	0.063	0.067	-0.000
PROFIT_GROWTH	0.867	1.000	0.031	0.146	0.136	0.141	-0.466
MANAG_OWN	-0.046	0.031	1.000	-0.015	0.273	-0.055	-0.171
FOREIGN	0.081	0.146	-0.015	1.000	-0.035	0.026	-0.185
STATE	0.063	0.136	0.273	-0.035	1.000	0.098	-0.200
LTIME	0.067	0.141	-0.055	0.026	0.098	1.000	-0.138
PROFIT_2000	-0.000	-0.466	-0.171	-0.185	-0.200	-0.138	1.000

Graph A.1. Scatter graph of scaled bribes against the sales for the raw sample.



Graph A.2. Scatter diagram of scaled bribes against the sales for the main group of the sample



APPENDIX B

FORMAL TESTS AND REGRESSION ANALYSIS

Appendix B.1. Results of the Hausman test on endogeneity between total bribes (BRIBE) sales growth (SALES_GROWTH), bribes and profitability growth (PROFIT_GROWTH).

(1) SALES_GROWTH = 1.592 + 0.123*BRIBE -
(0.914)* (0.004)
-0.0001*BRIBE_FITTED - 0.209*LAGE
(0.004) (0.127)

(2) BRIBE = - 0.398 + 7.568*SALES_GROWTH +
(2.711) (0.272)
+4.594*SALES_GROWTH_FITTED - 0.244*LTIME
(2.926) (0.805)

* The standard deviations are provided in the parenthesis.

As the coefficients at total bribe [BRIBE in (1)], sales growth [SALES_GROWTH in (2)] and fitted values of the sales growth [SALES_GROWTH_FITTED in (2)] are significant at 1%, 1%, and 12% levels of significance correspondingly, the null hypothesis of non-endogenity in relations between total bribes and sales growth can be rejected.

(3) PROFIT_GROWTH = -0.957 + 0.001*BRIBE +
(0.446) (0.004)
+ 0.138*LAGE - 0.0001*BRIBE_FIT
(0.061) (0.001)

(4) BRIBE = 16.346 + 0.125*PROFIT_GROWTH –
(10.640) (4.769)
- 4.267*LTIME - 0.108*PROFIT_GROWTH_FIT
(3.155) (0.479)

The coefficients at the fitted values of total bribe [BRIBE_FIT in (3)] and profitability growth [PROFIT_GROWTH_FITTED in (4)] are insignificant at any sensible levels of significance. The null hypothesis of non-endogenity in relations between total bribes and profitability growth is not rejected.

Appendix B.2. Results of the Hausman test on endogeneity between taxes paid in 2000 (TAX_2000) and sales growth (SALES_GROWTH)

(1) SALES_GROWTH = 7.440 - 2.539*TAXES_2000 +
(4.262) (3.685)
+ 0.015*TAXES_2000_FITTED - 0.931*LAGE
(0.008) (0.637)

(2) TAXES_2000 = -8.311 + 1.518*SALES_GROWTH –
(6.916) (0.666)
-4.719*SALES_GROWTH_FITTED +
3.037*LTIME
(3.927) (2.068)

The coefficients at fitted values of taxes paid in 2000 [TAX_2000_FITTED in (1)] and ones at fitted values of sales growth [SALES_GROWTH_FITTED in (2)] are insignificant at any sensible level of significance. Therefore, there is no reverse causality; the null hypothesis of non-endogenity in relations between taxes and sales growth cannot be rejected.

Appendix B.3. Results of the Hausman test on endogeneity between total bribes (BRIBE) sales in 2000 (LSALES_2000)

(1) LSALES_2000 = 1.770 - 1.946 * BRIBE -
(2.130) (1.093)
-1.946 * BRIBE_FITTED + 1.338*LTIME
(1.093) (0.604)

(2) BRIBE = - 5.438 - 0.019*LSALES_2000 +
(3.725) (0.095)
+0.976*LSALES_2000_FITTED - 0.201*LAGE
(0.976) (0.389)

As the coefficients at fitted values of total bribe [BRIBE_FITTED in (1)] and sales in 2000 [SALES_2000_FITTED in (2)] are significant at 10%, 5% levels of significance correspondingly, the null hypothesis of non-endogenity in relations between total bribes and sales is rejected.

Appendix B.4. Results of the Hausman test on endogeneity between total bribes (BRIBE) and profitability in 2000 (PROFIT_2000)

(1) PROFIT_2000 = 0.0524 - 0.065*BRIBE +
(0.534) (0.066)
+ 0.145*BRIBE_FITTED - 0.0288*LTIME
(0.274) (0.151)

(2) BRIBE = 0.420 - 0.362*PROFIT_2000 –
(3.000) (0.423)
-7.730e-05*PROFIT_2000_FITTED - 0.055*LAGE
(0.0001) (0.415)

The coefficients at fitted values of total bribe [BRIBE_FITTED in (1)] and profitability in 2000 [PROFIT_2000_FITTED in (2)] are insignificant at any sensible levels of significance. The null hypothesis of non-endogenity in relations between total bribes and sales is not rejected.

Appendix B.5. Results of the Hausman test on endogeneity between total bribes (BRIBE) and tax rate change (TAXES_GROWTH)

(1) TAXES_GROWTH = 1.345 - 0.187*LAGE + 9.435*BRIBE +
(0.783) (0.112) (9.129)
+ 0.003*BRIBE_FIT
(0.004)

(2) BRIBE = -106.997 + 36.370*LTIME - 5.036*TAXES_GROWTH
(123.874) (35.738) (6.825)
- 0.145*TAXES_GROWTH_FIT
(0.274)

The coefficients at fitted values of total bribe [BRIBE_FIT in (1)] and tax rate change [TAXES_GROWTH_FIT in (2)] are insignificant at any sensible levels of significance. The null hypothesis of non-endogenity in relations between bribes and taxes growth is not rejected.

Table B.1. The Probit regression analysis with the bribery dummy as a dependent variable equal to one if a manager gave bribes and zero otherwise

Independent variables	Specification of the nested models					
	I	II	III	IV	V	VI
Constant	0.894 (0.919)	-0.526 (1.739)	0.618 (1.852)	0.311 (1.749)	4.238 (3.945)	7.066 (4.635)
Center	7.479*** (0.232)	8.216*** (0.331)	6.832*** (0.410)	7.574*** (0.258)	10.849*** (1.102)	9.460*** (1.232)
East	0.833*** (0.306)	1.002** (0.457)	-0.185 (0.525)	0.795* (0.444)	2.070*** (0.730)	-
West	-	0.209 (0.315)	-0.985** (0.422)	-	-0.192 (0.634)	-2.618*** (1.056)
Capital	1.091*** (0.327)	1.168*** (0.470)	-	0.964** (0.424)	4.069*** (1.181)	2.543** (1.263)
South	0.253 (0.185)	-	-1.172*** (0.468)	-0.210 (0.318)	-	-2.330*** (0.867)
Manufact	-0.380 (0.397)	-0.340 (0.324)	-	-0.762** (0.350)	-2.074** (0.876)	-2.363** (1.038)
Trade	-0.188 (0.375)	0.452 (0.398)	0.773** (0.353)	-	-1.573* (0.841)	-2.057* (1.098)
Service	-0.248 (0.383)	-	0.299 (0.333)	-0.490 (0.406)	-	-0.023 (1.052)
Intermed	6.848*** (0.398)	7.850*** (0.438)	7.994*** (0.412)	7.009*** (0.460)	7.797*** (1.091)	-

Science	-0.419 (0.661)		6.737*** (0.523)			
Other	-	0.042 (0.570)	0.380 (0.556)	-0.344 (0.572)	-0.406 (1.158)	-
Mediator	1.058*** (0.317)	0.974*** (0.359)	0.974*** (0.356)	1.000*** (0.351)	10.822*** (1.264)	12.025*** (1.606)
Foreign					-0.038** (0.016)	-0.043*** (0.017)
State					0.020 (0.068)	0.036 (0.070)
Manag_own					0.024*** (0.009)	0.027*** (0.011)
Lage	0.019 (0.110)	-0.005 (0.194)	-0.028 (0.203)	-0.030 (0.205)	-0.170 (0.529)	-0.063 (0.516)
Ltime	0.097 (0.092)		0.169 (0.196)	0.140 (0.198)	-1.053** (0.507)	-1.170** (0.570)
Llabor_2000	-0.109*** (0.044)	0.081 (0.093)	0.117 (0.110)	0.082 (0.118)	0.151 (0.208)	0.238 (0.218)
Lsales_2000				0.102 (0.104)	0.204 (0.207)	0.370 (0.294)
Profit_2000		-0.005*** (0.002)	-0.004* (0.002)	-0.004 (0.002)	-0.498 (0.402)	-0.453 (0.327)
LCapital_2000					-0.126 (0.097)	-0.334 (0.313)
Lcost_p_2000			-0.040 (0.053)	-0.099 (0.064)		-0.114 (0.097)
Log-likelihood	-156.83	-60.368	-60.149	-59.895	-17.629	-17.290
LR	70.224	31.508	31.946	32.058	37.129	37.806
McFadden R^2	0.182	0.206	0.209	0.211	0.512	0.522
Observations	357	162	162	161	84	84

Notes:
The dependent variable (D_bribe_tot) equals to one if the respondent answered that s/he gave individual or collective bribes and zero if the respondent did not.
The first specification is applied to the whole sample accepting all non-answered respondents as bribers
The standard deviations are provided in the parenthesis.
The method of quadratic hill climbing with Huber-White robust covariance was applied.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The likelihood ratio tests (LR tests) reject the null hypothesis that the slope coefficients are equal to zero in all specifications at any sensible level of significance.

Table B.2. The Tobit regression analysis with the monetary bribe as a dependent variable

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	5.097** (2.372)	5.804*** (2.240)	2.650 (3.790)	0.784 (3.645)	1.362 (5.541)	-2.282 (7.309)
Center	-	-0.544 (0.751)	-	1.676* (0.953)	2.029 (1.580)	1.502 (2.153)
East	-0.831 (0.659)	-1.365** (0.621)	-1.192 (0.935)	0.483 (0.719)	0.910 (1.117)	-
West	-1.684*** (0.624)	-2.271*** (0.604)	-1.905 (0.902)	-0.213 (0.737)	-	-1.702 (1.564)
Capital	0.528 (0.749)	-	0.328 (1.004)	2.005*** (0.845)	2.726** (1.202)	1.380 (1.388)
South	-1.333** (0.656)	-1.879*** (0.630)	-1.675* (0.953)	-	0.129 (1.111)	-0.941 (1.494)
Manufact	-0.211 (0.921)	0.028 (0.486)	-	0.192 (0.668)	-0.131 (1.547)	-0.443 (1.778)
Trade	-0.067 (0.889)	-	0.476 (0.677)	0.663 (0.735)	0.224 (1.601)	-0.459 (1.931)
Service	-0.175 (0.938)	-0.026 (0.463)	-0.182 (0.665)	-	0.138 (1.669)	-0.667 (2.197)
Intermed	1.939 (1.423)	2.144* (1.194)	0.282 (1.332)	0.464 (1.412)	-	-2.876 (2.594)
Other	-	0.207 (0.909)	-0.255 (1.152)	-0.071 (1.200)	0.910 (1.902)	-
Mediator	0.548 (0.394)	0.544 (0.395)	0.964 (0.615)	0.958 (0.616)	0.765 (0.897)	1.334 (1.355)
Foreign					-0.012 (0.020)	-0.025 (0.033)
State					0.004 (0.022)	0.007 (0.027)
Manag_own					0.001 (0.010)	-0.006 (0.016)
Lage	-0.584** (0.268)	-0.601** (0.270)	-0.223 (0.413)	-0.218 (0.414)	-0.245 (0.548)	0.336 (0.860)
Ltime	0.173 (0.238)	0.179 (0.238)	0.391 (0.416)	0.388 (0.417)	0.225 (0.559)	0.805 (0.820)
Llabor_2000		-0.072 (0.100)	-0.193 (0.280)	-0.185 (0.283)	-0.467 (0.418)	-1.017* (0.603)
Lsales_2000			-0.0002 (0.202)	-0.008 (0.208)	0.177 (0.277)	0.499 (0.423)
Profit_2000				0.033 (0.203)	-0.949* (0.572)	-1.291* (0.791)
Adv_exp_2000						-0.0003 (0.001)
R-squared	0.073	0.078	0.051	0.050	0.082	0.221
Log likelihood	-515.38	-515.12	-250.73	-250.71	-117.81	-90.352

Akaike info criterion	4.406	4.417	4.646	4.673	5.065	5.687
Observations	244	244	118	118	57	41

Notes:
The standard deviations are provided in the parenthesis.
The method of quadratic hill climbing with logistic distribution was applied.

Table B.3. The Tobit regression analysis with the dependent variable monetary bribe with control of endogeneity between bribe and sales in 2000

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	5.097** (2.372)	5.804*** (2.240)	5.483 (4.080)	3.215 (3.633)	3.197 (6.787)	1.323 (8.629)
Center	-	-0.544 (0.751)	-	1.625** (0.800)	1.915 (1.289)	1.446* (0.900)
East	-0.831 (0.659)	-1.365** (0.621)	-1.338 (0.697)	0.280 (0.566)	0.940 (1.435)	-
West	-1.684*** (0.624)	-2.271*** (0.604)	-2.016*** (0.812)	-0.370 (0.644)	-	-1.481 (2.393)
Capital	0.528 (0.749)	-	0.265 (0.853)	1.891*** (0.766)	2.686** (1.267)	1.153 (1.338)
South	-1.333** (0.656)	-1.879*** (0.630)	-1.619** (0.799)	-	0.302 (1.309)	-0.732 (1.803)
Manufact	-0.211 (0.921)	0.028 (0.486)	-	0.661 (0.667)	0.184 (1.224)	0.902 (2.822)
Trade	-0.067 (0.889)	-	0.289 (0.495)	0.937 (0.666)	0.364 (1.188)	0.897 (2.256)
Service	-0.175 (0.938)	-0.026 (0.463)	-0.644 (0.664)	-	0.208 (1.264)	0.733 (1.602)
Intermed	1.939 (1.423)	2.144* (1.194)	-0.104 (0.815)	0.538 (0.892)	-	-1.121 (2.091)
Other	-	0.207 (0.909)	-1.530 (1.089)	-0.880 (1.004)	-0.183 (1.541)	-
Mediator	0.548 (0.394)	0.544 (0.395)	1.021 (0.559)	1.017* (0.559)	0.596 (0.778)	0.796 (1.253)
Foreign					-0.009 (0.020)	-0.023 (0.048)
State					-0.0002 (0.012)	0.007 (0.017)
Manag_own					0.002 (0.011)	-0.007 (0.023)
Lage	-0.584** (0.268)	-0.601** (0.270)	-0.270 (0.305)	-0.262 (0.304)	-0.320 (0.538)	0.026 (1.100)
Ltime	0.173 (0.238)	0.179 (0.238)	0.397 (0.380)	0.386 (0.384)	0.360 (0.559)	0.972 (1.300)
Llabor_2000		-0.072 (0.100)	-0.132 (0.196)	-0.131 (0.196)	-0.176 (0.472)	-0.622 (1.079)

Lsales_2000_ins			-0.678 (0.484)	-0.687 (0.490)	-0.516 (0.720)	-0.324 (1.018)
Profit_2000				0.046 (0.133)	-0.770 (0.581)	-1.114 (1.033)
Adv_exp_2000						0.0001 (0.000)
R-squared	0.073	0.078	0.062	0.061	0.068	0.177
Log likelihood	-515.38	-515.12	-249.44	-249.92	- 117.80	-90.98
Akaike info criterion	4.406	4.417	4.633	4.659	4.800	5.383
Observations	244	244	118	118	57	41

Notes:
The standard deviations are provided in the parenthesis.
The method of quadratic hill climbing with logistic distribution was applied.

Table B.4. The regression analysis with the sales growth as dependent variable and bribery dummy (D_BRIBE) as an explanatory variable

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	-0.357 (1.362)	0.442 (1.350)	1.114 (1.123)	1.030 (1.044)	0.802 (1.155)	1.139 (1.212)
Center	-0.057 (0.291)	0.084 (0.304)	-	0.092 (0.272)	0.143 (0.319)	-0.012 (0.254)
East	-0.172 (0.244)	0.026 (0.252)	0.019 (0.248)	0.108 (0.188)	0.158 (0.231)	-
West	-	0.101 (0.267)	-0.083 (0.267)	-	0.049 (0.165)	-0.111 (0.194)
Capital	-0.178 (0.250)	-	-0.054 (0.235)	0.031 (0.212)	0.075 (0.264)	-0.093 (0.206)
South	0.030 (0.200)	0.208 (0.292)	-0.136 (0.313)	-0.051 (0.164)	-	-0.165 (0.240)
Manufact	-0.089 (0.342)	-	-0.079 (0.145)	-0.098 (0.219)	0.064 (0.433)	-0.106 (0.223)
Trade	-0.052 (0.342)	0.079 (0.206)	-0.051 (0.173)	-0.069 (0.226)	0.099 (0.429)	-0.062 (0.230)
Service	-0.178 (0.307)	-0.099 (0.190)	-	-0.016 (0.224)	0.153 (0.439)	-0.011 (0.229)
Intermed	-0.258 (0.463)	-0.087 (0.496)	-0.144 (0.432)	-0.170 (0.456)	-	-0.159 (0.463)
Science	-0.246 (0.438)	0.004 (0.922)	-0.136 (0.618)	-0.160 (0.644)	-0.001 (0.730)	-0.168 (0.654)
Other	-	0.073 (0.305)	0.020 (0.222)	-	0.165 (0.458)	-
D_bribe_ins	0.993 (0.913)	0.929 (0.815)	0.061 (0.670)	0.027 (0.698)	0.027 (0.701)	0.008 (0.719)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Tax_2000			0.012 (0.008)	0.012 (0.009)	0.012 (0.009)	0.012 (0.009)
Lage	-0.037 (0.098)	-0.092 (0.121)	-0.088 (0.091)	-0.087 (0.092)	-0.088 (0.092)	-0.086 (0.097)
Llabor_2000		0.176** (0.073)	0.055 (0.060)	0.056 (0.060)	0.060 (0.062)	0.062 (0.063)
Ltime				0.015 (0.082)	0.016 (0.082)	0.014 (0.084)
Lsales_2000		-0.184*** (0.049)	-0.085** (0.041)	-0.086** (0.042)	-0.087** (0.042)	-0.088** (0.043)
Labor_growth			0.298* (0.164)	0.303* (0.167)	0.310* (0.169)	0.310* (0.171)
Capital_growth					-0.014 (0.054)	-0.015 (0.055)
Cost_p_growth			0.322*** (0.035)	0.322*** (0.035)	0.321*** (0.035)	0.321*** (0.036)
Adv_exp_growth						-0.003 (0.026)
White test	rejects	not	not	not	not	not
R^2	0.025	0.110	0.724	0.724	0.724	0.724
F-statistic	0.353	1.400	16.230	15.128	14.156	13.139
Observations	161	161	116	116	116	115

Notes:
The standard deviations are provided in the parenthesis.
The White correction for heteroscedasticity is applied to the regressions, in which White heteroscedasricity test rejects the null hypothesis of homoscedasticity and to the last one where the test cannot be provided due to insignificant number of observations.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
In the first and second regression F-test rejects null hypothesis.

Table B.5. The regression analysis with the sales growth as a dependent variable and bribe rate (Bribe) as an explanatory variable (with outliers)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	0.733 (1.046)	0.330 (0.943)	-1.144 (1.387)	-1.222 (1.519)	0.515 (1.219)	0.322 (1.148)
Center	0.109 (0.229)	-0.045 (0.232)	0.386 (0.341)	-	0.261 (0.270)	0.105 (0.285)
East	-	-0.200 (0.175)	0.330 (0.282)	-0.054 (0.404)	0.207 (0.214)	-
West	-0.272 (0.260)	-0.469 (0.346)	-	-0.385 (0.343)	0.148 (0.193)	-0.037 (0.201)
Capital	0.077 (0.160)	-	0.388 (0.285)	-0.001 (0.399)	0.222 (0.226)	0.011 (0.225)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
South	-0.012 (0.188)	-0.382* (0.181)	0.170 (0.262)	-0.223 (0.385)	-	-0.164 (0.215)
Manufact	-	-0.180 (0.227)	-0.343 (0.242)	0.112 (0.385)	0.069 (0.440)	-
Trade	0.222 (0.182)	-	-0.234 (0.294)	0.214 (0.445)	0.063 (0.447)	-0.014 (0.197)
Service	0.159 (0.177)	0.160 (0.188)	-	0.451 (0.425)	0.293 (0.453)	0.249 (0.173)
Intermed	0.245 (0.300)	-0.179 (0.549)	-0.574 (0.639)	-0.125 (0.704)	-	-0.064 (0.437)
Other	0.452 (0.408)	0.237 (0.392)	-0.469 (0.405)	-	0.238 (0.494)	0.184 (0.271)
Mediator	0.175 (0.147)	0.129 (0.159)	0.182 (0.242)	0.182 (0.244)	0.013 (0.172)	0.058 (0.175)
Bribe	0.120*** (0.005)	0.127*** (0.005)	0.118*** (0.009)	0.118*** (0.009)	0.079*** (0.008)	0.082*** (0.008)
Tax_2000		0.349 (0.612)	0.334 (0.311)	0.328 (0.316)	0.362* (0.221)	0.398* (0.222)
Lage	-0.102 (0.097)	-0.049 (0.119)	0.071 (0.155)	0.076 (0.159)	-0.073 (0.113)	-0.026 (0.117)
Llabor_2000	0.090 (0.074)	0.066 (0.076)	0.226** (0.108)	0.224 (0.110)	-0.057 (0.084)	-0.071 (0.084)
Ltime	-0.056 (0.089)	-0.034 (0.091)	0.048 (0.143)	0.048 (0.144)	-0.014 (0.101)	-0.004 (0.101)
Lsales_2000	-0.044 (0.075)	-0.005 (0.071)	-0.099 (0.079)	-0.100 (0.079)	-0.001 (0.057)	0.011 (0.057)
Labor_growth			1.139*** (0.254)	1.131*** (0.262)	0.058 (0.226)	0.046 (0.225)
Capital_growth				0.077 (0.521)	0.315 (0.367)	0.354 (0.366)
Cost_p_growth					0.324*** (0.039)	0.313*** (0.040)
Adv_exp_growth						0.039 (0.029)
White test	rejects	rejects	not	not	not	not
R^2	0.785	0.819	0.862	0.862	0.933	0.935
F-statistic	27.227	20.261	25.440	23.585	48.918	47.005
Observations	119	83	82	82	82	82

Notes:
The standard deviations are provided in the parenthesis.
The White correction for heteroscedasticity is applied to the regressions, in which White heteroscedasricity test rejects the null hypothesis of homoscedasticity and to the last one where the test cannot be provided due to insignificant number of observations.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.

The observations with the dummy SCIENCE do not correspond to the observations with the concrete declared sum of bribes. Therefore, the dummy SIENCE is dropped to avoid singular matrix and to make possible the estimation procedure.

Table B.6. The results of the regression analysis with the sales growth as a dependent variable and industry-location average of bribe (Bribe_ins) as an explanatory variable (without outliers)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	0.733 (1.041)	0.285 (0.939)	-1.142 (1.399)	-1.221 (1.533)	0.518 (1.228)	0.333 (1.159)
Center	0.129 (0.243)	-0.030 (0.230)	0.387 (0.344)	-	0.256 (0.272)	0.100 (0.290)
East	-	-0.178 (0.193)	0.330 (0.284)	-0.054 (0.410)	0.215 (0.216)	-
West	-0.264 (0.262)	-0.450 (0.368)	-	-0.385 (0.347)	0.151 (0.194)	-0.039 (0.201)
Capital	0.149 (0.199)	-	0.389 (0.310)	-0.001 (0.412)	0.190 (0.240)	-0.002 (0.246)
South	-0.009 (0.191)	-0.363* (0.182)	0.170 (0.264)	-0.223 (0.389)	-	-0.168 (0.218)
Manufact	-	-0.161 (0.258)	-0.343 (0.245)	0.112 (0.388)	0.054 (0.444)	-
Trade	0.265 (0.217)	-	-0.233 (0.310)	0.213 (0.465)	0.014 (0.465)	-0.026 (0.214)
Service	0.161 (0.178)	0.176 (0.196)	-	0.451 (0.430)	0.272 (0.459)	0.246 (0.176)
Intermed	0.237 (0.292)	-0.152 (0.570)	-0.576 (0.648)	-0.125 (0.711)	-	-0.059 (0.442)
Other	0.454 (0.411)	0.254 (0.397)	-0.469 (0.408)	-	0.226 (0.498)	0.185 (0.273)
Mediator	0.178 (0.148)	0.128 (0.159)	0.183 (0.244)	0.182 (0.246)	0.010 (0.174)	0.056 (0.177)
Bribe _ins	-1.682 (2.435)	0.830 (3.954)	-0.049 (4.905)	0.033 (4.974)	1.466 (3.491)	0.539 (3.552)
Tax_ 2000		0.345 (0.610)	0.335 (0.314)	0.328 (0.319)	0.353 (0.224)	0.394* (0.225)
Lage	-0.108 (0.096)	-0.047 (0.118)	0.071 (0.157)	0.076 (0.161)	-0.067 (0.114)	-0.025 (0.119)
Llabor_2000	0.086 (0.075)	0.066 (0.076)	0.226** (0.109)	0.224** (0.110)	-0.058 (0.085)	-0.071 (0.085)
Ltime	-0.043 (0.097)	-0.039 (0.076)	0.049 (0.148)	0.048 (0.149)	-0.023 (0.105)	-0.008 (0.105)
Lsales_2000	-0.048 (0.075)	-0.004 (0.072)	-0.100 (0.080)	-0.100 (0.080)	0.001 (0.058)	0.012 (0.058)
Labor_growth			1.140*** (0.256)	1.131*** (0.265)	0.050 (0.228)	0.043 (0.227)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Capital_growth				0.077 (0.529)	0.333 (0.372)	0.360 (0.371)
Cost_p_growth					0.325*** (0.039)	0.314*** (0.040)
Adv_exp_growth						0.038 (0.030)
White test	rejects	rejects	not	not	not	not
R^2	0.089	0.114	0.318	0.318	0.670	0.678
F-statistic	0.724	0.567	1.868	1.732	7.005	6.783
Observations	118	81	81	81	81	81

Notes:
The standard deviations are provided in the parenthesis.
The F-tests reject the null hypothesis in the second models at any sensible level.
The White correction for heteroscedasticity is applied to the regressions, in which White heteroscedasricity test rejects the null hypothesis of homoscedasticity and to the last one where the test cannot be provided due to insignificant number of observations.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The observations with the dummy SCIENCE do not correspond to the observations with the concrete declared sum of bribes. Therefore, the dummy SIENCE is dropped to avoid singular matrix and to make possible the estimation procedure.

Table B.7. The regression analysis with the profitability growth as a dependent variable and the bribery dummy for as an explanatory variable

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	4.497 (12.917)	-27.685** (12.288)	-41.899** (17.678)	-34.376 (23.259)	-40.778 (37.866)	-40.234 (41.823)
Center	-4.438 (10.621)	0.002 (8.957)	-0.952 (10.147)	-1.044 (10.963)	-	2.840 (11.088)
East	0.695 (8.398)	-2.377 (7.186)	-3.109 (8.548)	-3.656 (9.176)	-3.788 (10.914)	-
West	2.520 (7.296)	-	-0.829 (7.356)	-3.954 (7.883)	-2.985 (9.670)	1.075 (7.828)
Capital	-0.565 (8.998)	1.577 (7.292)	-	-	-0.150 (11.025)	3.242 (9.445)
South	-	3.331 (6.899)	2.982 (8.924)	-0.613 (9.373)	2.596 (11.096)	5.583 (9.298)
Manufact	2.798 (6.932)	-6.678 (8.817)	0.324 (6.884)	1.470 (19.545)	-4.160 (9.211)	-
Trade	-4.336 (7.745)	-6.466 (9.778)	-	4.040 (19.818)	-2.742 (10.135)	0.636 (7.586)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Service	-	-4.540 (9.316)	2.728 (7.442)	6.502 (19.885)	-0.141 (9.949)	3.629 (7.172)
Intermed	-1.583 (16.912)	-7.057 (19.697)	-2.202 (18.553)	-	-8.292 (21.197)	-3.909 (20.071)
Science	12.114 (33.826)	-9.893 (27.708)	-3.931 (26.426)	-4.668 (33.338)		
Other	-4.946 (11.062)	-	5.913 (9.813)	7.841 (21.152)	-	6.110 (9.797)
D_bribe	3.039 (7.172)	9.651 (6.774)	9.552 (6.784)	11.413* (7.146)	13.575* (7.288)	12.815* (7.395)
Tax_2000		4.260*** (0.380)	4.222*** (0.383)	4.681*** (0.416)	4.855*** (0.374)	4.636*** (0.429)
Lage					-0.004 (4.231)	-0.677 (4.411)
Llabor_2000	-3.579 (2.954)	-7.685*** (2.625)	-7.632** (2.629)	-4.255* (2.561)	-5.095* (2.798)	-6.062 (2.962)
Ltime			2.939 (3.461)		3.879 (3.742)	3.520 (3.823)
Lsales_2000	1.131 (1.993)	7.642*** (1.824)	7.411*** (1.847)	5.264*** (1.798)	5.373*** (5.373)	5.853*** (1.983)
Labor_growth	-7.798 (8.296)	-16.150*** (7.082)	-15.432** (7.142)		-2.034 (6.955)	-6.951 (8.079)
Sales_growth	24.663*** (3.431)	13.425*** (3.258)	13.238*** (3.270)			
Capital_growth				-0.155 (2.496)	0.158 (2.545)	0.275 (2.577)
Cost_p_growth				1.351 (1.447)		2.018 (1.724)
Adv_exp_growth						0.131 (1.204)
White test	not	not	not	not	not	not
R^2	0.323	0.722	0.724	0.675	0.678	0.683
F-statistic	4.918	17.215	16.139	13.881	12.913	11.408
Observations	159	115	115	116	115	114

Notes:
The standard deviations are provided in the parenthesis.
The White correction for heteroscedasticity is applied to the regressions, in which White heteroscedasricity test rejects the null hypothesis of homoscedasticity and to the last one where the test cannot be provided due to insignificant number of observations.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
In the second and third models coefficients at dummy for bribing are significant at 16% level of significance, whereas in the fifth and sixth models ones are significant at 6% level.

Table B.8. The regression analysis with the profitability growth as a dependent variable and bribe rate as an explanatory variable

Independent variables	Specification of the models						
	I	II	III	IV	V	VI	VII
Constant	-10.283 (10.608)	-5.880 (11.431)	8.282 (6.177)	9.095 (12.794)	18.271*** (5.294)	24.933** (11.265)	18.543 (11.820)
Center	-1.284 (2.574)	1.407 (2.762)	-3.985 (2.924)	-7.368 (3.107)	-7.510*** (2.916)	-	-7.687 (3.049)
East	-2.856 (2.097)	-0.191 (2.143)	3.321 (2.429)	-	-	7.353** (3.016)	-
West	-	2.662 (2.038)	0.935 (2.287)	-2.741 (2.241)	-1.949 (2.132)	5.508** (2.581)	-2.064 (2.198)
Capital	-1.555 (2.295)	1.229 (2.416)	-	-2.906 (2.486)	-2.764 (2.362)	4.671 (2.897)	-2.934 (2.409)
South	-2.468 (1.998)	-	-0.367 (2.398)	-5.164** (2.372)	-4.633** (2.224)	2.766 (2.808)	-5.436** (2.319)
Manufact	-	-6.106* (3.221)	3.595 (4.625)	2.682 (4.751)	1.485 (1.801)	-14.799*** (2.830)	-
Trade	-0.686 (1.991)	-6.613* (3.475)	1.377 (4.787)	1.133 (4.891)	-0.098 (2.205)	-16.334*** (3.202)	-2.003 (2.081)
Service	0.447 (1.885)	-5.591* (3.407)	1.877 (4.763)	1.303 (4.910)	-	-16.235*** (3.081)	-1.854 (1.852)
Intermed	-3.206 (4.034)	-9.106* (4.931)	-	-	-0.354 (4.693)	-16.738*** (5.134)	-2.560 (4.608)
Other	5.506* (2.991)	-	15.426*** (5.226)	17.715 (5.412)	16.321*** (3.035)	-	15.929*** (2.939)
Bribe	3.426 (12.308)	2.964 (12.436)	301.32*** (95.616)	335.32*** (97.723)	329.10*** (94.213)	329.59*** (94.954)	323.38*** (94.813)
Tax_2000			-20.138*** (2.403)	-21.424*** (2.519)	-20.948*** (2.377)	-20.884*** (2.411)	-21.615*** (2.462)
Lage	1.520 (1.217)	1.432 (1.241)		0.965 (1.196)		0.265 (1.155)	0.453 (1.210)
Llabor_2000	0.655 (0.766)	0.681 (0.906)	1.608** (0.719)	2.085** (0.872)	1.360 (0.902)	1.389 (0.918)	1.146 (0.940)
Ltime	0.775 (1.127)	0.634 (1.152)		-1.498 (1.134)	-1.680 (1.093)	-1.664 (1.104)	-1.702 (1.104)
Lsales_2000	-0.508 (0.573)	-0.514 (0.641)	-1.781*** (0.582)	-1.848*** (0.657)	-1.515** (0.650)	-1.507** (0.655)	-1.509** (0.659)
Labor_growth		-0.941 (2.312)		-1.440 (2.041)	-4.084* (2.281)	-3.964* (2.357)	-4.861** (2.439)
Profitability_2000	15.236*** (0.462)	15.248*** (0.469)	14.334*** (0.401)	14.321*** (0.415)	14.339*** (0.390)	14.349*** (0.395)	14.214*** (0.404)
Capital_growth	-1.769 (2.534)	-1.624 (2.579)		4.912 (4.117)			5.832 (4.022)
Cost_p_growth			0.576* (0.350)		0.972** (0.409)	0.956*** (0.418)	1.048** (0.426)
Adv_exp_growth							-0.110 (0.308)
White test	Not	Not	Not	Not	Not	Not	Not

Independent variables	Specification of the models						
	I	II	III	IV	V	VI	VII
R^2	0.926	0.926	0.967	0.968	0.970	0.970	0.971
F-statistic	84.528	78.098	138.17	113.63	130.18	120.68	108.65
Observations	118	117	82	81	81	81	81

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The observations with the dummy SCIENCE do not correspond to the observations with the concrete declared sum of bribes. Therefore, the dummy SIENCE is dropped to avoid singular matrix and to make possible the estimation procedure.

Table B.9. The regression analysis with the profitability growth as a dependent variable and bribe rate as an explanatory variable (without the outliers in profitability observations).

Independent variables	Specification of the models						
	I	II	III	IV	V	VI	VII
Constant	-0.656 (1.192)	-0.527 (1.121)	1.008 (1.278)	1.878*** (0.740)	1.634** (0.754)	2.482** (1.215)	1.840 (1.277)
Center	-0.069 (0.250)	-0.181 (0.273)	-0.306 (0.273)	-0.335 (0.265)	-0.150 (0.293)	-	-0.630** (0.320)
East	0.076 (0.202)	-	0.311 (0.230)	0.311 (0.218)	0.511** (0.237)	0.653** (0.315)	-
West	-	-0.089 (0.202)	-	-	0.191 (0.208)	0.340 (0.269)	-0.302 (0.229)
Capital	0.029 (0.223)	-0.058 (0.236)	0.100 (0.236)	0.080 (0.228)	0.272 (0.247)	0.420 (0.307)	-0.233 (0.252)
South	-0.104 (0.196)	-0.190 (0.207)	-0.071 (0.208)	-0.197 (0.207)	-	0.144 (0.298)	-0.489** (0.244)
Manufact	0.241 (0.392)	-	0.222 (0.490)	0.076 (0.472)	0.067 (0.475)	-1.088*** (0.312)	-
Trade	0.199 (0.404)	0.009 (0.201)	0.168 (0.500)	0.084 (0.479)	0.088 (0.482)	-1.066*** (0.358)	0.017 (0.222)
Service	0.315 (0.408)	0.106 (0.185)	0.220 (0.505)	0.104 (0.484)	0.111 (0.487)	-1.041*** (0.342)	0.058 (0.192)
Intermed	-	-0.213 (0.393)	-	-	-	-1.166*** (0.552)	-0.075 (0.487)
Other	0.502 (0.472)	0.231 (0.314)	1.047* (0.555)	1.179** (0.539)	1.157** (0.545)	-	1.094*** (0.314)
Mediator	-0.290* (0.176)	-0.301* (0.177)	-0.287 (0.186)	-0.405** (0.183)	-0.409** (0.184)	-0.402** (0.191)	-0.383** (0.196)
Bribe	0.582 (1.191)	0.453 (1.200)	15.134* (9.087)	16.939* (9.777)	17.317* (9.876)	17.301* (9.956)	17.321* (10.016)
Tax_2000			-1.396*** (0.270)	-1.488*** (0.263)	-1.500*** (0.266)	-1.497*** (0.269)	-1.480*** (0.273)

Independent variables	Specification of the models						
	I	II	III	IV	V	VI	VII
Lage	0.127 (0.121)	0.141 (0.122)	0.060 (0.124)			0.019 (0.124)	0.040 (0.130)
Llabor_2000		0.086 (0.092)			0.043 (0.094)	0.044 (0.096)	0.038 (0.097)
Ltime	0.059 (0.110)	0.064 (0.111)	-0.042 (0.113)	-0.097 (0.111)	-0.096 (0.112)	-0.094 (0.113)	-0.090 (0.114)
Lsales_2000	-0.074* (0.042)	-0.117 (0.063)	-0.140*** (0.051)	-0.146*** (0.049)	-0.166*** (0.066)	-0.165** (0.067)	-0.160** (0.068)
Labor_growth	0.127 (0.216)	0.242 (0.249)		-0.378* (0.204)	-0.315 (0.248)	-0.308 (0.254)	-0.313 (0.255)
Profitability_2000	0.251*** (0.006)	0.253*** (0.006)	0.235*** (0.006)	0.234*** (0.006)	0.234*** (0.006)	0.234*** (0.006)	0.234*** (0.006)
Capital_growth	0.0009 (0.244)	-0.044 (0.249)	0.176 (0.403)	0.403 (0.395)	0.363 (0.408)	0.374 (0.417)	0.389 (0.420)
Cost_p_growth	0.212*** (0.034)	0.200*** (0.036)	0.343*** (0.035)	0.380*** (0.038)	0.371*** (0.042)	0.370*** (0.043)	0.366*** (0.044)
Adv_exp_growth							0.017 (0.032)
White test	Not	Not	Not	Not	Not	Not	Not
R^2	0.944	0.944	0.972	0.974	0.974	0.974	0.975
F-statistic	98.044	92.530	131.80	141.44	131.88	122.94	115.41
Observations	116	116	81	80	80	80	80

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The coefficients at the bribe rate are significant at 8% in 6th, 7th and 8th equations, and at 10% at 3rd equation.
The observations with the dummy SCIENCE do not correspond to the observations with the concrete declared sum of bribes. Therefore, the dummy SIENCE is dropped to avoid singular matrix and to make possible the estimation procedure.

Table B.10. The results of the regression analysis with the tax rate change as a dependent variable and the bribery dummy as an explanatory one

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	0.974 (1.145)	3.844* (2.022)	-2.176 (8.295)	5.275 (3.689)	0.743 (3.671)	2.515 (4.169)
Center	0.257 (0.289)	0.084 (1.002)	1.116 (2.454)	-	0.729 (1.094)	0.006 (0.966)
East	-0.006 (0.907)	-	-0.396 (2.008)	-0.056 (1.032)	0.349 (0.892)	-0.277 (0.779)
West	0.191 (0.786)	0.098 (0.835)	-0.594 (1.637)	0.189 (0.906)	0.751 (0.730)	-

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Capital	-	-0.202 (0.243)	1.296 (2.106)	-0.189 (1.046)	0.601 (0.939)	-0.223 (0.797)
South	-0.385 (0.939)	-0.496 (0.838)	-	-0.522 (1.031)	-	-0.840 (0.749)
Manufact	0.257 (0.723)	-0.113 (1.520)	-1.706 (1.993)	0.274 (0.844)	0.182 (0.899)	0.036 (1.665)
Trade	-	-0.149 (1.552)	0.016 (2.224)	0.206 (0.936)	0.071 (0.992)	-0.143 (1.694)
Service	-0.158 (0.786)	-0.339 (1.582)	-0.595 (2.150)	-0.133 (0.899)	-0.282 (0.960)	-0.379 (1.739)
Intermed	-0.119 (1.987)	-	-0.230 (4.756)	0.498 (1.987)	0.261 (2.121)	-
Other	-0.418 (1.040)	-0.924 (1.721)	-	-	-	-0.276 (1.862)
D_bribe	-1.068 (0.732)	-0.926 (0.671)	-0.671 (1.619)	-0.749 (0.685)	-0.898 (0.725)	-1.026 (0.731)
Lage			0.396 (0.947)	-0.105 (0.410)	0.175 (0.420)	0.107 (0.421)
Llabor_2000		0.709*** (0.261)	0.810** (0.409)	0.503** (0.237)	0.016 (0.184)	-0.037 (0.205)
Ltime			-1.016 (0.818)	-0.371 (0.350)	-0.506 (0.365)	-0.497 (0.369)
Lsales_2000		-0.763*** (0.181)		-0.618*** (0.175)		
Sales_growth	-1.222*** (0.096)	-2.261*** (0.434)		-2.152*** (0.441)	-1.034*** (0.306)	-1.883*** (0.463)
Labor_growth	0.995 (0.726)	1.449** (0.720)				0.581 (0.770)
Capital_growth						-0.054 (0.251)
Cost_p_growth		0.479** (0.205)	-1.743*** (0.274)	0.594*** (0.208)		0.469** (0.225)
Adv_exp_growth				-0.026 (0.110)		
Profit_2000	0.200*** (0.008)	0.214*** (0.008)	0.031*** (0.0005)	0.213*** (0.008)	0.199*** (0.008)	0.204*** (0.009)
White test	Not	Not	Not	Not	Not	Not
R^2	0.900	0.919	0.978	0.916	0.900	0.906
F-statistic	77.063	75.242	337.77	62.893	65.579	55.508
Observations	115	115	117	115	116	115

Notes:
The standard deviations are provided in the parenthesis.
In the first, the second, and sixth models the coefficients at dummy of bribe are significant at 14%, 17%, and 16% significance level correspondingly.

The White correction for heteroscedasticity is applied to the regressions, in which White heteroscedasricity test rejects the null hypothesis of homoscedasticity and to the last one where the test cannot be provided due to insignificant number of observations.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The observations with the dummy SCIENCE do not correspond to the observations with the concrete declared sum of bribes. Therefore, the dummy SIENCE is dropped to avoid singular matrix and to make possible the estimation procedure.

Table B.11. The results of the regression analysis with the tax rate change as a dependent variable and the bribe rate as an explanatory one

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Constant	-0.936** (0.414)	-0.547 (0.413)	-0.394** (0.191)	-0.742** (0.374)	-0.921** (0.459)	-1.114*** (0.437)
Center	0.188* (0.113)	0.382*** (0.117)	0.176* (0.107)	0.199** (0.095)	0.196* (0.104)	0.417*** (0.106)
East	-0.196 (0.089)	-	-0.228*** (0.087)	-0.221*** (0.076)	-0.221*** (0.082)	-
West	0.039 (0.079)	0.236*** (0.084)	-0.020 (0.082)	-	-0.010 (0.075)	0.211*** (0.077)
Capital	0.017 (0.097)	0.219** (0.097)	-	0.019 (0.082)	0.017 (0.089)	0.241*** (0.089)
South	-	0.208** (0.090)	-0.034 (0.087)	-0.024 (0.073)	-	0.218*** (0.084)
Manufact	0.460*** (0.102)	-0.075 (0.085)	-0.124 (0.077)	-0.093 (0.066)	-0.042 (0.173)	-
Trade	0.524*** (0.119)	-	-	0.032 (0.083)	0.065 (0.175)	0.103 (0.079)
Service	0.507*** (0.111)	-0.022 (0.092)	-0.034 (0.083)	-	0.040 (0.177)	0.075 (0.068)
Intermed	0.481** (0.208)	-0.036 (0.197)	-0.024 (0.174)	-0.013 (0.178)	-	0.039 (0.175)
Other	-	-0.548*** (0.122)	-0.530*** (0.109)	-0.492*** (0.101)	-0.510*** (0.190)	-0.464*** (0.104)
Bribe	-11.672*** (3.571)	-11.470*** (3.585)	-7.109* (3.732)	-6.796** (3.506)	-6.502* (3.541)	-6.629* (3.551)
Mediator			-0.069 (0.063)	-0.056 (0.065)	-0.027 (0.068)	-0.030 (0.070)
Lage	0.032 (0.045)	0.022 (0.047)		0.038 (0.043)	0.050 (0.044)	0.045 (0.046)
Llabor_2000	0.004 (0.024)	0.008 (0.024)		-0.014 (0.034)		-0.013 (0.034)
Ltime	0.070* (0.042)	0.067 (0.043)	0.042 (0.039)	0.042 (0.039)	0.055 (0.039)	0.053 (0.040)

Independent variables	Specification of the models					
	I	II	III	IV	V	VI
Lsales_2000			- 0.049*** (0.017)	- 0.052*** (0.017)	- 0.051*** (0.017)	- 0.057** (0.023)
Labor_growth					0.113 (0.074)	0.092 (0.091)
Capital_growth		-0.138 (0.157)	-0.168 (0.134)	-0.137 (0.139)	-0.192 (0.141)	-0.182 (0.148)
Cost_p_growth			-0.039*** (0.012)	-0.039*** (0.012)	-0.050*** (0.014)	-0.046*** (0.016)
Adv_exp_growth						
Profit_2000	-0.220*** (0.002)	-0.220*** (0.002)	-0.221*** (0.002)	-0.221*** (0.002)	-0.221*** (0.002)	-0.222*** (0.002)
White test	Not	Not	Not	Not	Not	Not
R^2	0.993	0.993	0.995	0.995	0.995	0.995
F-statistic	805.26	745.28	880.40	822.38	787.59	684.83
Observations	81	81	81	81	80	80

Notes:
The standard deviations are provided in the parenthesis.
*** (**/*) denote the significance at 1% (5%/10%) confidence level.
The coefficients at bribe rate in the sixth, fifth, and third equations are significant at 6% level.
The observations with the dummy SCIENCE do not correspond to the observations with the concrete declared sum of bribes. Therefore, the dummy SIENCE is dropped to avoid singular matrix and to make possible the estimation procedure.