Trust, Cooperation and Time Horizon in Economic Decisions

Iván Major[1,2*]

[1] Budapest University of Technology and Economics, and Institute of Economics, CERS, H.A.S. Budapest, Hungary

[2] University of California, San Diego (visiting professor), San Diego, CA, USA

[*] Iván Major, E-mail: major@kgt.bme.hu

Abstract

My paper addresses an issue that is rarely discussed in the economics literature: how does the economic actors' trust in each other and in the legal and political institutions affect a country's economic performance? The first part of the paper is an empirical analysis of the interrelationship between confidence in institutions in different countries, the economic actors' willingness to cooperate with each other and with state institutions, and their decisions' time horizon on the one hand, and the countries' economic performance on the other. I compare the relevant indicators of Central and East European countries (CEE countries), the advanced Western countries and some Asian countries. I show that the low level of trust, the lack of cooperation among the economic actors and with their state institutions, and the short-term time horizon of economic decisions in CEE countries are at the root of how these countries can cope with the current financial and economic crisis.

The second part of the paper applies the theoretical models of mechanism design to the issues discussed in the first part. I demonstrate that government policy results in "perverse incentives" toward the economic actors if they do not have confidence in their economic institutions.

Keywords

trust, cooperation, mechanism design, incentive theory, adverse selection, moral hazard, Bayesian games

1. Introduction

Economic actors of a market economy make a large number of decisions every day in the belief that they can rely on the usual procedures, signals and habits of other participants. In other words, they need to trust other "players" on the market to some extent, and they need to have confidence in the legal and cultural institutions of the state to be able to run their operation. As Kenneth Arrow wittingly wrote: "To get markets that work, you have to keep the other person from trying to cheat you at every moment. So morality is closely related to the workings of the market… In fact, the markets do have it (that is, trust—*I. Major*) because they need fairness and efficiency to some extent. Yet the logic of markets means that such considerations have to be modeled as totally self-regarding, and people are not totally self-regarding" (Note 1). People cannot be totally self-regarding because they must cooperate in the complex world of a modern economy. And cooperation requires trust. But the need for confidence and cooperation becomes much less obvious during times of economic crises. Trust and cooperation can only be retained in these difficult periods if such a behavior is supported by deeply embedded social institutions rather than enforced by government action. Several advanced countries—for instance, the Netherlands in the 1970s, Ireland, Portugal, Spain in the 1980s and Japan in the 1990s—serve as good examples, especially during difficult times. I shall use the term "advanced countries" to cover the group of fourteen European countries plus the USA. I included the U.S. to show that there are not significant differences between European and non-European advanced societies (Note 2). The group of CEE countries comprised fourteen countries (Note 3). In addition, I extended the analysis to four Asian countries—China, India, Japan and South Korea (Note 4)—because the impact of trust, cooperation and people's thriftiness on economic development are in contrast with what we could observe in European countries.

I shall argue in this paper that the low level of trust and cooperation, along with the short-term time horizon of economic decisions on all levels in CEE countries—from individual economic actors to government—are not just temporary weaknesses of these countries but they are deeply embedded social and cultural institutions in Central and Eastern Europe (Note 5). I shall show that low trust, the lack of cooperation and the short-term horizon of economic decisions are directly interrelated and they are at the roots of how these countries can cope with economic crises. Then I turn to an even more intriguing question: can the rules of the political and economic game be changed in CEE countries?

The analytical framework I use originates from non-cooperative game theory and from the theory of mechanism design. I shall also conduct an empirical data analysis to demonstrate the differences with regard to trust and cooperation among the CEE countries, Western countries and a small group of Asian countries. The structure of the paper is as follows: I present the basic empirical findings on trust in the three groups of countries in section 2 and on people's willingness to cooperate in section 3. I discuss the time horizon of economic decisions and the relationship between time horizon and trust in section 4. I address the question: can optimal mechanisms—efficient institutions—be implemented in a country that result in a higher level of trust and cooperation and ultimately in better economic performance in

374

section 5. Conclusions and discussion follow in section 6. The data base of the analysis and the regression results are given in the Appendix.

2. Analytical Methods and Definitions

2.1 Trust in Asian, in Western and in CEE Countries

The notion of "trust" is defined or applied in many different ways in social sciences (Note 6). I define trust as follows: an individual trusts another person, organization or institution if she makes her objectives, her actions, and the outcome of her actions contingent on her expectations about the signals coming from the other party. A signal can be information or behavior, or both. Trust is not a binary variable—in the sense that it would either exist or it would not—but it can have different levels, depending on the distance between an individual's expectations about, and the actual behavior of, the other party.

I discuss two types of trust in this paper: one is a relationship among individuals, and the other is a relationship between an individual and the legal and political institutions. I shall ask first, how much people trust each other. But the focus of my analysis is at what level do individuals have confidence in the main legal institutions of their country that provide the framework of people's economic decisions and behavior? I also ask the question whether there are significant differences among the levels of trust in CEE, in Western advanced countries and in Asian countries. If we find that the level of trust is low in CEE, we may assume that economic behavior tends to be less cooperative than in case economic actors have confidence in the legal institutions (Note 7).

I present the results of individuals' trust in other persons, separately for Asian, for Western and for CEE countries in Table 1 below (Note 8). The indicators of trust among people were calculated from the European Value Study–World Value Survey (EVS-WVS) 1981-2004, the World Value Survey 2005-2008, and from the European Value Study (EVS) 2008 data bases (Note 9). The indicators are arithmetic averages of the respondents' answers in the two groups of countries (standard deviations in parentheses).

Table 1. Trust in Other People in Asian, in Western and in CEE Countries

Asian countries			
1989-1993	1994-1999	1999-2004	2005-2008
1.573	1.595	1.593	1,630
(0.484)	(0.485)	(0.479)	(0,469)
Western countries			
1989-1993	1994-1999	1999-2004	2005-2008
1.586	1.589	1.617	1.646
(0.470)	(0.484)	(0.475)	(0.463)
CEE countries			

1989-1993	1994-1999	1999-2004	2005-2008
1.733	1.757	1.779	1.816
(0.434)	(0.417)	(0.407)	(0.415)

Note. 1 = "Most people can be trusted"; 2 = "Can't be too careful".

Data in Table 1 clearly show that the level of individual trust has always been significantly lower in the CEE group than either in Asian or in advanced Western countries. Based on these data we cannot claim that the socialist past in CEE developed a solid network of trust among individuals that would have substituted for the missing network of trust in legal institutions. It is also interesting to note that people's trust in each other has been stronger in Asian than in Western countries.

Now we turn to people's trust in legal institutions. Individual confidence indicators were computed from the same data bases as above. The indicators are arithmetic averages of the respondents' answers by country.

The "Mean Trust" indicator was calculated as an arithmetic average of individual confidence indicators. Table 2 shows the values of "Mean Trust" in Asian countries, Table 3 consists of the values of "Mean Trust" in Western market economies, while Table 4 comprises the values of "Mean Trust" in CEE countries (Note 10).

Table 2. Trust in Legal Institutions in Asian Countries between 1989 and 2008

Country	1989-1993	1994-1999	1999-2004	2005-2008
China	2.39	2.33	2.02	2.05
India	2.36	2.35	2.39	2.20
Japan	2.70	2.58	2.67	2.66
South Korea	2.56	2.67	2.81	2.71
Average of Asian countries	2.48	2.47	2.41	2.51

Table 3. Trust in Legal Institutions in Western Countries between 1989 and 2008

Country	1989-1993	1994-1999	1999-2004	2005-2008
Austria	2.58	n.a.	2.57	2.76
Denmark	2.48	n.a.	2.44	2.34
Finland	2.60	n.a.	2.50	2.62
France	2.55	n.a.	2.69	2.64
Germany	2.62	2.85	2.65	2.64
Great Britain	2.57	n.a.	2.75	n.a.
Greece	n.a.	n.a.	2.96	2.89
Italy	2.59	n.a.	2.57	2.70*
Netherlands	2.54	n.a.	2.56	2.61*
Norway	2.42	2.45	2.56	2.40*

Portugal	2.60	n.a.	2.41	2.54
Spain	2.64	2.68	2.65	2.71
Sweden	2.54	2.57	2.53	2.46*
Switzerland	n.a.	2.64	n.a.	2.49
Average of European advanced countries	2.56	2.64	2.60	2.60
USA	2.37	2.59	2.56	2.67

Table 4. Trust in Legal Institutions in CEE Countries between 1989 and 2008

Country	1989-1993	1994-1999	1999-2004	2005-2008
Bulgaria	2.70	2.58	2.87	3.11
Croatia	n.a.	2.69	2.79	2.44
Czech Republic	2.63	2.80	2.90	2.89
Estonia	2.77	2.52	2.76	2.65
Hungary	2.59	2.69	2.74	2.87
Latvia	2.79	2.72	2.68	2.72
Lithuania	2.64	2.64	2.79	2.69
Poland	2.40	2.61	2.57	2.78
Romania	2.68	2.73	2.68	2.68
Russian Federation	2.58	2.78	2.92	2.71
Serbia and Montenegro	n.a.	2.85	2.88	3.04
Slovakia	2.70	2.69	2.61	2.60
Slovenia	2.64	2.75	2.70	2.53
Ukraine	n.a.	2.66	2.78	2.95
Average of CEE countries	2.65	2.69	2.76	2.78

Note. "Mean Trust" Index = arithmetic average of individual confidence indices. The value of the "Mean Trust" Index can vary between 1 = high trust, and 4 = lack of trust.

Sources: own calculations based on *European Value Study* (*EVS*), Waves 1-4, *World Value Survey (WVS)*, Wave 5, and *EVS-WVS*, Wave 5.

As can be seen from the tables, confidence in legal, political and social institutions has been higher in Asian countries than either in Western or in CEE countries. Citizens of the advanced Western countries have trusted their legal institutions more than CEE countries in each period between 1989 and 2008. What is even more striking: while citizens of CEE countries have trusted the Church (a traditionalist institution of the past) and the European Union (an external force of guidance) the most, citizens of Western countries have had higher confidence in their parliament, justice system, civil service and the police than in religious institutions or in the EU. The Asian countries show a mixed picture. People have the highest confidence in political institutions—political parties, the government and parliament—in China, they trust the church the most in India while they have the highest confidence in

the media in Japan, and in the armed forces and the church in South Korea.

We should not forget that the comparison of CEE countries on the one hand and Western and Asian countries on the other relates to a time period when the former group went through a system change while the Western and Asian countries mostly pursued "their business as usual". Consequently, we cannot—and I do not intend to—claim that the groups of Asian and Western countries are inherently endowed with a higher level of trust among people and in institutions than the CEE group. The political and economic transformation in CEE largely affected—sometimes it fully demolished—the formerly existing social networks and relations among individuals. It may happen that trust and cooperation will attain the same level in CEE as it has been in the advanced group. My only point here is that the CEE countries arrived at the critical times of a deep financial and economic crisis with unfavorable indicators of trust and cooperation.

The low level of trust in CEE countries created an unstable institutional basis for economic policy and for business operations. The lack of stability directly resulted in the short-term time horizon of economic decisions at all levels of the economy and in the lack of cooperation among the economic agents. I shall show in the next section that CEE countries have been much less cooperative than Western societies during the past two decades.

2.2 Propensity to Cooperate in Asian, in CEE and in Western Countries

Private ownership and market competition require that the economic actors can make autonomous decisions. It seems that there is not much room for cooperation among the players. But cooperation does not inevitably imply the central coordination of economic decisions. Cooperation can be built on trust and on the information economic actors share with each other. If the players refuse to share their private information—for they always strive for a monopoly rent from private information—the game they will play cannot be but non-cooperative. Non-cooperative games usually result in sub-optimal outcomes. And the outcome can even be disastrous, especially in periods of economic crises.

I measure the level of cooperation with two different types of indices. I label the first indicator as "Mean Cheat Index" that reflects people's attitudes toward the violation of basic legal codes of conduct (Note 11). The intuition behind this index is that a person who finds it justifiable to violate the basic legal codes of a country is less likely to cooperate with his fellow citizens. He would rather free-ride on other citizens' efforts. This type of cooperation—or the lack of it—is mediated by the state and by legal institutions. The state's mediatory functions occur through the provision of public services and public information that require the citizens' cooperation by financing those services.

The citizens' willingness to cooperate through government mediation is measured by so- called "cheat indices". The "Mean Cheat Index" is calculated as the arithmetic average of individual "Cheat Indices", where individual indices are country averages of the responses to four questions, scaled between 1 and 10. The "Mean Cheat Indices" for the three different groups of countries are given in Tables 5, 6 and 7 below.

Table 5. "Mean Cheat Indices" in Western Countries, 1989-2008

Country	1989-1993	1994-1999	1999-2004	2005-2008
Austria	1.76	n.a.	2.00	2.45
Denmark	1.73	n.a.	1.57	1.98
Finland	2.92	2.08	2.21	1.93
France	2.82	n.a.	2.77	2.63
Germany	2.11	2.55	2.06	2.05
Great Britain	1.98	n.a.	2.20	n.a.
Greece	n.a.	n.a.	3.14	2.70
Italy	2.08	n.a.	1.97	1.80
Netherlands	2.15	n.a.	2.14	1.90
Norway	1.92	1.9	n.a.	2.03
Portugal	2.76	n.a.	n.a.	1.98
Spain	2.25	1.81	2.02	2.35
Sweden	1.93	2.34	n.a.	0
Switzerland	1.88	2.21	n.a.	1.9
Average of European advanced countries	2.18	2.15	2.21	2.19
USA	1.87	1.6	2.15	2.05

Table 6. Mean "Cheat Indices" in CEE Countries, 1988-2008

Country	1988-1993	1994-1999	1999-2004	2005-2008
Bulgaria	2.04	2.00	n.a.	2.73
Croatia	n.a.	3.48	2.34	n.a.
Czech Republic	1.96	2.8	2.26	2.65
Estonia	2.11	2.48	n.a.	2.2
Hungary	2.98	3.17	n.a.	1.98
Latvia	2.15	3.14	n.a.	2.73
Lithuania	2.22	2.63	2.86	2.93
Poland	2.05	2.03	n.a.	2.6
Romania	2.02	2.07	n.a.	2.48
Russian Federation	2.29	2.75	2.64	3.08
Serbia	n.a.	2.23	2.06	1.85
Slovakia	2.34	3.2	n.a.	2.75
Slovenia	2.26	2.7	n.a.	2.13
Ukraine	n.a.	3.17	3.05	2.3
Average of CEE countries	2.22	2.70	2.54	2.42

Table 7. "Mean Cheat Indices" in Asian Countries, 1989-2008

Country	1989-1993	1994-1999	1999-2004	2005-2008
China	1.54	1.68	1.60	2.26
India	1.54	1.67	2.12	3.08
Japan	1.70	1.69	1.68	1.67
South Korea	2.08	2.09	2.11	2.17
Average of the Asian countries	1.72	1.78	1.88	2.30

Note. "Average Cheat Index" = arithmetic average of individual "cheat indices". The value of the "Mean Cheat Index" can vary between 1 = "never justifiable" and 10 = "always justifiable".

Sources: for the "Mean Cheat Index": own calculations based on *European Value Study* (*EVS*), Waves 1-4, *World Value Survey (WVS)*, Wave 5, and *EVS-WVS*, Wave 5.

It can be seen from the tables that the group average of CEE countries is 20-40 per cent higher than the group average of the Western countries and it is further away from Asian countries. That is, citizens of Central and Eastern Europe find it much more acceptable not to cooperate through state mediation than the citizens of the Western or Asian countries.

It is also interesting to note that the Asian countries score better than the group of Western countries. But the cheat indices of the individual countries largely diverge. The citizens of China and Japan are willing to cooperate with the rules of conduct to a much larger extent than the citizens of India or South Korea.

The low level of trust and cooperation among East Europeans is related to the extensive level of corruption in public administration of these countries. As the "Corruption Perception Indices" (CPI) of Transparency International for the years 2008, 2009 and 2010 attest, CEE countries rank far below the advanced countries and the Asian countries, except for India that can be found at the "low end" of the corruption scale (See Table A3 on CPI between 2008 and 2010 in CEE countries and in advanced countries in the Appendix!).

The other type of indicators measures people's attitudes toward private ownership of businesses and toward competition. I assume that support for private ownership just acknowledges that the system of private property rights is an organic institution of the market economies. I further assume that support for competition—however important ingredient of a market economy it is—favors non-cooperative behavior.

Table 8. Public Support for Private Ownership in the Three Country Groups

	1989-1993	1994-1999	1999-2004	2005-2008
Private vs. state ownership of business, Advanced countries	4.18 (2.155)	4.30 (2.211)	4.25 (1.897)	4.80 (2.121)

Private vs. state ownership of business, CEE countries	4.70 (2.769)	5.36 (2.791)	5.04 (2.453)	5.47 (2.565)
Private vs. state ownership of business, Asian countries	5.53 (2.528)	5.26 (2.604)	5.54 (2.607)	5.67 (2.580)

Table 9. Public Support for Competition in the Three Country Groups

	1989-1993	**1994-1999**	**1999-2004**	**2005-2008**
Competition good or harmful, Advanced countries	3.77 (2.226)	3.70 (2.069)	4.05 (2.305)	4.27 (2.171)
Competition good or harmful, CEE countries	2.94 (2.228)	3.46 (2.316)	3.52 (2.426)	3.90 (2.381)
Competition good or harmful, Asian countries	3.23 (2.149)	3.53 (2.283)	3.55 (2.358)	3.6075 (2.318)

Note. Support for private ownership = 1; Support for state ownership = 10; Competition is good = 1; harmful = 10 (Standard deviations in parentheses).

Comparing people's attitudes toward private ownership in advanced, CEE and in Asian countries reveals (see Table 8) that East Europeans accept private property much less than the citizens of the advanced countries. It is even more so for Asian countries where private ownership is the least accepted. The indicator of support for state *versus* private ownership is 20-25 per cent higher in CEE than in advanced countries, and it is another 10 per cent higher in Asian countries. It is usually above 5 in CEE, showing that East Europeans are reluctant to accept the dominance of private ownership. The same conclusion holds for Asian countries. On the other hand, citizens of Asian and CEE countries support competition—non-cooperation—much more than citizens of the advanced countries. Their support for competition is 10-30 per cent higher than in the advanced countries. We can conclude this section that the citizens of East European and Asian countries favor non-cooperation in business life when it comes to supporting fellow citizens through public services and to sharing information, while they would like to have state rather than private ownership. This result is in line with the conclusions of other studies (Note 12) on attitudes in CEE and in some Asian countries: East Europeans and especially Chinese citizens would like to get more from, but they are willing to give less through public channels.

2.3 Trust and Time Horizon

Trust and cooperation are closely related to how economic actors value future benefits and costs. If social trust and cooperation are strong among agents, they tend to discount future gains much less than in case the level of trust and cooperation is low. In turn, myopic decisions result in increased uncertainty and instability of economic operations that further reduce trust and cooperation among economic actors. Countries can easily find themselves in a vicious circle that has a negative impact on

381

economic performance.

A good exposition of the relationship between the economic actors' time preference and economic performance is given by Easterly et al. (1991). They show, by developing a simple model, that the rate of economic growth is a function of the agents' discount factor. In other words, the more economic agents discount future returns—for they value future gratification very low relative to immediate benefits—the lower the rate of growth becomes (Note 13). A fairly reliable indicator of the decision makers' time horizon is the savings rate in a country. I present the savings rate separately for Asian, for Western and for CEE countries in Tables 10, 11 and 12 below.

Table 10. Annual Average of Gross Savings per GDP in Asian Countries, per cent

Asian countries	1990-1999	2000-2008	2009-2014
China	10.5	45.2	50.5
India	5.5	30.4	32.4
Japan	3.5	26.4	22.5
South Korea	8.7	33.5	34.5
Group average	7.1	33.9	35.0

Table 11. Annual Average of Gross Savings per GDP in Western Countries, per cent

Western countries	1990-1999	2000-2008	2009-2014
Austria	22.56	25.35	25,38
Belgium	n.a.	18.68	22,94
Denmark	21.53	23.78	24,61
Finland	20.60	26.03	21,92
France	20.02	20.25	21,07
Germany	20.91	21.92	25,71
Greece	16.35	11.38	9,25
Ireland	22.81	21.20	18,08
Italy	20.69	19.66	17,65
The Netherlands	25.70	26.70	27,93
Norway	25.75	35.83	37,40
Portugal	21.82	14.39	12,35
Spain	21.57	22.12	19,75
Sweden	19.08	24.70	29,12
Switzerland	30.84	28.85	32,66
United Kingdom	15.30	15.01	12,98
United States	19.07	18.07	16.67
Average of advanced countries	19.72	21.34	22.09

Table 12. Annual Average of Gross Savings[*] per GDP in CEE Countries per cent

CEE countries	1990-1999	2000-2008	2009-2014
Croatia	11.18	20.02	21.83
Bulgaria	12.50	14.93	19.55
Czech Republic	18.70	23.51	24.62
Estonia	18.33	22.09	25.29
Hungary	17.94	17.65	22.15
Latvia	17.08	19.70	22.88
Lithuania	9.02	15.16	17.09
Poland	19.76	17.69	17.11
Romania	18.99	17.78	22.80
Russian Federation	15.15	31.28	25.05
Serbia	n.a.	1.15	11.23
Slovak Republic	16.75	19.14	20.44
Slovenia	19.03	25.41	23.17
Ukraine	13.51	25.27	14.15
Average of CEE countries	16.66	19.33	20.53

[*] Gross savings are calculated as gross national income less total consumption, plus net transfers.

Sources: IMF Database, World Bank national accounts data, and OECD National Accounts data files.

As can be seen from the tables, CEE countries have had a lower savings rate than advanced countries between 1990 and 2014, while both the CEE countries and advanced countries lagged far behind the group of selected Asian countries. The most effective factor that can secure the balanced time preference of the economic actors is the credibility of the government's economic policy. Credibility can be created by the government's actions but it can best be maintained by the actions and character of strong economic institutions, such as, the transparent and regulated way of decision making within and among government agencies, the independence of such important bodies as the national bank and other regulatory agencies and the stability of the legal and regulatory environment. These institutions are weak in most CEE countries (Note 14). No wonder that the time preference of the decision makers at different levels—from the individual consumers up to the political parties and to central government—has been heavily biased toward short-term gains and to the detriment of long-term benefits. Citizens, corporations and government agencies heavily discounted future gains that ultimately resulted in a short-term horizon of economic decisions at all levels.

We have seen before that the short-term horizon of the economic actors is intimately related to the low level of trust among individuals, and the lack of trust of the individual decision makers in legal and economic institutions. CEE citizens have low trust in courts and in the whole system of justice, and in government agencies. Low trust among the economic actors results in high transaction costs and large social losses on the one hand and in a short- term horizon of the decision makers on the other. As a

consequence, the economic crisis—when it hit these countries—became deeper and more prolonged while the recovery slower than would otherwise have been feasible had the actors trusted each other and their institutions more.

3. Results of a Simple Regression Analysis

I conducted regression analysis on the relationship between economic growth, trust and cooperation in CEE and West European countries. I admit that the analysis is fairly rudimentary, but it still sheds light on the substantial difference between the group of Western and Asian more advanced countries and the group of CEE countries. I used economic growth as dependent variable first. Then I reversed the direction of causality and I regressed trust on growth and the index of cooperation. Finally, I regressed the countries' indices of cooperation on growth and trust. I conducted the analysis separately on CEE and on West European countries.

As we could expect, I did not find a significant relationship among economic growth and trust and the indicator of cooperation in Western countries. The level of trust and cooperation had no explanatory power of economic performance, and the rate of economic growth had no significant impact on how strongly West European citizens trust their legal institutions or are willing to cooperate (Note 15). We can infer from these results that trust and cooperation are fairly stable social institutions in Western countries and their level does not fluctuate with regular business or election cycles.

Contrary to what we could observe in the group of West European countries, trust in legal institutions and the level of cooperation had a significant effect on economic performance of the CEE countries as can be seen in Table 13 below.

Table 13. Regression Coefficients for the Group of CEE Countries (Note 16)

Dependent var.→	Economic growth	Trust	Cooperation
Independent var.↓			
Economic growth		0.283**	-0.312**
Trust	0.304**		-0.195
Cooperation	0.329**	-0.192	

** significant at 0.05 level.

As the data in Table 13 show, both trust and cooperation have a positive and significant effect on economic growth. One point improvement in the trust indicator results in a 0.28 per cent increase of the average growth rate. Similarly, a one point increase in the cooperation index results in a 0.31 per cent increase of the rate of economic growth (Recall that the "cheat" index gave higher scores those respondents who found it justified non-cooperative behavior). It can also be seen from the table that higher growth rates came along with a higher level of trust and more willingness to cooperate in CEE countries. A closer look at the financial data of these countries also shows that the successive periods of

384

fiscal expansion and contraction follow the pattern of an "election cycle". Fiscal expansion usually increases trust—but it does not have such an effect on the level of cooperation—while the level of trust decreases in periods of fiscal austerity. And more trust in legal institutions expands while less trust reduces the time horizon of economic decisions.

The above findings suggest that the rate of economic growth is significantly influenced by the degree of trust and cooperation in CEE and *vice versa*: the level of trust and cooperation and the time horizon of economic decisions are sensitive to the countries' economic performance. We may infer that trust in legal institutions and cooperative behavior are not solidly embedded in CEE societies yet. Their intensity fluctuates with economic growth and with fiscal policy.

4. Can Optimal Mechanisms for Policy Decisions always be Designed?

Up to this point I assumed that the rules of the game different countries play are permanently or at least for a long time, set by the embedded social institutions of trust and level of cooperation along with a given time horizon. I also described the feasible strategies that can be chosen within given rules. Now I reverse the question and ask: what rules (what game or mechanism) could lead to a set of predetermined strategies and outcomes?

The literature on mechanism design departs from the assumption that asymmetric information between the economic actors and the "social planner" (the government or government agencies) is the main stumbling block on the road toward an efficient outcome of social welfare maximization. "Mechanism designers" also assume that it is the government that does not have sufficient information about the predetermined characteristics of the economic actors—in the usual slang of economics, about the actors' type—and about the actors' effort level. In other words, the actors' type is their private information, and government cannot monitor their effort level either. Economic actors, on the other hand, possess all the relevant information. Therefore, they have an information monopoly over government. Then the government's problem is how it can induce the economic agents so that the agents would reveal their private information and they would behave according to the government's expectations.

A widely accepted but critical assumption among economists is that people always respond to the proper incentives. This would render the government's task easy in attaining certain policy objectives: it should apply the right incentives to induce the expected behavior from the economic actors. But what if information is not just asymmetric between economic agents and the government, but it is "double-asymmetric" in the sense that people also lack relevant information about the government's intentions and actions? In other words, how can government induce trust and cooperation if economic actors do not have trustful and sufficient information? I shall address this issue on a fairly general level but the results of the analysis are easily applicable to very specific questions. For instance, can government induce the expected savings or tax-paying behavior of the economic agents by using the proper incentives? Can the desired consumption pattern or the use of the environment be induced by

the right incentives? Or can the regulator induce the firms' voluntary information revelation in regulated markets? These and similar questions are discussed in the framework of *mechanism design*. Under adverse selection or moral hazard with the agents' uncertainty about the principal's type or effort level, social welfare maximization becomes a much more complex exercise if a reasonable solution for the social welfare maximization problem can be attained at all.

4.1 Literature Review

My approach is similar to, but it is not identical with the studies on double moral hazard and on double adverse selection. The literature on double moral hazard and on double adverse selection is not very extensive. Romano (1994) analyzed double moral hazard in a resale price maintenance setting. He concluded that double moral hazard results in vertical externalities between firms, and optimal pricing can only be attained by fixing the minimum or the maximum price. Bhattacharyya and Lafontaine (1995) discussed double-sided moral hazard in a sharecropping or franchising environment. They found that linear contracts can be optimal in revenue or profit sharing. Kim and Wang (1998) assumed a risk averse agent and double moral hazard and showed that the optimal contract is non-linear, and it does not converge to a linear contract even if the risk aversion of the agent approaches zero. Agarwal (2002) proved that double moral hazard can best be contained by institutional arrangements as had been suggested by Coase. Aggarwal and Lichtenberg (2005) looked for an optimal pollution tax under double moral hazard and concluded that a first best optimum cannot be attained in such a setting. Besley and Ghatak (2005) assumed that principals and agents are mission-oriented as opposed to seeking maximum profits in a public bureaucracy or in a non-profit organization. They showed that matching the principals' and agents' preferences can improve organizational efficiency and lessen the impact of asymmetric information. Carrillo and Palfrey (2009) conducted laboratory experiments and concluded that an anomalous equilibrium occurs between Bayesian players if one of them is weaker than the other: they will never compromise although an intermediate outcome could benefit both of them. Hun Seog (2010) argued that only inefficient equilibriums unfold between buyers and sellers in product markets in the presence of adverse selection with uncertainty despite product warranties and the existence of a connected insurance market. Firms of different types offer either a pooling warranty to good and bad buyers, or good firms attract only bad buyers while bad firms equally sell to good and to bad buyers.

4.2 My Contribution to the Existing Literature

I present two simple examples of social welfare maximization to demonstrate the complexity of the problem. In the first example, the government has but probabilistic knowledge of the economic actors' type and the actors possess only probabilistic information about the government's type. Agents can be "efficient" or "inefficient", while government can be "trustworthy" or "untrustworthy". I shall label such a scenario "adverse selection with uncertainty". In the second example I assume that government can be one of two types: it can be "trustworthy" or "untrustworthy". At the same time, government has insufficient knowledge about the effort level of the economic actors. Economic actors can exert high or

386

low effort to fulfill the task government assigns to them (Note 17). Such a setting is also a case for double-sided asymmetric information: the government cannot monitor the agents' effort level, while the agents do not know the government's type when they engage in a contract. I label the government trustworthy if it does what it previously announced and the agents expect from him to do. That is, it pays high remuneration for the agents' efficient outcome and low remuneration for the agents' inefficient outcome in the first example. In the second example, the government will be called trustworthy if it pays high benefit in case it observes high accomplishment from the agents and low benefit if it observes low accomplishment. The opposite will hold for an untrustworthy government: it pays *less* for an efficient than for an inefficient outcome in the first case, and it pays *less* for a high than for a low accomplishment in the second example.

4.3 Adverse Selection with the Agents' Uncertainty

Let us assume that the government announces some policy measure that results in a gain $S(q)$ to government (and to society) and a benefit $b(q)$ to each economic actor depending on the magnitude of the actors' accomplishment q. To further simplify the analysis I shall assume that economic actors have the same valuation of benefits and costs. Agents learn how large their benefit will be only after accomplishing the task the government assigns to them, but they know from the start that their benefit can be high $b_E(q_E, q_{IE})$ or low $b_E(q_E, q_{IE})$, that is, the benefits paid for efficient and for inefficient accomplishment. Their actual benefit will also depend on the government's type. Agents know that the government can be trusted with probability π or mistrusted with probability $1-\pi$. On the other hand, the government lacks perfect information about the agents' type. It only knows that they can be efficient with probability ν or inefficient with probability $1-\nu$.

Let us start with the companies' problem. I assume that a company performs the task q with a linear cost function $C(q) = \theta q$, where the magnitude of its marginal cost θ indicates its type: $\theta \in \{\theta_E, \theta_{IE}\}$, with $\theta_E < \theta_{IE}$ (I disregard fixed costs for the sake of simplicity, but this will not affect the essence of the analysis). Hence, marginal cost can be low θ_E or high θ_{IE} indicating the company's efficiency level. I also assume that the company is risk neutral. Then its valuation U of benefit net of costs can simply be written as $U(b(q) - \theta q) = b(q) - \theta q$. Finally, I shall assume that the economic actor's reservation utility is normalized to zero: $U_0 = 0$.

Both types can choose a pure strategy of performing either the efficient outcome q_E or the inefficient outcome q_{IE} and receive the expected benefit of $\pi b_E + (1-\pi) b_{IE}$ or $\pi b_{IE} + (1-\pi) b_E$, respectively, where b_E and b_{IE} are short for $b_E(q_E, q_{IE})$ and $b_{IE}(q_{IE}, q_E)$, and denote the companies' benefit for efficient and for inefficient accomplishment, respectively. However, the economic actors can also choose a mixed strategy by randomizing between q_E and q_{IE}. For instance, if an efficient company—knowing that the regulator can only be trusted with probability π—performs q_E with probability p and it accomplishes q_{IE} with probability $1-p$, where p and $1-p$ are the probabilities of the efficient firm's mixed strategy. The inefficient company will find the probabilities of its mixed strategy in a similar way. I shall denote its mixing probabilities by r and $1-r$.

387

An efficient economic actor—knowing that the government can only be trusted with probability π—will opt for a mixed strategy if

$$\pi b_H + (1-\pi)b_{NH} - \theta_H q_H \leq \pi b_{NH} + (1-\pi)b_H - \theta_H q_{NH} \rightarrow (2\pi-1)\Delta b \leq \theta_H \Delta q \quad (1)$$

The inefficient agent will choose the mixed strategy under the following condition:

$$\pi b_H + (1-\pi)b_{NH} - \theta_{NH} q_H \geq \pi b_{NH} + (1-\pi)b_H - \theta_{NH} q_{NH} \rightarrow (2\pi-1)\Delta b \geq \theta_{NH} \Delta q \quad (2)$$

where $\Delta b = b_E - b_{IE}$; $\quad \Delta q = q_E - q_{IE}$.

Can these conditions be met at the same time? It seems unlikely, except when

$$\Delta\theta\Delta q \leq 0, \text{ where } \Delta\theta = \theta_{IE} - \theta_E \quad (3)$$

Because $\Delta\theta > 0$ will always hold by assumption, such an outcome can only occur if $\Delta q = q_E - q_{IE} \leq 0$, that is, $q_E \leq q_{IE}$. While such an output set $\{q_E; q_{IE}\}$ seems implausible, this is exactly our initial hypothesis: with an untrustworthy government, the performance of the efficient agents will be distorted downwards while that of the inefficient agents will be distorted upwards. Consequently, the "good types" will be punished while the "bad ones" will be rewarded. I shall prove below that such a distortion will occur in the adverse selection model with the agents' uncertainty. If the efficient agent randomizes her strategy with probabilities $(p, 1-p)$, while the inefficient agent randomizes with probabilities $(r, 1-r)$, they will find these probabilities from setting their expected payoffs from choosing one or the other strategy equal. For the efficient agent:

$$p[\pi(b_E - \theta_E q_E) + (1-\pi)(b_{IE} - \theta_E q_E)] = (1-p)[\pi(b_{IE} - \theta_E q_{IE}) + (1-\pi)(b_E - \theta_E q_{IE})] \quad (4)$$

Thus, the *efficient* agent's mixing probability becomes:

$$p = \frac{(1-\pi)b_E - \pi b_{IE} + (2\pi-1)\theta_E q_{IE}}{\Delta b - (2\pi-1)\theta_E \Delta q} \quad (5)$$

For the *inefficient* agent:

$$r[\pi(b_{IE} - \theta_{IE} q_{IE}) + (1-\pi)(b_E - \theta_{IE} q_{IE})] = (1-r)[\pi(b_E - \theta_{IE} q_E) + (1-\pi)(b_{IE} - \theta_{IE} q_E)] \quad (6)$$

from which we have:

$$r = \frac{\pi b_E - (1-\pi)b_{IE} - (2\pi-1)\theta_{IE} q_E}{\Delta b - (2\pi-1)\theta_{IE}\Delta q} \quad (7)$$

The economic actors will have different Participation Constraints (PC) and Incentive Compatibility Constraints (ICC) if they pursue a pure strategy than in case they opt for a mixed strategy. The PCs and the ICCs for the efficient and for the inefficient companies that select a pure strategy become (Note 18):

For the *efficient agent*

$$\pi(b_E - \theta_E q_E) + (1-\pi)(b_{IE} - \theta_E q_E) = \pi b_E + (1-\pi)b_{IE} - \theta_E q_E \geq 0 \quad \text{(PCEP)} \quad (8a)$$

$$\pi b_E + (1-\pi)b_{IE} - \theta_E q_E \geq \pi b_{IE} + (1-\pi)b_E - \theta_E q_{IE} \quad \text{(ICEP)} \quad (8b)$$

For the *inefficient agent*

$$\pi(b_{IE} - \theta_{IE} q_{IE}) + (1-\pi)(b_E - \theta_{IE} q_{IE}) = \pi b_{IE} + (1-\pi)b_E - \theta_{IE} q_{IE} \geq 0 \quad \text{(PCIEP)} \quad (8c)$$

$$\pi b_{IE} + (1-\pi)b_E - \theta_{IE} q_{IE} \geq \pi b_E + (1-\pi)b_{IE} - \theta_{IE} q_E \quad \text{(ICIEP)} \quad (8d)$$

In case the economic actors opt for a mixed strategy, the PCs and the ICCs will be (Note 19):

For the *efficient agent*

$$[p(2\pi-1)+1-\pi]b_E - [p(2\pi-1)-\pi]b_{IE} + p\theta_E\Delta q - \theta_E q_{IE} \geq 0 \quad \text{(PCEM)} \quad (9a)$$

$$p[\pi b_E + (1-\pi)b_{IE} - \theta_E q_E] + (1-p)[\pi b_{IE} + (1-\pi)b_E - \theta_E q_{IE}] \geq \quad \text{(ICEM)} \quad (9b)$$
$$\geq r[\pi b_{IE} + (1-\pi)b_E - \theta_E q_{IE}] + (1-r)[\pi b_E + (1-\pi)b_{IE} - \theta_E q_E]$$

For the *inefficient agent*

$$[r(2\pi-1)+1-\pi]b_{IE} - [r(2\pi-1)-\pi]b_E + r\theta_{IE}\Delta q - \theta_{IE} q_E \geq 0 \quad \text{(PCIEM)} \quad (9c)$$

$$r[\pi b_{IE} + (1-\pi)b_E - \theta_{IE} q_{IE}] + (1-r)[\pi b_E + (1-\pi)b_{IE} - \theta_{IE} q_E] \geq \quad \text{(ICIEM)} \quad (9d)$$
$$\geq p[\pi b_E + (1-\pi)b_{IE} - \theta_{IE} q_E] + (1-p)[\pi b_{IE} + (1-\pi)b_E - \theta_{IE} q_{IE}]$$

Participation constraints (8a) and (8c), and incentive compatibility constraints (8b) and (8c) are the usual constraints one can encounter in discussions about one-sided adverse selection or signaling problems where one party has private information about his type. These constraints just state that in case an efficient (inefficient) agent behaves as his type dictates, his expected benefit minus his type dependent cost cannot be smaller than his reservation utility, and an efficient (inefficient) type cannot achieve higher net benefit by pretending of being inefficient (efficient).

The remaining participation and incentive compatibility constraints—the PCs are given in equations (9a) and (9c), and the ICCs in (9b) and (9d)—are the really interesting ones when adverse selection with the agents' uncertainty unfolds. The PCs show that in case an efficient (inefficient) agent knows that the government can only be trusted with probability and he will randomize his accomplishment according to this probability, he cannot be worse off than by accomplishing nothing and accepting his reservation utility. The ICCs show that an efficient (inefficient) agent—who knows that the government can be trusted with probability π, but it is untrustworthy with probability $1-\pi$—cannot gain less by randomizing his accomplishment of his true type according to the known probabilities than by randomizing as if he were the other type.

If the agents choose pure strategy, the inefficient agent's PC (equation 8c) and the efficient agent's ICC (equation 8b) will bind, and the well-known results from "simple" adverse selection obtains:

$$S'(q_E) = \theta_E, \text{ and } S'(q_{IE}) = \theta_{IE} + \left(\frac{\nu}{1-\nu}\right)\Delta\theta \quad (10)$$

where $\Delta\theta = \theta_{IE} - \theta_E$.

In case the economic actors opt for the mixed strategy, also the PC of the inefficient agent and the ICC of the efficient agent will bind–as can be seen in equations (9c) and (9b), but the government's welfare maximization becomes a more tedious exercise than with the agents' pure strategy. From the binding constraint we have:

$$[r(2\pi-1)+1-\pi]b_{IE} - [r(2\pi-1)-\pi]b_E + r\theta_{IE}\Delta q - \theta_{IE} q_E = 0 \quad (11)$$

and

$$p[\pi b_E + (1-\pi)b_{IE} - \theta_E q_E] + (1-p)[\pi b_{IE} + (1-\pi)b_E - \theta_E q_{IE}] = \quad (12)$$
$$= r[\pi b_{IE} + (1-\pi)b_E - \theta_E q_{IE}] + (1-r)[\pi b_E + (1-\pi)b_{IE} - \theta_E q_E]$$

Solving equations (11) and (12) for b_E and for b_{IE} we get:

$$b_E - b_{IE} - \frac{\theta_E \Delta q}{2\pi - 1} = 0 \qquad (13)$$

and

$$b_E = r\Delta\theta\Delta q + \frac{(1-\pi)\theta_E \Delta q}{2\pi - 1} + \theta_{IE} q_E ; \quad b_{IE} = r\Delta\theta\Delta q - \frac{\pi\theta_E \Delta q}{2\pi - 1} + \theta_{IE} q_E \quad (14)$$

It will hold at any value of π (when $0 \leq \pi < 1$) for the compensations paid by the government to the agents in return for their efficient or inefficient performance that $b_{IE} > b_E$. That is, government will "*reward*" the *inefficient* and it will "*punish*" the *efficient* accomplishment. Another important result of the analysis is that the randomizing probabilities of the efficient and the inefficient agents, *p* and *r* will have constant values. They will be independent of the agents' performance level. This can be seen by plugging the results from equation (14) back into equations (5) and (7).

Now we turn to the discussion of the government's social welfare maximization problem. I assume that the government has a quasi linear valuation function of the agents' accomplishment minus the agents' benefit, that government allocates to the agents for their performance in the form of $S(q) - b(q)$ with the usual properties: $S'(q) > 0$ and $S''(q) < 0$. In the social welfare function, q measures the magnitude of the economic actors' accomplishment, and $b(q)$ is the benefit paid to the agents by government. Thus, the government's social welfare maximization problem is as follows:

$$\max_{q_E, q_{IE}, b_E, b_{IE}} \left\{ \begin{array}{l} \nu\left[\begin{array}{l} \pi\{p(S(q_E)-b_E)+(1-p)(S(q_{IE})-b_{IE})\}+ \\ +(1-\pi)\{p(S(q_E)-b_{IE})+(1-p)(S(q_{IE})-b_E)\} \end{array} \right] + \\ +(1-\nu)\left[\begin{array}{l} \pi\{r(S(q_{IE})-b_{IE})+(1-r)(S(q_E)-b_E)\}+ \\ +(1-\pi)\{r(S(q_{IE})-b_E)+(1-r)(S(q_E)-b_{IE})\} \end{array} \right] \end{array} \right\}. \qquad (15)$$

Substituting the results from equation (14) into the government's social welfare maximization problem yields:

$$\max_{q_E, q_{IE}} \left\{ \begin{array}{l} [\nu p + (1-\nu)(1-r)]S(q_E) + [\nu(1-p)+(1-\nu)r]S(q_{IE}) \\ -[\nu p + (1-\nu)(1-r)](r\Delta\theta\Delta q + \theta_{IE} q_E) - \\ -[\nu(1-p)+(1-\nu)r](r\Delta\theta\Delta q + \Delta\theta q_E + \theta_E q_{IE}) \end{array} \right\}. \qquad (16)$$

Solving equation (16) for welfare maximum obtains:

$$S'(q_E) = \theta_{IE} + \frac{(\nu(1-p)+(2-\nu)r)\Delta\theta}{\nu p + (1-\nu)(1-r)} \qquad (17a)$$

for the *efficient outcome*, and

$$S'(q_{IE}) = \theta_E - \frac{r\Delta\theta}{\nu(1-p)+(1-\nu)r} \qquad (17b)$$

for the *inefficient outcome*.

As can be seen from equations (20) and (21), neither the efficient nor the inefficient agent will conduct his task at its "first best" level, where the marginal benefit from welfare optimization would equal the marginal cost of the economic actors' activities. Thus, the outcome of social welfare maximization will

be away from its Pareto efficient state. What is even more striking, the solution of the amended adverse selection problem will provide "perverse" incentives to the economic actors. Notably, the extent of the efficient agent's activity will be distorted *downwards*—that is, the efficient agent will accomplish less than would be socially optimal, while the activity level of the inefficient agent will always be distorted *upwards*.

We may conclude this part of the analysis that even the usual second best solution of social welfare maximization cannot be attained if the economic actors do not possess perfect information about the government's trustworthiness. In the presence of adverse selection with the economic actors' uncertainty the efficient agents will produce less and the inefficient ones will produce more than would be socially optimal. These production levels will result in the downward distortion of the efficient agents' compensation—what I labeled "punishment" before—and the upward bias of the inefficient ones, previously labeled "reward". The usual second best solution—where the efficient agents produce at their first best level while the government distorts the production of the inefficient ones downwards—can only be attained if government can fully be trusted.

4.4 The Agents' Moral Hazard with the Government's Unknown Type

Now we turn to the second scenario where moral hazard with the government's unknown type unfolds. Assume that government assigns a task to the economic actors the fulfillment of which requires effort from the agents. An agent can decide whether she exerts high or low effort fulfilling her task. The cost of effort is given by $\psi(e)$ where e stands for the agent's effort level. The cost of high effort is $\psi(e) = \psi$, while the cost of low effort is normalized to zero. An agent's accomplishment can be high (q_H) or low (q_L). The economic actors' accomplishment is related to, but it is not solely determined by their effort. Other factors of the economic environment can also have an impact on the outcome. Government can observe the agents' accomplishment, but it is not capable of monitoring their effort. Government only knows the conditional probabilities of different outcomes with different effort levels. Notably, the accomplishment can be high with probability $\Pr(q_H|e_H) = v_H$ if the agent's effort was high, or the outcome can be low with probability $\Pr(q_L|e_H) = 1 - v_H$ despite the agent's high effort. The agent's accomplishment can be high with probability $\Pr(q_H|e_L) = v_L$ although she exerted low effort, or her accomplishment can be low with probability $\Pr(q_L|e_L) = 1 - v_L$ if she exerted low effort. We shall assume that $v_H > v_L$ which simply states that the probability of having high outcome is larger with high than with low effort. I assume that the government prefers high to low effort from the economic actors.

The economic actors also lack perfect information about the government's type. They only know that the government can be trusted with probability π or it can be untrustworthy with probability $1 - \pi$.

We know from Laffont and Martimort (Note 20) that with simple moral hazard and with risk neutral agents the first best optimum can always be attained. In case the agents are risk averse while government is risk neutral, the government faces a trade-off between efficiency and information rent that it pays to the agents in order to induce high effort from them. With risk averse agents and high

391

effort the agents' valuation of benefits net of effort costs becomes:

$U(b(q), \psi(e)) = v_H b_H + (1 - v_H) b_L - \psi$, where b_H and b_L stand for high and for low benefits, respectively. In order to simplify the analysis, I shall only present the case of risk neutral agents. Now we need to find the agents' participation and incentive compatibility constraints which is not as straightforward as with simple moral hazard. An agent who exerts high effort can expect net benefit:

$$v_H[\pi b_H + (1 - \pi)b_L] + (1 - v_H)[(1 - \pi)b_H + \pi b_L] - \psi \qquad (18)$$

for the government can only be trusted with probability π. The agent's net benefit with low effort becomes:

$$v_L[\pi b_H + (1 - \pi)b_L] + (1 - v_L)[(1 - \pi)b_H + \pi b_L] \qquad (19)$$

If government wants to induce high effort from the agents, the agents' participation constraint becomes:

$$v_H[\pi b_H + (1 - \pi)b_L] + (1 - v_H)[(1 - \pi)b_H + \pi b_L] - \psi \geq 0 \qquad (20)$$

The companies' incentive compatibility constraint will be:

$$\begin{aligned} v_H[\pi b_H + (1 - \pi)b_L] + (1 - v_H)[(1 - \pi)b_H + \pi b_L] - \psi \geq \\ \geq v_L[\pi b_H + (1 - \pi)b_L] + (1 - v_L)[(1 - \pi)b_H + \pi b_L], \end{aligned} \qquad (21)$$

or $\Delta v(2\pi - 1)(b_H - b_L) - \psi \geq 0$, where $\Delta v = v_H - v_L$.

What type of a contract menu should the government offer to the agents? It can find the optimal menu of contracts by solving the following welfare maximization problem subject to constraints (20) and (21).

$$\max_{u_H, u_L}\{v_H[S_H - \pi b_H - (1 - \pi)b_L] + (1 - v_H)[S_L - (1 - \pi)b_H - \pi b_L] - \psi\} \qquad (22)$$

Government can attain maximum welfare if the benefits disbursed to economic actors for effort are the smallest. Consequently, both the participation constraint and the incentive compatibility constraint will bind. Thus, we can find the optimal benefits paid to the companies by solving the system of equations in (20) and (21). Then the following optimal benefits obtain:

$$b_H = \psi + \frac{[(1 - v_H)\pi + v_H(1 - \pi)]\psi}{\Delta v(2\pi - 1)} = \left(\frac{\pi}{\Delta v(2\pi - 1)} - \frac{v_L}{\Delta v}\right)\psi \qquad (23a)$$

$$b_L = \psi + \frac{[(1 - v_H)\pi + v_H(1 - \pi) - 1]\psi}{\Delta v(2\pi - 1)} = -\left(\frac{(1 - \pi)}{\Delta v(2\pi - 1)} + \frac{v_L}{\Delta v}\right)\psi \qquad (23b)$$

With simple moral hazard the economic actors would accrue the following high or low benefit, respectively:

$$b_H = \left(\frac{1 - v_L}{\Delta v}\right)\psi \quad \text{and} \quad b_L = -\left(\frac{v_L}{\Delta v}\right)\psi \qquad (24)$$

Comparing equations (23a) and (23b), and the relevant equations in (24) immediately shows that the high benefit a not fully trusted government untrustworthy must pay for high accomplishment will be above the benefit that would have been paid with simple moral hazard, while low benefit paid by an government will be smaller than the low benefit that would have been paid by a trustworthy government in a simple moral hazard scenario. The final outcome from moral hazard with an

untrustworthy government will be a poorer economic performance and a larger social welfare loss than in case a fully trusted government induces high effort from the actors. At the same time, the probability that economic actors receive a high benefit for high effort will be smaller with a trustworthy than with an untrustworthy government, for $v^H > v^H \pi + (1 - v^H)(1 - \pi)$ will always hold. Consequently, the economic actors will not be strongly tempted to exert high effort either.

5. Conclusions and Discussion

I demonstrated in this paper that in CEE countries, where trust in other people and in legal institutions, and cooperation among economic actors do not have firm roots, the level of trust and cooperation have a significant impact on the countries' economic performance. Contrary to Asian and Western advances countries where countrywide trust and cooperation are present as fairly stable social institutions, distrust in legal institutions and the lack of cooperation have become the embedded social institutions in CEE countries. If citizens of CEE countries trust any institution at all, these are traditional, religious rules and organizations rather than the legal pillars of a liberal democracy and a market economy. If people's trust is based on faith rather than on empirical observation and on reason, cooperation can easily be replaced by authoritarian rule.

I showed in the paper that there cannot be cooperation among economic actors without trust. I also argued that the lack of cooperation will inevitably result in a short-term time horizon of the economic actors. And the short-term time horizon of economic decisions will reinforce distrust at all levels of the CEE societies.

CEE countries cannot avoid playing the traditional static prisoners' dilemma game within the framework of low trust, the lack of cooperation and the short term horizon. Such a non-cooperative and static game cannot result in a Pareto-optimal outcome of resource allocation and welfare maximization. Finally, I reversed the question and asked: can optimal mechanisms be found so that the rules of the game CEE countries play would be altered? I showed that there is no obvious and simple solution to this problem. The advocates of mechanism design tend to forget that social or economic transactions are loaded with two-sided information asymmetries between the economic agents and the social welfare maximizers. I have proven that social welfare maximization cannot yield Pareto-optimal outcomes if decision makers at all levels face the problem of adverse selection (or moral hazard) with the agents' uncertainty about the government's type. Even a reasonable "second best" solution cannot be attained under these circumstances. And the double-sided asymmetric information among economic actors is just one of the difficulties CEE countries must cope with. The task CEE countries face is extremely complex but it is not hopeless. Governments and other institutions of the CEE states can contribute to increasing the level of trust and cooperation by restoring credibility and by showing a firm commitment to developing and maintaining the important legal institutions of a democratic state and a modern economy.

References

Ackerman-Rose, S., Kornai, J., & Rothstein, B. (2004). *Creating Social Trust in Post-Socialist Societies*. NY: Palgrave.

Arrow, K. (2006). The Economy of Trust. *Religion & Liberty*, *16*(3).

Bhattacharyya, S., & Lafontaine, F. (1995). Double-Sided Moral Hazard and the Nature of Share Contracts. *Rand Journal of Economics*, *26*(4), 761-781. https://dx.doi.org/10.2307/2556017

Coleman, J. (1990). *Foundations of Social Theory*. Cambridge, MA: The Belknap Press of Harvard University Press.

Dasgupta, P. (2009). Trust and cooperation among economic agents. Philosophical. *Transactions of the Royal Society*, *B364*(1534), 3301-3309. https://dx.doi.org/10.1098/rstb.2009.0123

Easterly, W., King, R., Levine, R., & Rebelo, S. (1991). *How Do National Policies Affect Long-run Growth*? A research Agenda, World Bank Working Paper No. 794 (October).

EBRD. (2010). *Transition Report 2010: Recovery and Reform*. London: EBRD.

European Value Study. (2008). Retrieved from http://www.zacat.gesis.org

Farrell, H. (2009). *The Political Economy of Trust*. Cambridge: Cambridge University Press. https://dx.doi.org/10.1017/CBO9780511596933

Fukuyama, F. (1996). *Trust: The Social Virtues and the Creation of Prosperity*. Touchstone Books.

Győrffy, D. (2006). Governance in a Low-Trust Environment: The Difficulties of Fiscal Adjustment in Hungary. *Europe-Asia Studies*, *58*(2), 239-259. https://dx.doi.org/10.1080/09668130500481410

Győrffy, D. (2009). Structural Change Without Trust: Reform Cycles in Hungary and Slovakia. *ACTA OECONOMICA*, *59*(2), 147-177. https://dx.doi.org/10.1556/AOecon.59.2009.2.2

Hardin, R. (Eds.). (2002). *Trust and trustworthiness*. Russell Sage Foundation.

Hun Seog, S. (2010). Double-Sided Adverse Selection in the Product Market and the Role of the Insurance Market. *International Economic Review*, *51*(1), 125-142. https://dx.doi.org/10.1111/j.1468-2354.2009.00573.x

Hurwicz, L. (2008). But Who Will Guard the Guardians? *American Economic Review*, *98*(3), 577-585. https://dx.doi.org/10.1257/aer.98.3.577

Kim S. K., & Wang, S. (1998). Linear Contracts and the Double Moral-Hazard. *Journal of Economic Theory*, *82*(2), 342-378. https://dx.doi.org/10.1006/jeth.1998.2439

Kornai, J. (1992). *The Socialist System: The Political Economy of Communism*. Princeton, N.J.: Princeton University Press. https://dx.doi.org/10.1093/0198287763.001.0001

Luhmann, N. (1979). *Trust and Power*. John Wiley & Sons.

Maskin, E. S. (2008). Mechanism Design: How to Implement Social Goals. *American Economic Review*, *98*(3), 567-576. https://dx.doi.org/10.1257/aer.98.3.567

Mookherjee, D. (2008). The 2007 Nobel Memorial Prize in Mechanism Design Theory. *Scandinavian Journal of Economics*, *110*(2), 237-260. https://dx.doi.org/10.1111/j.1467-9442.2008.00535.x

Myerson, R. B. (2008). Perspectives on Mechanism Design in Economic Theory. *American Economic*

Review, *98*(3), 586-603. https://dx.doi.org/10.1257/aer.98.3.586

Resnick, P. (2006). The value of reputation on eBay: A controlled experiment. *Experimental Economics*, *9*(2), 79-101. https://dx.doi.org/10.1007/s10683-006-4309-2

Romano, R. E. (1994). Double Moral Hazard and Resale Price Maintenance. *Rand Journal of Economics*, *25*(3), 455-466. https://dx.doi.org/10.2307/2555772

Sztompka, P. (1999). *Trust: A Sociological Theory*. Cambridge: Cambridge University Press.

TÁRKI. (2009). *Európai Társadalmi Jelentés* (European Social Report). Budapest: TÁRKI.

World Bank Economic Indicators. (2010). Retrieved from http://www.data.worldbank.org/indicator/

World Economic Outlook. (2015). *International Monetary Fund*. Retrieved from https://www.imf.org/external/pubs/ft/weo/2015/.../weodata/index.aspx

World Value Survey. (2010). Retrieved from http://www.worldvaluessurvey.org/

Zak, P. J., & Knack, S. (2001). Trust and growth. *Economic Journal*, *111*, 295-321. https://dx.doi.org/10.1111/1468-0297.00609

Appendix

Table A1.a. Average Annual Growth Rate of GDP in Asian Countries

Country	1989-1993	1994-1999	1999-2004	2005-2008
China	10.90	9.01	9.54	11.44
India	4.70	6.34	6.26	7.86
Japan	2.15	1.03	1.38	-0.67
South Korea	7.98	5.96	5.42	3.54

Note. Avg. Growth Rate = Average annual growth rate of GDP in the relevant period.

Source: own calculations based on *World Bank Economic Indicators*.

Table A1.b. Average Annual Growth Rate of GDP in Western Countries

Country	1989-1993	1994-1999	1999-2004	2005-2008
Austria	2.70	2.67	1.83	2.88
Denmark	1.05	3.22	1.48	1.67
Finland	-1.08	4.42	3.04	3.37
France	1.66	2.41	2.07	1.68
Germany	3.14	1.90	1.09	1.91
Great Britain	0.81	3.43	2.81	2.03
Greece	1.20	2.81	4.54	3.31
Italy	1.37	1.80	1.50	0.71
Netherlands	2.80	3.73	1.70	2.76
Norway	2.47	4.07	2.32	2.39

Portugal	2.76	3.62	1.48	1.05
Spain	2.21	3.44	3.55	3.01
Sweden	-0.12	3.38	2.78	2.47
Switzerland	1.46	1.37	1.50	2.91
USA	2.24	3.93	2.45	2.08

* 2005-2007.

** United Kingdom.

Note. Avg. Growth Rate = Average annual growth rate of GDP in the relevant period.

Source: own calculations based on *World Bank Economic Indicators*.

Table A1.c. Average Annual Growth Rate of GDP in CEE Countries

Country	1989-1993	1994-1999	1999-2004	2005-2008
Bulgaria	-5.92	-0.67	5.13	6.29
Croatia	-13.60	4.32	4.30	4.19
Czech Republic	-4.02	2.01	3.22	5.43
Estonia	-7.78	4.06	8.15	5.83
Hungary	-3.66	3.19	4.74	2.38
Latvia	-10.39	3.79	7.46	7.06
Lithuania	-14.39	2.12	6.89	7.06
Poland	-0.20	5.84	3.22	5.41
Romania	-6.33	0.51	5.30	6.87
Russian Federation	-7.81	-2.97	6.87	6.95
Serbia and Montenegro	-18.86	2.67	5.10	5.80
Slovakia	-5.29	5.03	3.85	7.98
Slovenia	-3.84	4.40	3.67	5.15
Ukraine	-6.96	-8.37	8.36	5.00

Note. Avg. Growth Rate = Average annual growth rate of GDP in the relevant period.

Sources: own calculations based on *World Bank Economic Indicators*.

Table A.2. Corruption Perception Index 2008-2010

2010 rank	2009 rank	2008 rank	Country/Territory	2010 Score	2009 Score	2008 Score
1	1	1	Denmark	9.30	9.30	9.30
4	3	1	Finland	9.20	8.90	9.00
4	8	9	Sweden	9.20	9.20	9.30
7	8	9	Netherlands	8.80	8.90	8.90
8	11	14	Switzerland	8.70	9.00	9.00

10	8	7	Norway	8.60	8.60	7.90
14	16	12	Ireland	8.00	8.00	7.70
15	14	14	Austria	7.90	7.90	8.10
15	20	22	Germany	7.90	8.00	7.90
17	22	28	Japan	7.80	7.70	7.30
20	25	23	United Kingdom	7.60	7.70	7.70
22	19	18	Belgium	7.10	7.10	7.30
22	25	23	United States	7.10	7.50	7.30
25	27	27	France	6.80	6.90	6.90
26	27	26	Estonia	6.50	6.60	6.60
27	27	31	Slovenia	6.40	6.60	6.70
30	35	32	Spain	6.10	6.10	6.50
32	37	36	Portugal	6.00	5.80	6.10
41	34	33	Poland	5.30	5.00	4.60
46	43	43	Lithuania	5.00	4.90	4.60
50	49	47	Hungary	4.70	5.10	5.10
53	66	65	Czech Republic	4.60	4.90	5.20
59	56	52	Latvia	4.30	4.50	5.00
59	65	62	Slovakia	4.30	4.50	5.00
62	71	72	Croatia	4.10	4.10	4.40
67	66	67	Italy	3.90	4.30	4.80
69	71	72	Romania	3.70	3.80	3.80
73	84	67	Bulgaria	3.60	3.80	3.60
78	84	80	Serbia	3.50	3.50	3.40
134	146	166	Ukraine	2.40	2.20	2.50
154	158	151	Russia	2.10	2.20	2.10

Source: Corruption Perception Report 2010, Transparency International, Retrieved from http://www.transparency.org

Results of the Regression Analysis: Economic Growth, Trust and Cooperation

Table A.3. Growth-Trust and Cheat in CEE Countries

R Square	Adjusted R Square	Std. Error of the Estimate
0.158	0.126	6.00

ANOVA

	Sum of Squares	df	Mean Square	F	Significance
Regression	358.127	2	179.063	4.979	0.010
Residual	1906.040	53	35.963		
Total	2264.167	55			

Predictors: (Constant), CHEAT_CEE, TRUST_CEE.

Dependent Variable: GROWTH_CEE.

Coefficients

	Standardized Coefficients	t	Significance
	Beta		
(Constant)		-2.695	0.009
TRUST_CEE	0.283	2.234	0.030
CHEAT_CEE	-0.312	-2.461	0.017

Dependent Variable: GROWTH_CEE.

Table A.4. Trust-Cheat and Growth in CEE Countries

R Square	Adjusted R Square	Std. Error of the Estimate
0.097	0.063	0.12846

ANOVA

	Sum of Squares	df	Mean Square	F	Significance
Regression	0.094	2	0.047	2.851	0.067
Residual	0.875	53	0.017		
Total	0.969	55			

Predictors: (Constant), GROWTH_CEE, CHEAT_CEE.

Dependent Variable: TRUST_CEE.

Coefficients

	Standardized Coefficients	t	Significance
	Beta		
(Constant)		25.378	0.000
CHEAT_CEE	-0.195	-1.436	0.157
GROWTH_CEE	-0.304	-2.234	0.030

Dependent Variable: TRUST_CEE.

Table A.5. Cheat-Trust and Growth in CEE Countries

R Square	Adjusted R Square	Std. Error of the Estimate
0.113	0.080	0.37822

ANOVA

	Sum of Squares	df	Mean Square	F	Significance
Regression	0.970	2	0.485	3.389	0.041
Residual	7.582	53	0.143		
Total	8.552	55			

Predictors: (Constant), TRUST_CEE, GROWTH_CEE.

Dependent Variable: CHEAT_CEE.

Coefficients

	Standardized Coefficients	t	Sig.
	Beta		
(Constant)		-3.703	0.001
GROWTH_CEE	-0.329	-2.461	0.017
TRUST_CEE	-0.192	-1.436	0.157

Dependent Variable: CHEAT_CEE.

Notes

Note 1. Arrow, 2006.

Note 2. The group of advanced countries consists of Austria, Denmark, Finland, France, Germany, Great Britain, Greece, Italy, The Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, and the USA.

Note 3. The group of CEE countries consists of Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Russian Federation, Serbia and Montenegro, Slovakia, Slovenia and Ukraine.

Note 4. I originally planned to include more Asian countries in the analysis but I had to limit their number to four because of the lack of data. I shall mention some of the other Asian countries in the discussion when appropriate.

Note 5. The importance of trust during transition has been extensively discussed by Ackerman-Rose, Kornai and Rothstein (2004), and Győrffy (2006, 2009).

Note 6. See, for instance, Luhmann (1979), Coleman (1990), Fukuyama (1996), Sztompka (1999), Zak and Knack (2001), Hardin (2002), and Resnick (2006).

Note 7. On the political economy of trust see, for instance, Farrell (2009) and Dasgupta (2009).

Note 8. The respondents in each country were asked whether they agree with the following statement: "Most people can be trusted". The numeric codes were as follows: "Most people can be trusted" = 1, "Can't be too careful" = 2.

Note 9. The full database on trust and cooperation in individual countries is available from the author upon request.

Note 10. I used the following individual trust indicators to calculate "Mean Trust":

- "confidence in church",

- "confidence in parliament",

- "confidence in civil service",

- "confidence in political parties",

- "confidence in the government",

- "confidence in the justice system",

- "confidence in the police",

- "confidence in the press",

- "confidence in television,

- "confidence in trade unions",

- "confidence in major companies",

- "confidence in the European Union".

Individual confidence indicators and the "Mean Trust" indicator can vary between 1 (= high trust) and 4 (= lack of trust).

Note 11. The questions were as follows:

Is it justifiable to

- claim state benefits;

- avoid paying the fare on public transportation;

- cheat on taxes;

accept a bribe.

Note 12. See, for instance, Ackerman-Rose, Kornai and Rothstein (2004) and TÁRKI (2009).

Note 13. In a simple version of their model the relationship between growth rate and future discounting can be written as $g = \dfrac{A - (1 + \rho)}{(2 + \rho)}$, where g is the country's growth rate, A denotes the productivity indicator of the aggregate production function and ρ is the discount factor.

Note 14. See, for instance, EBRD (2010).

Note 15. The data I could use for calculating the indices of trust and cooperation goes until 2008. It may be the case that the relationship among trust, cooperation and economic performance has changed after that year as the worldwide financial and economic crisis unfolded.

Note 16. See the detailed results of the regression analysis on CEE countries and on Western countries in the Appendix.

400

Note 17. The government's and the agents' type as well as the agents' effort level could be represented by continuous variables. I limit the analysis to the simplest case, where the government or the agents can be one of two types, or the agents can exert only high or low effort, to keep the analysis tractable.

Note 18. PCEP = participation constraint of the efficient agent with pure strategy; ICEP = incentive compatibility constraint of the efficient agent with pure strategy; PCIEP = participation constraint of the inefficient agent with pure strategy; ICEP = incentive compatibility constraint of the inefficient agent with pure strategy.

Note 19. PCEM = participation constraint of the efficient agent with mixed strategy; ICEM = incentive compatibility constraint of the efficient agent with mixed strategy; PCIEM = participation constraint of the inefficient agent with pure strategy; ICIEM = incentive compatibility constraint of the inefficient agent with mixed strategy.

Note 20. Laffont and Martimort (2000), p. 154.