Economic Inequality and Corruption [1]

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Abstract

A review of recent contributions to the explorations of the relations between economic inequality and corruption demonstrates that corruption as a factor of inequality has been poorly theoretically explained, although some empirical evidence has been tracked down. More convincing theoretical explanations have been offered regarding inequality as one of the factors of corruption. A theoretical model in which economic inequality is one of the factors (explanatory variables) of judicial corruption is formulated. Some consequences of this kind of corruption, practically the effects to economic inequality are analyzed. Finally, some policies to combat judicial corruption are been suggested.

Key words: Economic inequality, Public expenditures, Judicial corruption, Transaction costs, Rule of Law
JEL codes K49, K41

I Introduction

Economic research into the relations between economic inequality and corruption is rather young discipline; it has begun rather recently, with most of the relevant contributions published in the last five years. There are two basic approaches to these relations. The first approach is focused to the consequences of corruption in terms of its effects to the change of economic inequality and the second approach explores economic inequality as one of the factor of corruption, usually also taking into account a reverse causation, i.e. that increased corruption due to the economic inequality can produce additional inequality. The aim of this paper is to briefly review recent theoretical and empirical contributions to the explorations of the relations between economic inequality and corruption and to provide for a theoretical model of judicial corruption in which economic inequality is one of the factors (explanatory variables) of judicial corruption. Some consequences of judicial corruption will be analyzed. Finally, some of the feasible policies to combat judicial corruption will also be considered.

In this paper corruption is, following Tanzi (1995), considered as violation of the arms-length principle to economic decisions. The paper is focused to the administrative corruption, i.e. violation of the arms-length principle in the process of enforcement of laws, rules and regulations, leaving out of consideration corruptive influence to formulation (content) of the public policies, i.e. laws, rules and regulations ("state capture"). Furthermore, it is assumed that economic inequality associated with political inequality, i.e. inequality of influence, though the causality can be both ways; hence hereafter only the term inequality instead of economic inequality will be used.

II Inequality as a Consequence of Corruption

Probably the first contribution on the relations between inequality and corruption (Johnson, 1989) is focused to the effects of corruption to income inequality, claiming that corruption tends to preserve or even widen inequalities in the distribution of income.

One of the seminal contribution on the effects of corruption to income inequality (distribution) Li *et al.* (2000) whose model of these effects is well founded in the three sectors rent-seeking model developed by Murphy *et al.* (1993). Consistent interpretation of

the three sector model provided a ground for both high and low inequality equilibrium. With very low and very high level of corruption, inequality is low (Gini is zero, according to the model), and with intermediate level of corruption, inequality is high. Thus the hypothesis is the corruption affects inequality in an inverted U-shape way (similar to the Kuznetz curve). Nonetheless, econometric testing of the hypothesis provided no evidence for that: in majority of the applied methods of estimation and model specifications, estimates of parameters of quadratic transformation of the corruption indicator were not statistically significant.[2]

Gupta *et al.* (2002) provided some theoretical finding of the causality from corruption to inequality and provided some empirical results on that relation. A few mechanisms of influence of corruption to increased inequality have been identified. According to the authors, the first one is biased tax system as corruption can lead to tax evasion, defective tax administration and exemptions that favor the wealthy (and well connected) – this can reduce effective tax base and undermines possibilities for compulsory income/wealth redistribution from rich to poor, leading to the preservation or even increase of the inequality. Nonetheless, the same mechanism decreases effective tax burden and that can have beneficial effects to growth, not necessary decreasing inequality, but increasing the prospects for the improvement of the welfare of the poor. It is also disputable that tax exemptions and evasion is only in favor of the rich and well connected, i.e. it is not demonstrated that relative effective tax burden due to corruption is necessarily in favor of the rich, particularly not in the case of defective tax administration.[3] Even if this mechanism of causality from corruption to inequality proves to be relevant, its effect heavily depends on the structure of the public expenditures. If the bulk of them are focused to the provision of the public good, rather than redistribution, than the effects will not be significant.

The second mechanism is poor effective targeting of the social programs to the truly needed due to the corruption that is siphoning the funds from poverty alleviation programs from the poor to the powerful/reach individuals. It is dubious to what extent poor effective targeting of

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[2] The problem with inverted U-curve hypothesis can probably be traced down in two features of the three sector model formulated by Murphy *et al.* (1993). The first one is assumption that there is no inequality within the sector, and the second feature is assumption that rent-seeking exhibits general equilibrium increasing returns, an assumption that crucially depends on relative returns of productive and rent seeking activities: both functions seems not to be monotonic.

[3] Gyimah-Brempong (2002) focused the analysis to African countries claiming that the crucial distributional effect of corruption is via making effective taxation regressive. The claim is based on the finding of the theoretical model of Hendriks *et al.* (1999) that considered incentives to both tax payers and tax officials in the case of normative progressive taxation.

the social programs due to corruption really is contributing to increasing inequality. It is rather unrealistic to assume that the rich will be engaged in deliberate undermining social programs targeting via corruption as to siphoning rather limited funds. The point is that resources invested in corruption generate much higher returns in other activities comparing with targeting of social programs. Finally, poor targeting results in decreasing efficiency of the redistributive policies, i.e. inefficient deceasing of inequality, rather than increasing it.[4]

The third mechanism identified by Gupta *et al.* (2002) is the one linked to the formation of human capital, i.e. education. As it has been already pointed out corruption decreases public revenues, hence all effective public expenditures, including education expenditures are scaled-down. Furthermore, it was demonstrated (Mauro, 1998, Tanzi and Davoodi, 1998 and Gupta *et al.* 2001) that corruption has detrimental effects to the structure of the public expenditures in such a way that share of education is substantially decreased. Lowering provision of public education has detrimental effects on the ability of the poor to invest in their human capital and that can influence lower returns to the human capital of the poor comparing with the rich who have invested in their human capital from non-public sources, hence increasing economic inequality.

Finally, according to Gupta *et al.* (2002) corruption increases uncertainty and risk for poor and not so well connected as it is reasonable to assume that the rules of the game are disturbed by corruption in favor of well off and well connected, hence the increase of risk premium is not equally distributed across the population. The risk premium is higher for the poor, and lack of their investment is creating more inequality. This is obviously "state capture" argument, rather than administrative corruption. It is not clear how rules of the game (being distorted or not) increase uncertainty and risk – high risk is due to biased enforcement of the rules, not the rules themselves. The other point is that a part of the rules of the game can be barriers to entry created by the rich to preserve rents. But that it has got nothing to do with the risk premium but, but with lack of new entries.[5]

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[4] Olken (2006) estimated that 18% of the rice that is distributed to the poor in Indonesia as a component of the wealth redistribution program disappears due to the corruption of the civil servants involved in the redistribution program.
[5] Although the notion of "state capture" as it has been specified by Hellmann and Kaufmann (2001) is that it is based on illicit influence, one (following Stigler, 1971 and Becker, 1983) can see no reason why "state capture" cannot be establish by legitimate influence. If that is the case, this not the mechanism that links corruption and inequality.

There is obviously a problem of the theory behind causality from corruption to inequality – it is not convincing. In addition to the already noticed problems, there is the other one. The crucial question is whether the rich and the poor face the same kind of corruption. It is reasonably to assume that these two groups are dealing with completely different segments of public administration and provision of public services. The rich faces big corruption, extortion regarding various business operations licenses and poor are facing rather small corruption, mainly in provision of public services. The crucial issue is the incidence of corruption taxation of the rich is rather complicated – that heavily depends on the character of the labor market.

If it is assumed that the rich and the poor face the same kind of corruption, than the issue is whether corrupt officials are able to price discriminate among the corruptors, i.e. to extort the bribe according to the ability to pay the bribe. If there is perfect price discrimination, than such a corruption will not generate any change of inequality. Deviation from the perfect price discrimination in either direction will change inequality also in either direction. Obviously, there are some problems in theoretical explanation of the link between corruption and inequality.

In econometric testing Gupta *et al.* (2002) assumed that corruption is a factor of inequality, they implicitly acknowledged a reverse causation by introducing instrumental variable in econometric estimations of the impact of corruption to inequality. Cross section estimates of multiple independent variables on Gini coefficient based on the 37 countries sample demonstrated that OLS estimates of the corruption parameter are either significant or not, depending on the specification, while all IV estimates are statistically significant.

Econometric testing of the hypothesis that corruption is a factor of inequality in African countries done by Gyimah-Brempong (2002) provides some empirical evidence to support the hypothesis. The OLS estimations were statistically significant, though introduction of the IV proved not be so successful, as only in one case statistically significant estimation of the corruption parameters was recorded, demonstrating that the results are not econometrically robust.

There is little theoretical support for the hypothesis that corruption increases inequality and empirical evidence is somewhat more convincing. Nonetheless, much more challenging is the issue of inequality as a factor of corruption.

III Inequality as a Factor of Corruption

The first contribution that has considered inequality as a factor of corruption (Alam 1997) is focused to "countervailing actions" as important factor of corruption. The bigger possibility for these actions by the victim of corruption (either via evasive, direct and illicit countervailing actions), the smaller incidence of corruption. Alam (1997) specifies that the ability of the victims of corruption to be engaged in direct countervailing actions will depend on their income, as more actions will be taken with higher level of income of the losers and on that ground concludes that income distribution is a factor of corruption, implicitly assuming that increased inequality generates more corruption. Nonetheless, there is a problem in this reasoning, because the level of inequality does not provide any information on income level, both absolute income level and the income level relative to the resources needed for countervailing action. If average income level is high enough, even high level in inequality will not prevent people from countervailing action, i.e. even relatively poor people will have enough income for such an action, resulting in low incidence of corruption. Contrary to that, if the average level of income is low, even rather equal distribution (low values of Gini) will prevent people from countervailing actions, i.e. even relatively rich people in poor society will not have enough income for such an action, resulting in high incidence of corruption. Accordingly, this theoretical explanation of inequality as a factor of corruption is not convincing.

Husted (1999) assumes that there are mutual causation between inequality and corruption; nonetheless the focus of this contribution is to inequality as a factor of corruption, following rather implausible explanation that less inequality reflects the existence of middle class that is, following Scott (1997), considered as a barrier against corruption.[6] This hypothesis of

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[6] The explanation is given that the middle class can act to protect its interest through the organization of interest groups and it is assumed that such groups weaken particularistic demands (which tend to promote corruption). Of course the assumption about negative correlation between the strength of interest groups and the intensity of particularistic demands is not plausible, simply because the very rationale for interest groups emerge is promotion of the particularistic interest of the group members.

inequality as a factor of corruption has been tested on the sample of 44 countries using multiple regression models: no statistically significant results have been recorded.

The analysis of relation between gender and corruption (Swamy *et al.* 2001) that is focused to empirical research without any theoretical ground for the hypothesis that women are less involved in bribery and are less likely to condone bribe-taking. The gender parameter proved to be statistically significant and the authors report that including Gini coefficient in the equitation does not reduce significance of the gender parameter, implicitly assuming that inequality is factor of corruption (no report on the econometric results of the Gini parameter). No theoretical explanation has been provided whatsoever.

Dabla-Norris and Wade (2002) formulated a model focused to the impact of inequality on corruption that is based on the development of the theory of alternative allocation of human capital (talent and/or entrepreneurship) among productive and rent-seeking (distributive) activities (including corruption) following seminal contribution of Baumol (1990) and contributions of Murphy *et al.* (1991), Acemoglu (1995), and Acemoglu and Verdier (1998). Following these contributions it is assumed that a decision to which of these two sectors human capital will be allocated depends on the expected relative returns. Dabla-Norris and Wade (2002) assumes that there are substantial barriers of entry into rent-seeking activities (nonconvexities) that must be overcome for such allocation.[7] Taking that into account initial wealth distribution is important, because only wealthy can afford entry in to the rent-seeking world with higher returns than a productive one. Actually following early definition of barriers to entry, it is exactly these barriers that enable preservation of excessive (above normal) returns. The finding are based on the assumption that there is no financial mediation, i.e. that the poor cannot borrow money to invest in the entry in the rent seeking activates. Even if there is some financial mediation, credit markets in the countries with excessive rent seeking sector are typically characterize by high collateral requirements, much easier met by the wealthy then by the poor. Although this model is formulated to demonstrate impact of inequality to corruption, it vividly demonstrated reversed causation and vicious circle with high incidence and profitability of rent-seeking.

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[7] Such a barrier of entry is, for example, widely reported (Rose-Ackerman, 1999) lump sum illegal payment made to the senior civil servants as an entry fee for the civil service that enables appropriation of substantial rents due to the rent seeking (corruption).

Hellman and Kaufman (2002) addressed the issue of the inequality by introducing the concept of crony bias as the symptom of inequality of influence, assuming that rich are able to convert their greater wealth into greater political influence over both the formation and functioning of institutions. Nonetheless, the very concept of crony bias is not quite clear, particularly not the causation: whether rich are able to get political influence because they are rich, or whether they are rich because they have obtained political influence. As to the measuring, crony bias is specified as the influence to "national laws, rules and regulations", hence typical "state capture" concept, measured through perception of business people – there was no measurement of administrative corruption. Empirical findings (statistically significant estimates) that the bigger crony bias, the greater tax evasion and corruption have not been explained in terms of causation. Finally, the very notion of inequality of influence is considering inequality of the firms, not inequality of the population in general. Although both inequality and corruption have been mentioned in this contribution, no casualty has been established among them.

Far more important is the contribution of Glaeser and Shleifer (2002), a journey into American economic history, aimed at explaining the rise of the regulatory state in the US. It was demonstrated that in the era of robber barons, rich managed to undermine institutions, primary via judicial corruption, resulting in poor protection of the property rights of poor. An important innovation made by this contribution was implicit introduction of the concept of competition in bribery in the case of judicial corruption. The point is that rich defendants managed to bribe the judges involved in tort litigations started by poor plaintiffs, mostly in the cases of the customers vs. railways barons. Because of economic inequality, and consequent relative income limitations of the plaintiffs, there was no room for any short-term countervailing action, resulting in biased judgments, protection of private property rights of the rich and violation of the property rights of the poor, consequently increasing inequality. There are two important finding of this analysis. The first one is the vicious circle: inequality increases corruption and as a result there is increased economic inequality. The second one is that, facing the prospect that they cannot win litigation (within a common law legal framework), the poor managed to organize influence group that produce political pressure to Capitol Hill for producing national statutory legislation that will protect property right of these that cannot secure their property right via torts, i.e. within common law based judiciary.

It is concluded that judicial corruption (partly generated due to inequality) is to be blamed for the rise of the regulatory state in the US.[8]

Gleaser *et al.* (2003) went even furthered and formulated a formal model of judicial corruption, as the special case of subversion of the institutions by the wealthy and consequently political powerful for their own benefit. Nonetheless, the authors assume that causation between inequality and injustice (due to the judicial corruption) runs in both directions. Initial inequality leads to subversion of institutions, but weak institutions themselves allow only those able to protect themselves to become rich. Analyzing British and American history within this model, it is concluded that strong institutions that are not subverted are the prerequisite of emerge of the middle class. Finally, econometric estimate of the simple cross-section model in which GDP growth is explained by inequality (Gini) and rule of law (dummy variable), rendered statistically significant estimated of the parameters with expected sign. The conclusion is that inequality is bad for growth only in countries with poor rule of law (weak institutions).[9]

Sonin (2003) developed a formal model of institutional choice in which the rich may favor poor protection of the public protection of property rights, i.e. preferring private protection of their property rights and undermining property rights of the others, via, among other things. It was demonstrated ion the model, based on the experience of activities of Russian tycoons that increased economic inequality can create incentives to the rich for using corruption for alternative way of protecting their property rights.

Decker *et al.* (2005) used the finding of the previous model to develop strategy for developing rule of law in countries with its deficit. It is assumed that justice systems that are incomprehensible, remote, unaffordable, delayed and unfair, effectively deny legal protection to ordinary people – rule of law assumes that all people enjoy equal legal protection. Although this paper contributed very little to understanding relations between inequality and

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[8] Statutory legislation, i.e. „regulatory state" is considered by many (Rubin, 1977, Priest, 1977, and Manne, 1997 among many) inferior to common law litigations with respect to the protection of property rights. Accordingly, regulatory state (statutory legislation that regulates economic activities) can be considered as a second best solution.

[9] The obvious paradox of this finding is the XIX century United States. There was a weak rule of law at that time (according to the authors themselves) and inequalities were rather considerable. Yet, there was a substantial economic growth of the country in that period.

corruption, it emphasized the importance of equal legal protection, a very important concept of equality that substantially differs from Gini measured economic inequality.

The aim of Uslaner (2005) was to develop a model that will explain how inequality generates corruption. The author assumes that there is a direct relation between inequality, that reduces a generalized trust in a society, and then the lack of the generalized trust generates corruption. Nonetheless, it is not explained how these relations are established, i.e. what is the mechanism of that causation. Furthermore, since according to the author decline in the general trust increases a particularized trust (for example, mutual trust only within poor and within rich), one could conclude that increased inequality in society leads to increased corruption only in transaction between rich and poor, decreasing corruption in transactions among these groups members. Accordingly, increase of inequality is not sufficient for increase in the overall corruption incidence in society; it depends on relative change of inter-group corruption relative to the intra-group one.

You and Khagram (2005) concluded that inequality increases the level of corruption through material and normative mechanisms. Material mechanism is explained by claiming that rich have both greater motivation and more opportunity to engage in corruption, whereas the poor are more vulnerable to extortion and less able to hold the rich accountable as inequality increases.[10] Normative mechanism is explained as increase in inequality adversely affects social norms about corruption and people's beliefs about the legitimacy of rules and institutions.[11] Finally, the authors claim they have found empirical evidence on statistically significant interaction between corruption and economic inequality, pointing out to inverse causality that creates vicious circle.

Alesina and Angeletos (2005) developed a model based on the Meltzer-Richard's rational theory of the size of government (Meltzer and Richard, 1981). The Alesina-Angeletos' model is definitely one of the most important contributions to the field of explanation relations

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[10] This line of reasoning is not quite convincing. As inequality growths, rich are more confident and their influence and returns increases, there is no need for them to be involved in corruption. They have already shaped the institutions in their way and their property rights are protected. On the contrary, it is the poor who have incentives to corrupt – the issue is what their constraints are.

[11] This reasoning is based on the assumption of voluntary compliance with the rules. Nonetheless, modern societies are based on the compulsory compliance that is much more efficient and sustainable. This compliance is provided by sanction and respective deterrent. It is important to notice that apart from legal sanctions, there are also moral sanctions that can provide substantial deterrent in traditional societies.

between inequality and corruption. The model is based on the claim that bigger government raise the possibilities for corruption and more corruption may in turn raise the support for redistributive possibilities that indented to correct the inequality and injustice generated by corruption. The finding of the model is that redistributive and regulatory policies intended to reduce inequality may bring about even more opportunities for corruption. Accordingly, inequality is not a direct factor of corruption, but it influence flows through demand for redistribution (detailed analyzed in Alesina and La Ferrara, 2005), supply of redistribution via increase government intervention (size of the government) and the increased government intervention increase corruption. Alesina and Angeletos (2005) identify a policy dilemma: a small government that does not correct market generated inequalities or a large government that increases corruption and rent-seeking.[12] Nonetheless, it is a question whether this is a dilemma at all. As the authors have suggested public spending toward the poor is often mis-targeted and creates corruption and misallocation. Finally, the authors' statement that willingness to accommodate some corruption in the present may lead to the vicious circle where high levels of government intervention due to the market failures and corruption are self-sustained. Taking that into account, there is no dilemma from the welfare change aspect. Whether this will be a point of view of policy makers is another question altogether.

IV The Assumptions of the Model of Inequality and Judicial Corruption

There have been only few contributions on the topic of judicial corruption: Buscaglia and Ulen (1997), Buscaglia and Dakolis (1999), Buscaglia (2001a), Buscaglia (2001b) and Dal Bo *et al.* (2002), but only model by Glaeser *et al.* (2003) is focused to the issue of inequality that is both the origin of judicial corruption (powerful/rich individual's subversion of the judicial institutions) and the consequence of it (biased judicial institutions protects only powerful/rich). Begovic (2005) developed a general theoretical model of judicial corruption that will be used for modeling relations between inequality and corruption.

The theoretical model of inequality and judicial corruption is based on modeling litigation. In most litigation plaintiff and defendant dispute over the endowment and violation of the property rights and contract enforcement. The model of judicial corruption is based on the following assumptions:

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[12] This approach to the corruption issues (marker failure vs. government failure) has already been applied by Acemoglu (1995).

(a) There are two litigants (i = 1, 2) and there are only two outcomes of the litigation: one entirely in favor of the plaintiff and the other entirely in favor of defendant.

(b) Any outcome of the litigation does not change the total welfare, just redistributes the given total welfare. Accordingly, winning the litigation for the plaintiff i generates income R_i, and losing the case generates no income.

(c) Winning the litigation for the defendant i generates no income loss, and losing the case generates income loss R_i.

(d) Parties that bribe judicial officials are doing that for no other reason than winning the litigation.

(e) There are no moral constraints to activities of any party in the model.

(f) All parties (agents) behave rationally, i.e., all of them maximize their utility.

(g) Corruption is a crime and there is a criminal liability and sanction for accepting the bribe (f) as well as criminal sanction for bribing a judicial official (k), and it is assumed that always $f > 0$ and $k > 0$.

(h) The probability of the detection of crime of corruption (p) and the probability of apprehension and conviction of the corruptor/corrupted are identical and that probability is always bigger that zero ($0 < p \leq 1$). The probability of apprehension/conviction is the same for all the parties in the model.

(i) Judicial corruption is completely centralized and the judge is the only judicial official that can be corrupted.

(j) There is no appeal of the judgment of the first instance courts.

(k) Corruptor i who has paid the bribe receives corruption service, i.e. wins the litigation with the probability q_i, taking into account that $0 \leq q_i \leq 1$.

(l) All parties in the model are risk neutral.

(m) There is a budgetary constraint of both litigants regarding bribing. The total income of litigant i is $y_i = b_i + c_i$, where y_i stands for total income of the litigant i, c_i stands for the expenditures of litigant i for purchasing a composite subsistence good, and b_i is the maximum segment of income that can be used for bribing the judge (budgetary constraint for bribing).

Assumption (a) that there are only two outcomes of the litigation (one entirely in favor of the plaintiff and the other entirely in favor of defendant) is a simplification of reality as there is room for a wider range of the litigation outcomes. According to assumption (b) both parties

bribe (if it is decided to bribe) judicial officials only in order to ensure an outcome of the litigation in their favor. This contradicts empirical findings (Begovic *et al.*, 2004) that a substantial part of the corruption of the judiciary, particularly in the case of litigation is focused to delaying the case and postponing an unfavorable outcome. These motives of corruptors are ignored in the model to keep it simple.

Punishment for accepting the bribe (*f*) represents a monetary equivalent of the non-monetary punishment (prison, for example) and it also includes all forgone revenues due to the punishment. For example, it includes the present value of forgone revenues due to corruption (received bribes) and the present value of the difference of the legal incomes that is forgone due to expulsion from office, following the model of Stigler and Becker (1974).

According to assumption (i), there is completely centralized judicial corruption, i.e., it is sufficient to bribe only one judicial official to get the corruption service. This is not to assume that the service will certainly be delivered, but to assume that bribing of the additional judicial official will not increase the probability of delivering that service. For simplicity of the model it is assumed that judges are the only judicial officials that can be bribed. This assumption only facilitates the formulation of the model while departure from it (introducing the assumption that all judicial officials are subject to corruption) does not affect the model's results. Finally, this assumption should not be taken to imply that only judges, of all judicial officials, are prone to corruption.

Assumption (j) on no appeal possibility from the first instance courts judgments violates reality and it is introduced for simplicity of the model. Introducing second or more court instances provides for many possible strategies of the corruptors and leads toward counterproductive complication of the model.

According to assumption (k) there is room for an illegal corruption contract not to be enforced, i.e., that the corruptor receives no corruption services after he/she paid the bribe. Effectively, an assumption on opportunistic behavior of corrupted judge is introduced. Consequently it is the expected values of the monetary expressions of a favorable litigation outcome that are taken into account, i.e., all decisions regarding judicial corruption are subject to uncertainty.

Finally, bribery budgetary constraint of the litigants depends on inequality. If there is no inequality (Gini = 0), then:

$$y_1 = y_2 \tag{1}$$

and assuming that the consumption of the composite subsistence good is the same for both litigants, it follows that:

$$b_1 = b_2. \tag{2}$$

The introduction of inequality is based on the assumption that litigant $i = 1$ is in better position than litigant $i = 2$. Formally:

$$b_1 = b_2 + \beta; \qquad \beta = f(Gini); \qquad \frac{\partial \beta}{\partial Gini} > 0, \tag{3}$$

meaning that increase in inequality decreases relative bribery budgetary constraint of the better off litigant.

V Formulation of the Model

The key difference between judicial corruption and corruption in the most of the other branches of government lies in the fact that in the judiciary there are incentives for both parties (litigants) to corrupt the judicial official (judge) to secure a favorable outcome. In other words, two potential corruptors appear with conflicting requirements. In contrast, in corruption outside the judiciary, i.e., in the majority of other areas of state administration, there is in most of the cases only one potential corruptor. For example, with corruption in the customs administration only one importer is in position to bribe a customs officer to calculate a lower customs rate for a given delivery of goods.[13]

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[13] No doubt that judicial corruption is not the only case of administrative corruption in which two or more competing corruptors are active. The most similar case of administrative corruption is the case of public procurements and privatization of the firms via selling the capital. However, it the case of the "state capture", i.e. adopting the rules of the game that are favorable for the corruptor, it is reasonable to assume that, in principle, there are at least two concerned parties (more than one corruptor), as there are more than one individual and/or group interest in society.

Since there are two parties in cases of judicial corruption, i.e., two players on the supply side of the bribe (or on the demand side for corruption service), their inter-relation regarding the decision making on corruption should be examined. The question is, to use the terminology of game theory, whether this game is cooperative, i.e., whether two participants cooperate in the decision-making process. Clearly no cooperation exists in this case and consequently judicial corruption is a non-cooperative game. If there had been cooperation or the possibility of two sides coming to an agreement, they would not have been in court, but would have already agreed on the dispute which, precisely due to their non-cooperation, has become litigation. If they had been able to cooperate, they would not have been involved in the litigation, but would have resolved the dispute in an agreement or out-of-court settlement. This lack of cooperation means that both sides make decisions exclusively by anticipating their rival's actions.

The next important question is (still using the terminology of game theory): is this a multi-period game, i.e., a repeated game? If it is a multi-period game, each player will have to pay attention to the reactions of the other party in the next stage of the game. Litigation in this model, according to the assumption (j) that there is no possibility for appeals of the judgment of the court of first instance, is not a repeated game. The same pair of litigants does not appear before the court of first instance again in the same case. Therefore the following theoretical model of judicial corruption can be described as a single-period non-cooperative game, or, in microeconomic terminology, a static non-cooperative duopoly.

What are the incentives for a potential corruptor when deciding to bribe the judge and how much to offer? If the probability of an unbiased litigation outcome in favor of one party is 0.50, according to the assumption (c), and if the judge agrees to offer a corruption service exclusively to the litigant who has paid the higher bribe, the potential corruptor will be ready to offer an amount which is slightly higher than that offered by his opponent. In other words, it is the relative amount of bribe that is important for the judge when deciding the litigation – the higher amount of the bribe offered by one party produces a judgment in his/her favor, independently of the absolute amount of the bribe. In this process neither of the two litigants knows how much their opponent will offer, but for any amount of bribe offered by the opponent, the observed potential corruptor will offer slightly more. In other words, for a set of the amounts of a bribe offered by one litigant, a best-response (reaction) function from the

other litigant can be formulated. In this way a version of model of static non-cooperative duopoly is constructed.

How is the equilibrium established in the model? To answer this question it is necessary to formulate a curve of responses for both litigants, to specify the minimum amount of the bribe that the judge is ready to accept and the maximum amount of bribe that potential corruptors are ready to offer.

The best-response curve of both parties is described by the best response function that depends only on, in analogy with standard static models of non-cooperative duopolies, the amount of the bribe offered by the other party (rival). Consequently:

$$B_1 = R_1(B_2) \tag{4}$$

$$B_2 = R_2(B_1) \tag{5}$$

whereby B_1 and B_2 are the amounts of bribe that litigants $i = 1$ and $i = 2$ are ready to offer/pay. Since each corruptor is motivated to offer a bribe somewhat higher than that offered by the competitor assuming that both competitors behave in the same manner, response curves of both competitors can be formulated:

$$B_1 = R_2 + \varepsilon \tag{6}$$

$$B_2 = R_1 + \varepsilon \tag{7}$$

whereby ε stands for any small positive number.

The minimum amount of the bribe accepted by a judge, i.e., the minimum amount of the bribe for which a corrupted judge will render a service (a favorable judgment), can be specified on the basis of the finding of Becker's model of criminal behavior (Becker, 1968). The minimum, i.e., the amount of bribe B on the margin (the amount to which a judge is indifferent) is the amount which provides the judge with expected zero utility from the possible corruption transaction, as described by the following equation:

$$E(U) = pU(B - f) + (1 - p)U(B) = 0. \qquad (8)$$

whereby U stands for utility function, B stands for the amount of bribe, i.e., total revenue generated from committing the crime of corruption, f stands for monetary equivalent of the punishment for the crime of corruption (the amount of money that offender is prepared to pay for avoiding the punishment)[14], and p stands for the detection of the crime of corruption in the form of accepting the bribe, i.e., the probability of apprehension and conviction of the culprit. Naturally, the concrete value of the minimum amount of the bribe depends on the concrete shape and parameters of the function of utility of the judge. Since all the domains of the function (8) are monetary variables or monetary equivalents of some other variables, it is apparent that it is the case of utility function of money. If constant marginal utility of money is assumed and following the application of Becker's model for wages of civil servants as barrier for corruption (Becker and Stigler, 1974), condition (8) can be reformulated as:[15]

$$p(B - f) + (1 - p)B = 0. \qquad (9)$$

Solving (6) by B permits calculation of the minimum amount of bribe (B^*) that should be paid for delivering the corruption service, i.e., a favorable litigation outcome:

$$B^* = pf. \qquad (10)$$

The maximum amount of the bribe which can be offered by corruptors, according to the findings of Becker's model, depends on the expected utility from winning the litigation and the total costs incurred by the corruptor. The maximum amount of the bribe, i.e., the amount of the bribe on the margin, that the corruptor is ready to offer is the one which equates the expected utility stemming from the decision not to corrupt the judge (allowing the litigation to follow its course) and the expected utility stemming from corrupting the judge, as is described by the following equation:

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[14] This monetary value also includes forgone revenues (utility) that are consequence of the enforcement of the punishment. Implicit assumption of condition (8) is that judge obtains no utility from doing "the right things". This is one of the differences between this model and the one of Glaeser *et al.* (2003). If it is, following Posner (1995), assumed that judge obtains utility from "doing the right thing", left hand side of the equation should equal that expected utility.

[15] Furthermore, assumption on constant marginal utility of money is consistent with assumption (l) that all parties are risk-neutral.

$$\alpha_i U_i(R_i) = p U_i[-(B_i + T_i + k)] + (1-p) U_i[q_i R_i - (B_i + T_i)] , \qquad (11)$$

whereby $i = 1, 2$. In equation (11), α_i stands for probability of winning the litigation without corruption (both sides refrain from corruption), R_i stands for the revenue/loss due to the won/lost litigation, U_i stands for utility function, B_i stands for the amount of bribe litigant i is ready to pay, k stands for the monetary equivalent of the punishment for the crime of corruption by bribing judicial officials (the amount of money the culprit is ready to pay to avoid the punishment, p stands for the probability of detection of corruption and apprehension of the culprit who bribed the officials, T_i stands for transaction costs, and q_i stands for the probability of winning the litigation as the result of bribing the judge.[16]

The condition (11) includes the corruptor's total costs – in addition to the amount of the bribe itself, transaction costs (T_i) are taken into account irrespectively of whether the bribery was successful or not. The difference between this model and Becker's one lies in the assumption that in case of detection, the litigation judgment becomes null and void, so the corruptor is not able to enjoy the utility from winning the litigation by corruption. Furthermore, unlike Becker's model, it is assumed that there is no certainty of gaining utility from a corruption service, since there is no certainty that the service will be provided. In other words, instead of total value, the equation introduces the expected utility resulting from the corruption and a corruption based outcome (for each $q_i < 1$).

Accepting the assumption on constant marginal utility of money, equation (11) can be transformed into:

$$\alpha_i R_i = p[-(B_i + T_i + k)] + (1-p)[q_i R_i - (B_i + T_i)] . \qquad (12)$$

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[16] The term transaction costs in this paper is referring only to the transaction costs of judicial corruption. Consequently, legal transaction costs of litigation, i.e. legal expenditures of the litigants are not taken into account. These costs are important variable for explaining decision to sue, i.e. to start litigation, and during the litigation these costs are crucial for decision to settle instead to going to the trial (Kaplow and Shavell, 2002)). These legal expenditures must be borne by litigants one way or the other (under American or English rule), irrespectively whether they decide to bribe the judge or not, hence these costs/expenditures are omitted from the model.

hence the maximum amount of the bribe (B^{**}_i) that the corruptor i is ready to pay is the one that fulfills the condition (12). By solving equation (12), B_i, the maximum amount of the bribe corruptor i is ready to pay is established:

$$B_i^{**} = \begin{cases} [(1-p)q_i - \alpha_i]R_i - pk - T_i & if\ [(1-p)q_i - \alpha_i]R_i - pk - T_i < b_i \\ b_i & if\ [(1-p)q_i - \alpha_i]R_i - pk - T_i > b_i \end{cases}, \qquad (13)$$

emphasizing that the maximum amount of bribe corruptor i is ready to pay should be within his bribery budgetary constraint.

The mechanism for establishing equilibrium in this model can be described graphically (Figure 1). The line with a 45 degree angle with the origin represents a set of points describing the situation in which equal amounts of bribe are offered/paid by both litigants (isocorruptive curve). Initially, both litigants are motivated to depart from the curve of equal bribes and to offer a bribe which is slightly higher (ε) than the bribe offered by the other party, thus attempting to win a litigation by bribe. To the offer of an increased bribe, or its anticipation, the other party responds by increasing his/her offer again, to a level slightly higher than the former party's. In this manner the response curves of both parties are formed a little to the left and a little to the right from the equal bribe curve. Hence, the model clearly represents a non-cooperative oligopoly (duopoly) with a convergence of reaction curves from both litigants and the Bertrand equilibrium is established. However, the question arises, what is the value of the equilibrium; in other words, when does the competition of the two interested parties stop, bearing in mind that they have no incentive to change their behavior. In the Bertrand model, that is based on price competition, the equilibrium is established when prices equal marginal costs, since none of the competitors is motivated to decrease the sale price below the marginal costs. Analogous to this, equilibrium in this model of judicial corruption is established when the competition of two competing corruptors reaches the stage where the offered amount of bribe equals the maximum amount of bribe that the corruptors, on the basis of the limitation described by equation (7), are ready to pay (point E, Figure 1). In other words, the equilibrium amount of the bribe in this model equals the maximum amount of bribe that the corruptors are ready to pay.

The features of the equilibrium are very interesting. First, this equilibrium is Pareto inefficient, from the corruptors' viewpoint. The mechanism of Bertrand competition in duopoly leads to an equilibrium which can be established only with the maximum possible amount of the bribe. However, the same outcome for corruptors can be achieved (any point on the same bribe line below the equilibrium point) with a lower absolute amount of the bribe. In other words, the same outcome will be reached with lower costs for both corruptors – the only important thing is that the amount is higher than the minimum amount of bribe acceptable to the judge. This result corresponds to the result of Becker's model of competition between interest groups for political influence (Becker, 1983). Although Becker's model generates a Cournot-Nash equilibrium, there is no difference regarding the efficiency of allocation of resources in corruption or in organized political pressure.

Figure I
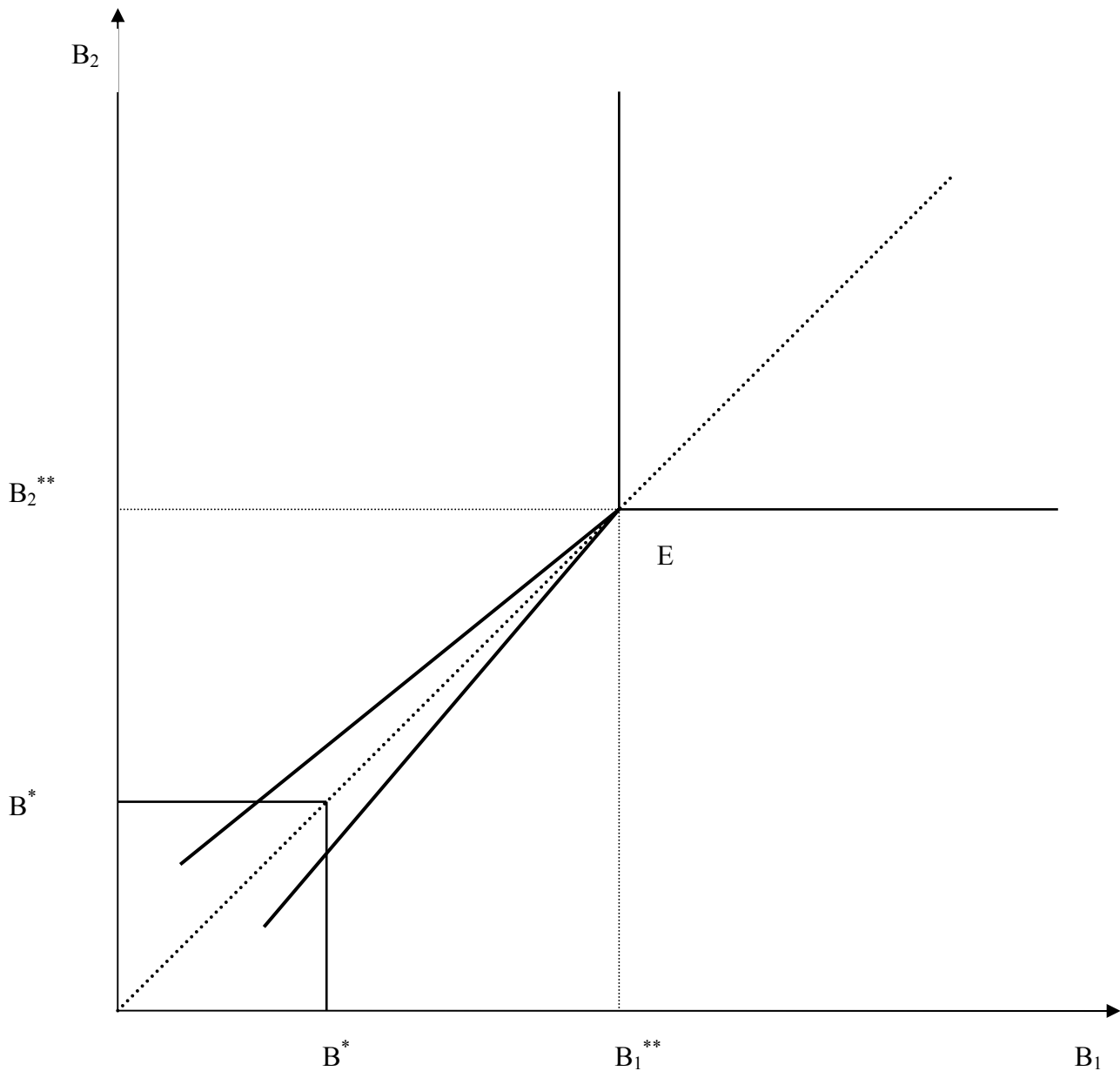
The second finding of the model is that in bribing equilibrium a litigation the outcome is the same as that in which no one bribes the judge (no corruption at all). The assumption of the model is that in conditions without corruption the probability of a litigation outcome in favor of one party is 50%. Under conditions in which the relative corruption pressure of both parties on the judge is the same, the probability does not change. This finding is paradoxical – at the maximum possible amount of bribe, the only feasible amount at the equilibrium, corruption has no effect on the litigation outcome. Furthermore, this finding is completely consistent with the previous one, as its special case – the same outcome from the viewpoint

of the litigants can be obtained if neither of the parties bribes the judge. If the two parties could agree on that and enforce the agreement, the welfare of both parties would increase, since there would be no direct (the amount of bribe) and indirect (transaction) costs of corruption. This demonstrates that this model of corruption, which belongs to the class of Bertrand models, corresponds in its results to the case of the prisoner's dilemma within the framework of game theory.

The previous finding leads to the conclusion that the equilibrium outcome of litigation with corruption is not only Pareto inefficient from the perspective of corruptors, but also leads to dead-weigh loss of welfare. The point is that, in addition to the amount of the bribe transferred from the corruptor to the corrupted, judicial corruption also generates substantial transaction costs, i.e., misallocation of real resources, with their opportunity costs. In other words, with the described outcome of a litigation which could have been reached without any transaction costs, i.e., without bribing the judge, judicial corruption in this model inevitably creates dead-weight loss of welfare. Elimination of corruption of the judiciary within this model inevitably creates an improvement of allocative efficiency, although it is not a Pareto improvement. The point is that elimination of such corruption leads to a decrease in the utility (welfare) of the corrupted judges, which violates the Pareto criterion.[17]

Finally, there is the question of the sustainability of the described equilibrium of this model. The question stems from the fact that in the equilibrium the outcome is identical to the situation in which neither of the litigants bribes the judge. In other words, there is no difference in the probability of winning the litigation with or without corruption. In such conditions, it is interesting to ask what value of probability q_i from equation (12) makes that maximum amount of the bribe that the corruptor is ready pay, specified by condition (14) lie below the minimum amount of the bribe that the judge is ready to accept, specified by condition (14), since this is a sufficient condition for the elimination of corruption in the model.

Judicial corruption exists if and only if:

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[17] Under assumption on existence of transaction costs of corruption, i.e. if transaction costs are bigger than zero, elimination of corruption will definitely be an improvement consistent with Kaldor-Hicks criterion (compensation test). If transaction costs are zero, elimination of corruption will be neutral regarding the compensation test.

$$B^* < B_i^{**},$$ (14)

for at least one i, which means that a sufficient condition for elimination of judicial corruption is:

$$p\,f > \begin{cases} [(1-p)q_i - \alpha_i]R_i - p\,k - T_i & if\,[(1-p)q_i - \alpha_i]R_i - p\,k - T < b_i \\ b_i & if\,[(1-p)q_i - \alpha_i]R_i - p\,k - T > b_i \end{cases}$$ (15)

for both i, whose transformation and solution by q_i yields (if the maximum bribe level is within the bribery budgetary constraints of i litigants):

$$q_i < \frac{p(f+k)+T_i}{(1-p)R_i} + \frac{\alpha_i}{(1-p)},$$ (16)

which demonstrates that for a given probability of winning the litigation by bribing the judge (q_i), increasing the probability of detection and apprehension, increasing the punishment for both paying and accepting the bribe, and an increase of the transaction costs increase the probability of fulfillment of inequality (16), i.e., the probability of elimination of corruption of the judiciary. On the other side, an increase in the value of litigation decreases the probability of elimination of corruption of the judiciary.[18] If both the left and right sides of the inequality (16) are divided by q_i, it is demonstrated that corruption will be eliminated if the expected value of total costs exceeds the expected value of the gain; an entirely plausible result.

If the maximum bribe level equals the bribery budgetary constraints of i litigants, than sufficient condition for elimination of judicial corruption is:

$$p\,f > b_i$$ (17)

Alternatively, a necessary condition for judicial corruption to exist is:

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[18] These finding can be used for as elements for policies against judicial corruption. It is evident that increase of probability of detection/apprehension and increase in punishment lead toward specific selection of the corrupt litigations; only high value litigations can be corrupted judicial cases. Furthermore, it is reasonable to assume the increase of probability of detection/apprehension leads toward the increase of transaction costs. Hence, beside direct, this measure will have an indirect effect.

$$q_i \geq \frac{p(f+k)+T_i}{(1-p)R_i} + \frac{\alpha_i}{(1-p)},$$ (18)

If condition (18) is fulfilled for every *i*, judicial corruption is eliminated because there is no way for the corruptor to offer/pay the amount of bribe that is effective. Hence it is demonstrated that, under the conditions specified, i.e., under the specific values of the variables in relation (18), equilibrium in the model of judicial corruption is not sustainable and elimination of judicial corruption must result. Hence, the question arises, why judicial corruption, in cases of litigations, exists nonetheless – at least according to the findings of empirical research in various countries.

So it is interesting to see whether this model can achieve an equilibrium in which one of the litigants offers/pays a higher bribe than the other. To answer this question one should review the implicit assumption about the identical maximum amounts of bribe that both litigants are ready to pay, i.e. that the values in equation (13) are identical for both corruptors. This assumption holds only for complete equality (Gini coefficient equals zero). The advent and increase of inequality introduces and increases probability that the maximum bribe of one litigant (the poor one) is constrained by his bribery budgetary constraint, resulting in one litigant (the rich one) offering higher bribe than the other.

In this framework one litigant can afford a higher maximum amount of bribe than the other, i.e., that the maximum amount of bribe that one litigant is ready to pay is higher than the other litigant's maximum, an equilibrium is achieved in which this amount is higher than the maximum amount of any bribe of the other litigant. Within this framework, the litigant who is ready to offer/pay the larger bribe inevitably wins, and the size of the difference in amounts is absolutely irrelevant. Consequently, under such conditions the equilibrium amount of the bribe will be as follows:

$$B_e = B_1^{**} = B_2^{**} + \varepsilon.$$ (19)

However, the change in the given assumption on the symmetry of competing corruptors altered the character of the model itself and the newly-established equilibrium is not a Bertrand type of equilibrium, but instead a monopoly equilibrium in which one of the competitors with his superior efficiency and lower costs manages to eliminate the opponent completely and thus establish a monopoly. In other words, a similar but inevitably alternative model of judicial corruption with two asymmetric corruptors is thus formulated.

The crucial question regarding this mechanism of equilibrium is the one about the probability that the poor litigant is constrained by its bribery budget. It is reasonable to assume that R, i.e. the value of the litigation between rich and poor litigant is rather small, because the value of the transaction is small. The bigger inequality, the smaller is value of the litigation/transaction. The smaller value of the litigation R, according to the relation (13), the smaller probability that bribery budgetary constraint of any side will affect the maximum (equilibrium) amount of the bribe one of the litigants is ready to pay. Accordingly, it seems that it is not very likely that inequality will bring the difference that will enable a monopoly equilibrium to be established.

Apart from inequality, what else brings about the difference between the maximum amounts of the bribe that two litigants are ready to pay? Some variables in the relevant equation (13) are inevitably identical (the sanctions and probability of apprehension/conviction).[19] However, the difference can appear in the transaction costs of corruption. It is reasonable to assume that those more knowledgeable in corruption and/or those with more experience in corruption, are more efficient in the implementation of corruption in relation to other corruptors – their transaction costs are lower. Since the gap in individual transaction costs is the source of difference in the maximum amount of the bribe that corrupting litigants and are ready to offer, the one who is more efficient in corruption implementation wins in the corruption competition. This demonstrates that there is an incentive to reduce transaction costs by specialization and innovation in the sphere of corruption and thus to gain superiority over competitors.[20] It is very important to notice that the poor can specialize in corruption,

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[19] One could argue that the probability of convictions of the rich is smaller that the poor due to better legal representation in the court. Although reasonable, it seem that effects of that are not significant.
[20] Such a specialization can generate at least another advantage: decreasing the probability of detection of corruption and probability of apprehension of the briber. This means violation of the assumption (h) of exogenous probability of detection. Decrease in that probability, according to the result (13), makes the increase of the maximum amount of bribe that the corruptor is prepared to offer/pay.

reducing their transaction costs of corruption and becoming more efficient in these operation and that will enable them to win the litigations via corruption.

These findings, especially the one about differences in transaction costs, demonstrates that the establishment of equilibrium in the new, modified model of judicial corruption can be reduced to a kind of auction mechanism which provides incentives to competitors to reveal their transaction costs of corruption, as well as their subjective assessment of the probability of the success of the corruption transaction, which means revelation of the real amount of bribe they are ready to pay.[21]

If the maximum amounts of the bribe which corruptors are ready to offer/pay vary, the equilibrium is established at an amount higher than the maximum size of the bribe that the inferior opponent is ready to pay. This modification leads to an equilibrium outcome resulting in a biased judgment favorable to the corruptor-winner to the extent to which the corrupt judge enforces the corruption contract, i.e., fulfils the obligations in this contract. Since this modification enables a corrupted judgment to occur, the model explains judicial corruption and, particularly, its sustainability.

VI Consequences of Judicial Corruption due Inequality

The crucial consequence of the judicial corruption due inequality is undermining property rights of the poor. That increases uncertainty and due to higher "requested" returns decreases investments of the poor, both in terms of physical and human capital. Accordingly, their prosperity relative to the rich is declining, increasing inequality. Furthermore, since judiciary should upholds the contracts, judicial corruption in favor of the rich means that transactions are not secured by the courts. Consequently that decreases market exchanges and the division of labor, since size of the market has long time ago (Stigler, 1951) been identified as one of the crucial constraint of that division and the productivity that follows from it. Furthermore, this type of judicial corruption, i.e. the one that favors rich provides incentives for poor to exchange among themselves, since theses contacts will be uphold by the courts – the rich are not interested in them. Such a restriction of trade (exchange) will additionally decrease welfare of the poor (comparing with free and unrestricted trade), although that restriction will

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[21] Other factors that can generate difference between the maximum amounts of the bribe that two litigants are ready to pay are described in Begovic (2005).

also affect the rich since it will reduce the transactions between the rich and the poor. Nonetheless, it is reasonable to assume that the adverse effects to the poor will be relatively bigger, increasing inequality.

Additional problem for the poor is necessity of alternative protection of their property rights, particularly the rights that are most vulnerable. Alternative protection generates additional costs (comparing with the rule of law), reduces welfare of the poor and creates inefficient allocation of resources. Some methods of alternative (private) protection of property rights are economically very pervasive and creates massive reallocation of resources in to the rent-seeking activities, decreasing overall economic efficiency and social welfare (Gambetta, 1993).

Furthermore, as demonstrated by Glaeser and Shleifer (2002), alternative protection of the property rights of the poor could be established via regulation, i.e. statutory legislation that will explicitly preclude dome actions of all economic agents. Nonetheless, it has already been pointed out that such legislation could be a second best solution.

Obviously, there are substantial adverse effects of judicial corruption both in terms of reducing economic efficiency and increasing inequality. Hence, the crucial question what public policies should be applied for combating judicial corruption. More specifically, is compulsory redistribution aimed at decreasing inequality reasonable public policy for combating corruption? First of all, inequality is identified as one, far from being the only factor of judicial corruption. It was even demonstrated that the poor, with appropriate adjustment policies (increasing efficiency due to the specialization in corruption and hence decreasing the transactions costs) can turn the corruption in their favor. Furthermore, decreasing inequality via compulsory redistribution will only increase total income of the poor, relaxing their budgetary constraint and increasing the incidence of corruption. The most important policies to combat corruption that are identified in relation (18) have nothing to do with inequality. Accordingly, there is no evidence that decreasing inequality will decrease judicial corruption.

Furthermore, as it has been pointed out by Alesina and Angeletos (2005), compulsory redistribution aimed at decreasing inequality increases size of the government intervention and by that the prospects for corruption which in turn (due to the impact of corruption to

inequality) increases inequality. Obviously it would be too costly and absolutely counterproductive to use decreasing inequality as policy for combating corruption (both specific judicial corruption, as well as the overall one).

The crucial policies for combating corruption are those not related to the redistribution. These are policies that both directly and indirectly increases the probability of apprehension/conviction and the total costs of bribing – not only negative utility stemming for the criminal punishment, but also all the opportunity costs of all streams of income forgone due to the apprehension, as well as transaction costs of corruption. Strong and efficient institutions have beneficial effect to all the mentioned policies.

All these policies are elements of the rule of law as the most important public good that government should provide. Accordingly, the government should provide a public good of rule of law, not the redistribution. If there is rule of law and strong institutions the prospects for decent life are growing and the demand for redistribution is decreasing, hence there will be less distribution. Provision of public good is not so vulnerable to special interest politics and corruption as redistributive policies. Strong, yet minimal government is the way out from vicious circle of inequality, redistribution and corruption

VII Conclusions

A review of recent contributions to the explorations of the relations between economic inequality and corruption demonstrated that corruption as a factor of inequality has been poorly theoretically explained, although some empirical evidence has been demonstrated. More convincing theoretical explanations have been offered regarding inequality as one of the factors of corruption. A theoretical model of judicial corruption in which economic inequality is one of the factors (explanatory variables) of judicial corruption has been formulated. It demonstrated that inequality can be one of the factors leading to the equilibrium in which one of the litigants acquires the case by bribing the official, not necessarily, even likely the decisive one. The consequences of corruption due to inequality, practically the effects to economic inequality are stemming from the inadequate protection of the property rights of the poor. Policies to combat judicial corruption should be focused to the provision of the public good of the rule of law, increasing both probability of the apprehension and the sanctions for the corruption.

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