IMF Working Paper

Corruption, Structural Reforms, and Economic Performance in the Transition Economies

George T. Abed and Hamid R. Davoodi

INTERNATIONAL MONETARY FUND

IMF Working Paper

Fiscal Affairs Department

Corruption, Structural Reforms, and Economic Performance in the Transition Economies

Prepared by George T. Abed and Hamid R. Davoodi[1]

July 2000

Abstract

Recent studies have highlighted the adverse impact of corruption on economic performance. This paper advances the hypothesis that corruption is largely a symptom of underlying weaknesses in public policies and institutions, a formulation that provides deeper insights into economic performance than do measures of "perceived corruption." The hypothesis is tested by assessing the relative importance of structural reforms vs. corruption in explaining macroeconomic performance in the transition economies. The paper finds that for four widely used measures of economic performance—growth, inflation, the fiscal balance, and foreign direct investment—structural reforms tend to dominate the corruption variable.

<div align="center">Contents   Page</div>

"Cross-country empirical work has confirmed the negative impact of corruption on growth and productivity, but it is of little use in designing anticorruption strategies."

Susan Rose-Ackerman (1999, p. 3)

"...the fight against corruption often cannot proceed independently from the reform of the state. In many ways, it is the same fight."

Vito Tanzi (1998, p. 590)

I. INTRODUCTION

The literature on corruption is growing rapidly. Until recently, corruption was mostly a subject for sociologists, political scientists, and public administrators.[2] Increasingly, economists have sought to apply the tools of economic analysis to this phenomenon (building on the pioneering work of Becker (1968); Rose-Ackerman (1978); Klitgaard (1988); and Tanzi (1995)). Economists have generally highlighted the adverse impact of corruption on economic performance while providing insights into its origins, manifestations, and possible remedies.[3] However, few studies have sought to examine the causes of corruption,[4] whereas fewer still have succeeded in linking the causes to possible remedies in a satisfactory analytical framework. This is partly due to the complexity and diversity of the underlying factors that give rise to corruption, many of which lie beyond the traditional domain of economics. More important, perhaps, is that greater effort has been made to "measure" corruption[5] than the more complex structural or institutional distortions that may underlie corrupt behavior. With the wider availability of "indices of perceived corruption" for an increasing number of countries, it is not surprising that economists have begun to examine the possible relationship between "corruption" and economic performance.[6]

---

[2] See Weber (1947); Myrdal (1968); Leff (1964); Huntington (1968); and Heidenheimer, Johnston, and LeVine (1999).

[3] See, for example, Kaufman, Kraay, and Zoido-Lobatón (1999a, 1999b), who pull together 300 indicators of governance from numerous sources from which the authors then construct six basic governance concepts. Others have offered useful typologies (Rose-Ackerman, 1999, and Tanzi, 1998) or instructive case studies (Klitgaard, 1988), while seeking a better understanding of the phenomenon. On the impact of corruption on measures of economic and social performance, see, for example, Mauro (1995); Wei (1997a, 1999a); Tanzi and Davoodi (1997); and Gupta, Davoodi, and Alonso-Termé (1998).

[4] Among these are the papers by Ades and Di Tella (1999); Rauch and Evans (2000); and Treisman (2000).

[5] "Corruption" has been measured by constructing indices of "perception of corruption" derived from surveys of businessmen, public officials, and possibly others. See Tanzi (1998) and Wei (1999a) for a discussion of some of these indices.

[6] Some studies have used data on conviction of publicly elected officials as a measure of corruption where the major source of conviction has been the violation of the public office by the elected or appointed official; see Goel and Nelson (1998) for an example.

This paper views corruption largely as a **symptom** of weaknesses in economic structures and institutions,[7] considered to be the **origin** of much of what is perceived as corruption in the public sector.[8] Furthermore, the paper finds that once these weaknesses are defined and somehow "measured," they tend to provide a stronger link to economic performance than do measures of real or perceived corruption. Thus although corrupt behavior should always be addressed head-on by administrative means, the design of economic policies to deal with the phenomenon called "corruption" is best pursued through structural and institutional reform. Accordingly, our main hypothesis, to be tested empirically in this paper, is that once structural reforms are taken into account, the corruption variables tend to lose their explanatory power in the analysis of macroeconomic performance.

Although we are of the view that this analytical framework may have wide applicability, we apply it to 25 transition economies for the period 1994–98. Conceptually, the choice of this group of countries derives from the wide attention given to the role of corruption in influencing the transition process in these economies,[9] and from the intensity of the structural and institutional change that has marked the transformation of these economies since the early 1990s. On a more practical level, comprehensive measures of structural and institutional reforms have become available for these countries since 1994.[10]

Section II of this paper sets out a simple analytical framework and applies it to the case of transition economies. Section III provides an empirical test of the paper's main hypothesis, using four indicators of macroeconomic performance that have been widely used in the literature on transition economies: growth, inflation, the fiscal balance, and foreign direct investment. Section IV provides evidence as to whether the structural reform index is a determinant of corruption, given other determinants of corruption in transition economies. Section V presents the conclusions.

II. CORRUPTION AS A SYMPTOM OF LAGGING REFORMS

Corruption, of course, is not an exclusively economic phenomenon. It manifests itself in the political process (e.g., rigging elections, trading votes within legislative bodies for self-serving gains); in the judicial system (e.g., tampering with juries, bribing judges); and in other, perhaps less visible, spheres. Economists, however, focus on corruption as a public

---

[7] Although corruption itself may contribute to institutional weaknesses and structural distortions, this paper's hypothesis is that the causality is largely in the other direction. See Section IV.

[8] See Tanzi (2000) on the importance of public institutions and role of the state.

[9] See Shleifer and Vishny (1993); Johnson, Kaufmann, and Shleifer (1997); Rose-Ackerman (1999); and EBRD (1999b).

[10] A narrower set of measures exist prior to 1994 (de Melo, Denizer, and Gelb, 1996).

economic policy issue, because corruption undermines the state's capacity to carry out its designated functions in the economy (e.g., as a supplier of public goods and services, a regulator of markets, or an agent for implementing society's redistributive goals).

In this context, it is not difficult to see that economic policy distortions and weak state institutions provide an environment that is conducive to corruption. For example, where the demarcation lines between the state and the market are not clear and are not properly regulated, distinctions between what is public and what is private are obscured and corrupt behavior may ensue. Similarly, regulations that are pervasive, obscure, and applied capriciously invite economic agents to find ways, including bribing public officials, to secure favorable interpretations. Exchange and trade restrictions also tend to breed informal, often corrupt, channels for market-induced transactions.

In this sense, statements that link corruption to economic performance are essentially statements about the link between structural/policy distortions and economic performance. Corruption is, for the most part, a manifestation of these distortions,[11] and analyses dealing with the effects of corruption on macroeconomic performance may, therefore, only be dealing with the symptoms. As such, they may not be very helpful in suggesting remedial policies as they beg such questions as what economic conditions may have brought about the phenomenon of corruption in the first place and what economic policies are needed to combat it. Identifying these conditions is essential to our understanding of why corruption occurs and what economic policies would be most effective to combat it.

In general, anticorruption strategies have employed a combination of direct actions against corrupt behavior while pursuing reforms of policies and institutions. More generally, such strategies may be broadly classified as belonging to one or more of the following three approaches:

1.   One approach emphasizes **administrative and legal remedies** designed essentially to limit the discretion of public officials, for example, through carefully crafted rules and regulations. These are intended to increase the probability of detection of corrupt behavior through strengthened monitoring and enforcement, and to ensure speedy and stiff punishment of proven wrongdoers.[12] This approach might include the establishment of internal monitoring units in bureaucracies (e.g., investigation bureaus in tax and customs administrations), the protection of the role of whistleblowers, and, more generally, the creation of anticorruption commissions (pioneered in Hong Kong and Singapore, and now established in a number of other countries).

---

[11] See Rauch and Evans (2000).

[12] This approach dominates the writings of policy analysts, public administrators as well as economists. See, for example, Becker (1968); Wade (1982); Klitgaard (1988, 1997); Hines (1995); and Rose-Ackerman (1978, 1999). Hines (1995), for example, points to the impact of penalties inherent in the U.S. Foreign Corrupt Practices Act of 1977 on trade with other countries.

2.	Another approach, often pursued in conjunction with other policies, relies on the promotion of good governance through adherence to **transparency and standards** in the conduct of the public's business.[13] Among the benefits of this approach is the strengthened accountability of public officials, hence reduced corruption.[14] Actions to improve governance may be initiated within the political process itself (e.g., by legislatures or the court system), by a more demanding donor community or by the media and civil society. For such an approach to be effective, however, it must be supplemented by adequate follow-up and enforcement mechanisms—such as a competent and independent judiciary, external audit mechanisms, and vigilant legislative bodies—as well as a free press and an alert civil society.[15]

3.	The third approach, and in our view the most effective over the long run, is based on **fundamental economic reforms,** whose objective is to remove the conditions that give rise to corruption in the first place. Such reforms seek to address weaknesses in economic policies and institutions by, inter alia, introducing into governmental activities greater reliance on economic incentives through civil service reform;[16] simplifying the tax system and reforming tax and customs administrations;[17] reforming public expenditure management systems;[18] introducing more internal competition among government agencies;[19] or commercializing or privatizing those activities of government that can no longer be justified as a public responsibility.[20] Similarly, where corruption is embedded in the supply of government goods and services (e.g., price support, subsidies), this approach would call for phasing out such programs in favor of greater reliance on the market through price liberalization; the substitution of market-based, self-enforcing mechanisms; or better targeting.

---

[13] See Ofosu-Amaah, Soopramanien, and Uprety (1999) for a comparative review of codes of conduct of public officials in different countries.

[14] This approach has been prominent in the fiscal reforms of Australia and New Zealand and in the IMF's promotion of the Codes of Fiscal and Monetary Transparency. The work of Transparency International is a notable effort in this regard, representing an initiative originating in civil society; see Pope (1999a, 1999b).

[15] For empirical evidence that countries with free press are perceived to have lower corruption, see Brunetti and Weder (1999).

[16] See Van Rijckeghem and Weder (1997) and Rauch and Evans (2000) for the impact of civil service pay and meritocratic recruitment, respectively, on corruption; for a more general approach to civil service reform, see Klitgaard (1997) and Rose-Ackerman (1999, chap. 5).

[17] See Crotty (1997); and Hindriks, Keen, and Muthoo (1999).

[18] See Garamfalvi (1997).

[19] See Shleifer and Vishny (1993) and Rose-Ackerman (1999).

[20] See Shleifer and Vishny (1993) and Rose-Ackerman (1999).

Although this paper focuses on the economic approach to curbing corruption, a few words may be in order concerning the other two approaches and the manner in which all three may be related or may be combined to combat corruption. Clearly, none of the three approaches is likely to be sufficient by itself. An effective anticorruption strategy needs to employ all three approaches, perhaps with differing emphases depending on the circumstances of the country. Indeed, most countries where the incidence of corruption is perceived to be very low (e.g., the Scandinavian countries, New Zealand, Canada, and the Netherlands) are generally seen to have well-developed administrative and legal systems, greater transparency and account-ability of government, as well as sound economic institutions and policy fundamentals. In the final analysis, all three approaches have to come together to achieve an optimal outcome.[21]

One merit of the fundamental economic reform approach is that by linking anticorruption strategies to the reform of economic policies and institutions, the fight against corruption can be defined as an issue in economic policy. Steady economic reforms aimed at reducing policy distortions and strengthening economic institutions are bound to reduce the opportunities for corruption, whereas progress in establishing effective administrative and legal systems and in creating a more open society is likely to improve detection of corrupt behavior and raise the cost to those who may engage in it. Ultimately, anticorruption strategies are related to the reform of state institutions.

In the case of the transition economies, the reform of the state has been associated with a reduction in the size of the public sector and, more important, with a fundamental shift in its role from one implying owning or controlling most productive resources to one that is more narrowly defined around essential state functions. In this process of transformation, greater emphasis has been placed on the state's role in securing the necessary conditions for the efficient operation of markets. These conditions are often related to the establishment of safeguards for the protection of basic rights (including civil and property rights) and to an effective operation of a rule-based regulatory environment.

Countries in transition have generally undertaken reforms in some or all of these areas and have achieved varying degrees of progress.[22] It is the hypothesis of this paper that those countries that have progressed the most in implementing these reforms have also had the greatest success in reducing opportunities for illicit rent seeking, arbitrary rule, and monopolistic behavior. **The reforming countries' relatively superior economic performance, according to this hypothesis, is related fundamentally to the achievement of these structural and institutional reforms and only incidentally to the degree to which corruption may have been reduced.** Indeed, this paper claims that corruption per se

---

[21] One such approach has been embedded in the so-called National Integrity Systems, which was developed by the President of Transparency International-Tanzania. See Langseth, Stapenhurst, and Pope (1999) for details; see also Wolf and Gürgen (2000).

[22] See EBRD (1999b) for a detailed account of the progress over the last ten years.

(as measured by the widely used corruption perception indices) has much weaker explanatory power than variables measuring structural and institutional reforms.

In contrast to the variety of sources that exist for measuring corruption in transition economies (see below), the EBRD is the sole agency that has consistently quantified measures of structural reforms every year since 1994. Table 1 provides these measures, based on 1998 data, of the progress achieved in the 25 transition economies in eight types of reforms, referred to as transition indicators, corresponding to the following three broad categories:

- **rationalizing state functions** through restructuring of enterprises and privatization of small- and large-scale businesses;

- **increasing the reliance on market-based pricing** through the liberalization of price, exchange, and trade systems, and the establishment of competition policy; and

- **creating a sound regulatory environment**, especially for the financial sector, through the reform of the banking system and other financial institutions.

Concerning the rationalization of state functions, and hence the corresponding growth in the private sector, in 16 of the 25 countries the share of the private sector was less than 50 percent in 1994, compared with 6 in 1998; in only one country the share of the private sector stood at 60 percent or higher in 1994 (Table 1), compared with as many as 13 in 1998. It may thus be assumed that in all these economies, the size of the public sector has been reduced—in some cases, dramatically. The data for 1998 also suggest a strong correlation between the growth of private sector activity and EBRD measures of privatization and restructuring of the state enterprise sector, with the correlation coefficients ranging from 0.73 to 0.87.[23]

The broad category of "market-based pricing" includes measures aimed at price liberalization, freeing of the trade and exchange systems, and the development of effective competition policies. Chart 1 displays the degree of progress achieved in each of the eight transition indicators during 1994–98. The chart clearly indicates that progress has been considerable in fostering a market-based economy through small- and large-scale privatization, and in reforming the trade and foreign exchange systems; progress has been slow in the area of price liberalization. Progress has been much slower in creating a sound regulatory environment. The latter is measured only with respect to financial markets and is reflected in the reform of the banking and securities sectors.

---

[23] Correlation has actually increased over time. In 1994, for example, the correlation coefficients ranged from 0.61 to 0.73.

Table 1. Progress in Structural Reforms in Transition Economies, 1998 1/

Country	Private Sector Share of GDP	Enterprises			Markets and Trade			Financial Markets	
		Large-scale privatization	Small-scale privatization	Governance & enterprise restructuring	Price liberalization	Trade & foreign exchange system	Competition policy	Banking reform & interest rate liberalization	Securities markets & nonbank financial institutions
	(%)								
Albania	75	2.0	4.0	2.0	3.0	4.0	2.0	2.0	1.8
Armenia	60	3.0	3.0	2.0	3.0	4.0	2.0	2.3	2.0
Azerbaijan	45	2.0	3.0	2.0	3.0	3.0	1.0	2.0	1.8
Belarus	20	1.0	2.0	1.0	2.0	1.0	2.0	1.0	2.0
Bulgaria	50	3.0	3.0	2.3	3.0	4.0	2.0	2.8	2.0
Croatia	55	3.0	4.3	2.8	3.0	4.0	2.0	2.8	2.3
Czech Republic	75	4.0	4.3	3.0	3.0	4.3	3.0	3.0	3.0
Estonia	70	4.0	4.3	3.0	3.0	4.0	2.8	3.3	3.0
FYR Macedonia	55	3.0	4.0	2.0	3.0	4.0	1.0	3.0	1.8
Georgia	60	3.3	4.0	2.0	3.0	4.0	2.0	2.3	1.0
Hungary	80	4.0	4.3	3.3	3.3	4.3	3.0	4.0	3.3
Kazakhstan	55	3.0	4.0	2.0	3.0	4.0	2.0	2.3	2.0
Kyrgyz Republic	60	3.0	4.0	2.0	3.0	4.0	2.0	2.8	2.0
Latvia	60	3.0	4.0	2.8	3.0	4.0	2.8	2.8	2.3
Lithuania	70	3.0	4.0	2.8	3.0	4.0	2.3	3.0	2.3
Moldova	45	3.0	3.3	2.0	3.0	4.0	2.0	2.3	2.0
Poland	65	3.3	4.3	3.0	3.3	4.3	3.0	3.3	3.3
Romania	60	2.8	3.3	2.0	3.0	4.0	2.0	2.3	2.0
Russian Federation	70	3.3	4.0	2.0	2.8	2.3	2.3	2.0	1.8
Slovak Republic	75	4.0	4.3	2.8	3.0	4.3	3.0	2.8	2.3
Slovenia	55	3.3	4.3	2.8	3.0	4.3	2.0	3.0	3.0
Tajikistan	30	2.0	2.3	1.8	3.0	2.8	1.0	1.0	1.0
Turkmenistan	25	1.8	2.0	1.8	2.0	1.0	1.0	1.0	1.0
Ukraine	55	2.3	3.3	2.0	3.0	2.8	2.0	2.0	2.0
Uzbekistan	45	2.8	3.0	2.0	2.0	1.8	2.0	1.8	2.0

Source: EBRD (1999a).

1/ Scale 0 to 4 (0=low progress; 4=high progress).
2/ Data with "+" in and "-" in the original EBRD source (EBRD, 1999a) have been increased and reduced, respectively by 0.25.

Chart 1. Average Annual EBRD Transition Indicators by Dimension, 1994-98
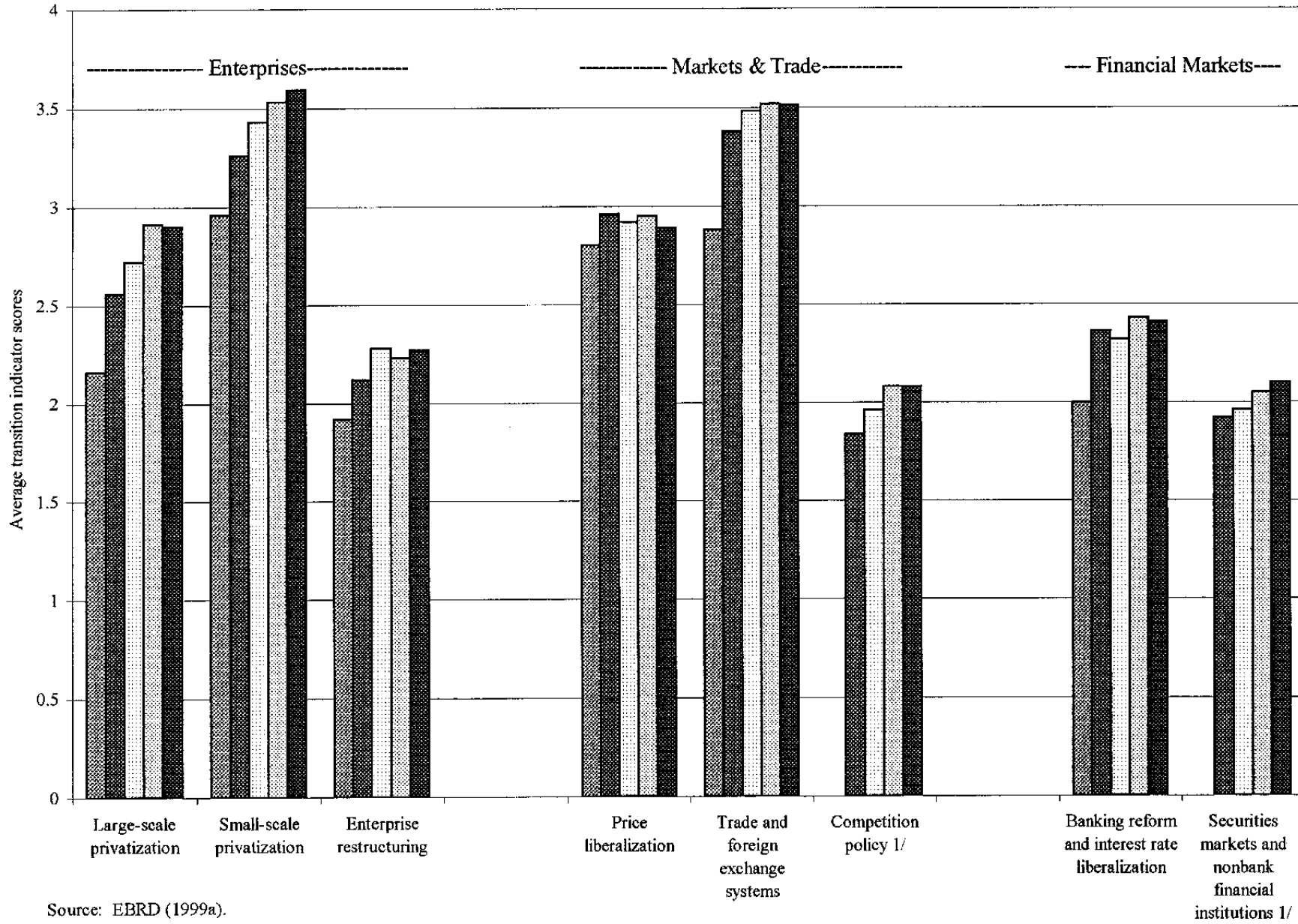
Source: EBRD (1999a).

1/ Data available only for 1995-98.

Legend: ▨ 1994 ■ 1995 □ 1996 ▧ 1997 ■ 1998

Table 2 shows reform trends in these 25 countries through a simple average of the eight transition indicators, henceforth referred to as the structural reform index, for each year during 1994–98.[24] The averages reported in Table 2 mask the heterogeneity indicated above, but they nevertheless provide a general picture of progress by advanced and slow reformers and the overall trend in structural reforms. The table shows that although some countries have made more progress than others, the gap between the advanced and slow reformers has been narrowing somewhat. Overall, structural reforms as measured by the EBRD are trending upward.

Considering the role of corruption in transition economies, we have assembled a comprehensive data set on the evolution of corruption in the 25 transition economies over the period 1994–98. The data, shown in Table 3, are drawn from six surveys of perception of corruption. The index of corruption ranges from zero to ten where higher values of the index represent lower perception of corruption. Keeping in mind the qualifications that attach to any data based on surveys seeking to measure perceptions, the data nonetheless illustrate several points:[25] (1) on average, corruption is perceived to be low in advanced reformers and high in slow reformers; (2) although data for the earlier years are somewhat less reliable, corruption is perceived to be increasing in the advanced reformers and decreasing in slow reformers, but not enough to overturn the previous finding; and (3) the perception of corruption is highly persistent, a fact that is consistent with evidence from a large group of nontransition economies.[26]

To test for the relative importance of structural and institutional reforms vis-à-vis corruption in explaining differences in performance among the transition economies, we employ the transition indicators as measures of structural reforms and institution building. We then provide a test of the hypothesis that these indicators, as summarized in the structural reform index, give a better explanation than the index of corruption for the observed variation in economic performance (growth, inflation, the fiscal balance, and foreign direct investment).

The case for the hypothesis that structural reforms lead to an improvement in economic performance is straightforward. A reduction in the size and scope of state functions, especially if effected through orderly privatization and effective devolution to market,

---

[24] Throughout this paper, the simple average of indicators is used, as any weighting scheme is likely to involve additional judgments.

[25] Because corruption perception indices are based on surveys, the data for any one year are probably more meaningful than the trends implied by the year-to-year data. Changes in the underlying surveys over time (e.g., composition of countries) and varying number of surveys can create different indices for a country. Therefore, the data have been averaged whenever multiple surveys are available for a country in any year.

[26] See Tanzi (1998). In fact, the correlation coefficient for 19 transition economies that have data in both 1995 and 1998 is about 0.75, suggesting that although perception of corruption does change, it does not change enough to radically reverse countries' relative rankings.

Table 2. Structural Reform Index in Transition Economies, 1994–98

	1994	1995	1996	1997	1998	1994-98 1/
Advanced reformers 2/ 3/						
Croatia	3.2	2.8	3.0	3.0	3.0	3.0
Czech Republic	3.5	3.4	3.3	3.4	3.4	3.4
Estonia	3.3	3.3	3.3	3.4	3.4	3.3
Hungary	3.3	3.4	3.4	3.6	3.7	3.5
Latvia	3.3	3.4	3.4	3.6	3.7	3.5
Lithuania	3.0	2.9	3.0	3.0	3.0	3.0
Poland	3.3	3.3	3.3	3.4	3.4	3.4
Slovak Republic	3.3	3.3	3.3	3.3	3.3	3.3
Slovenia	3.2	3.2	3.2	3.2	3.2	3.2
Average	3.3	3.2	3.3	3.3	3.3	3.3
Less-advanced reformers 2/ 3/						
Albania	2.5	2.4	2.6	2.6	2.6	2.5
Armenia	1.8	2.1	2.4	2.5	2.7	2.3
Azerbaijan	1.3	1.6	1.8	2.0	2.2	1.8
Belarus	1.7	2.1	1.9	1.6	1.5	1.8
Bulgaria	2.7	2.5	2.4	2.8	2.8	2.6
FYR Macedonia	2.8	2.5	2.6	2.6	2.7	2.7
Georgia	1.3	2.0	2.5	2.7	2.7	2.2
Kazakhstan	1.7	2.1	2.6	2.7	2.8	2.4
Kyrgyz Republic	2.8	2.9	2.8	2.8	2.8	2.8
Moldova	2.2	2.6	2.6	2.6	2.7	2.5
Romania	2.7	2.5	2.5	2.7	2.7	2.6
Russian Federation	2.7	2.6	2.9	3.0	2.5	2.7
Tajikistan	1.7	1.6	1.6	1.6	1.8	1.7
Turkmenistan	1.2	1.1	1.1	1.5	1.4	1.3
Ukraine	1.3	2.3	2.4	2.4	2.4	2.2
Uzbekistan	2.0	2.4	2.4	2.3	2.2	2.2
Average	2.0	2.2	2.3	2.4	2.4	2.3
Average (all countries) 1/	2.5	2.6	2.7	2.7	2.7	2.6
Average (19 countries) 1/ 4/	2.6	2.7	2.8	2.9	2.9	2.8

Source: EBRD (1999a).

1/ Unweighted average.
2/ Scale 0 to 4 (0=low progress; 4=high progress).
3/ Data with "+" in and "-" in the original EBRD source (EBRD, 1999a) have been increased and reduced, respectively by 0.25.
4/ Consisting of 19 countries that match the corruption perception data in Table 3.

Table 3. Corruption Perception Ranking in Transition Economies, 1994–98 1/

	1994 2/	1995 3/	1996 4/	1997 5/	1998 6/	1994-98 7/
Advanced reformers						
Croatia	...	6.0	...	5.9	3.3	5.1
Czech Republic	7.5	8.6	6.0	6.6	5.7	6.9
Estonia	...	7.1	...	7.0	7.0	7.0
Hungary	8.3	8.8	6.6	7.2	6.7	7.5
Latvia	...	6.6	...	5.4	3.9	5.3
Lithuania	...	6.8	...	6.0	5.0	5.9
Poland	8.3	8.6	7.0	6.9	6.5	7.4
Slovak Republic	7.5	6.6	5.0	4.5	5.3	5.8
Slovenia	...	9.3	...	8.6	6.7	8.2
Average	7.9	7.6	6.1	6.5	5.6	6.6
Less-advanced reformers						
Albania	6.7	4.3	3.3	3.2	5.0	4.5
Armenia	...	3.0	...	3.7	3.3	3.3
Azerbaijan	...	2.4	...	2.5	3.3	2.7
Belarus	...	3.1	...	3.0	5.3	3.8
Bulgaria	7.5	5.6	6.7	4.6	4.8	5.8
FYR Macedonia	...	4.6	...	5.6	...	5.1
Georgia	...	1.6	...	3.4	...	2.5
Kazakhstan	...	2.9	...	3.7	5.0	3.9
Kyrgyz Republic	...	3.3	...	3.7	...	3.5
Moldova	...	3.5	...	3.9	3.3	3.6
Romania	...	5.0	5.0	4.6	4.0	4.7
Russian Federation	5.0	2.3	3.0	3.5	2.9	3.3
Tajikistan	...	1.4	...	1.3	...	1.4
Turkmenistan	...	2.9	...	1.7	...	2.3
Ukraine	...	2.5	...	3.3	3.9	3.2
Uzbekistan	...	2.0	...	2.8	...	2.4
Average	6.4	3.2	4.5	3.4	4.1	3.5
Average (all countries) 7/	7.3	4.8	5.3	4.5	4.8	4.6
Average (19 countries) 7/ 8/	...	5.4	...	...	4.8	5.2

Sources: See footnotes below.

1/ Scale 0-10 (highly corrupt=0; highly clean=10).
2/ Tanzi and Davoodi (1997).
3/ Central European Economic Review (1995-96).
4/ Transparency International (TI) and World Bank (1997).
5/ Political Risk Services; Central European Economic Review (1997-98); World Bank (1997); and Lambsdorff (1998).
6/ Political Risk Services and TI.
7/ Unweighted average.
8/ Consisting of 19 countries that match the structural reform index in Table 2.

is a necessary first step in creating the conditions for a private sector to emerge. Such a development is likely to enhance the efficiency of the economy as a whole through a more effective operation of incentives and the price mechanism. Furthermore, to the extent that such devolution is supplemented by liberalization measures, opening up the economy to external trade and to capital flows, and by a strengthened regulatory environment, it is likely to lead to higher private-sector-led investment and growth. Similarly, to the extent that reduced government spending for a given tax effort reduces the public sector deficit, crowding out of the private sector is reduced while macroeconomic stability is enhanced (and may be reflected in reduced rates of inflation), especially if accompanied by an amelioration in price and cost distortions through price liberalization.[27]

Thus, the connection linking structural and policy reforms to economic performance is rather direct and is in conformity with traditional economic analysis.[28] Although corruption may, if viewed as a tax, impede investment and growth directly, the link between corruption and economic performance is generally of an indirect nature, operating essentially through weaknesses in institutions, policies, and incentive systems.[29] Corruption indices may, therefore, be thought of as *summary indicators* of the extent to which institutional and policy reforms have been undertaken. They, however, are not likely to provide an *explanation* of such performance.

III. EXPLAINING ECONOMIC PERFORMANCE: CORRUPTION OR STRUCTURAL REFORMS

To investigate the relative importance of corruption and structural reforms in influencing macroeconomic performance, we use regression and decomposition analyses.[30] The following methodology is used throughout this analysis when reporting results. First, each indicator of macroeconomic performance is regressed on a corruption index and control variables. This is essentially the approach that has been adopted in the empirical literature on the economic impact of corruption (e.g., Mauro, 1995; Tanzi and Davoodi, 1997). By drawing on an extensive data set of corruption indices in transition economies (described in the previous section), this regression can also inform us if the previous findings on the

---

[27] Additional motivations on the impact of structural reforms and corruption are provided in the next section for each indicator of economic performance.

[28] A similar analysis of structural reforms, corruption, and economic performance in the Baltic and CIS countries has recently been undertaken with reference to reforms included in IMF-supported adjustment programs. See Wolf and Gürgen (2000).

[29] The role of incentives in the corruption-growth relationship has recently been given a rigorous theoretical treatment (Ehrlich and Lui, 1999).

[30] The decomposition analysis follows the standard approach used in the empirical literature on economic growth; see Easterly and Levine (1997) for a cross-country approach, and Berg and others (1999) for an application to transition economies.

economic impact of corruption that were based largely on nontransition economies also extend to transition economies. Second, each indicator of macroeconomic performance is regressed on an index of structural reforms and the same control variables. This approach has been used extensively in studies of the economic impact of structural reforms in transition economies (e.g., de Melo, Denizer, and Gelb, 1996; Berg and others, 1999), where the focus has been limited to structural reforms and did not include corruption.

Finally, the novelty of this paper is to integrate the previous two approaches into a frame of analysis that includes both the corruption index and the structural reform index as independent variables while allowing for the same control variables as in the previous two regressions.[31] **This approach allows us to test the hypothesis that structural reforms are statistically and economically more significant than corruption in explaining economic performance.** According to this hypothesis, the fit of the estimated regression, as judged by the adjusted R-squared, should also improve when the corruption index is replaced by the structural reform index. Using panel and cross-sectional data for the transition economies, we apply this methodology to each of the following indicators of macroeconomic performance as the dependent variable: growth, inflation, the fiscal balance, and foreign direct investment. Important not only in gauging economic performance, these indicators have been widely used in the analysis of the impact of corruption on such performance.

For purposes of the regression analysis, the existing data on corruption indices restrict the choice of the start of the sample period to 1994. Thus, the sample period for all regressions in this paper starts in 1994 and ends in 1998.[32] The shorter sample period, in contrast to previous studies of growth in transition economies, therefore, excludes the so-called "transition recession" period (1990–93). As a result, the regressions used in this paper essentially apply to the upward-sloping part of the now familiar U-shaped curve, present in many indicators of macroeconomic performance in transition economies. Given the short time span and the limited number of observations, one cannot allow for rich dynamics between indicators of macroeconomic performance and other economic factors found in previous studies of transition economies (e.g., Berg and others, 1999). The only source of dynamics in the regressions reported in this paper, therefore, is the set of variables representing initial conditions, which may refer to 1993 or earlier, depending on the regression and data availability. However, it turns out that the results reported in this paper are generally consistent with those reported in previous studies of transition economies (of course, those studies did not assess the relative importance of structural reforms and corruption in influencing macroeconomic performance).

---

[31] Because of the potential endogeneity problem, initial values of control variables rather than current values are included in all the regressions.

[32] All the data used in the paper are taken from EBRD (1999a) unless otherwise indicated. Although EBRD (1999a and 1999b) provides data on 26 transition countries, only 25 countries are included in this paper, because of the lack of data on corruption for one of the countries.

A. Growth

Against this background, specification of the growth regression follows the standard approach in the growth literature (Sala-i-Martin, 1997), but is augmented with other variables used in a growing number of studies of growth in the transition economies.[33] The dependent variable is the real per capita GDP growth rate. The right-hand-side comprises six variables: a corruption index; a structural reform index;[34] initial real per capita GDP in U.S. dollars (a measure of convergence and other initial conditions); initial life expectancy (a measure of human capital);[35] the ratio of fiscal balance to GDP (a measure of macrofiscal stability); and the inflation rate. This specification thus allows for initial conditions, structural reforms, as well as macroeconomic stabilization policies to affect the growth rate. Additional control variables are then added to this regression; these include the choice of fixed exchange rate regime, a measure of natural resource wealth, the number of years a country lived under a central planning system, the initial Gini coefficient, the ratio of trade to GDP, the ratio of broad money to GDP, and the ratio of investment to GDP.[36] These variables have been used extensively in the empirical growth literature and in studies of growth in transition countries.[37]

---

[33] There are at least 20 econometric studies of growth in transition economies. To our knowledge, no study attempts to ascertain the robustness of the different variables used in these studies. This would be a good area for additional work.

[34] This is defined as the simple average of eight transition indicators constructed by the EBRD. These are (1) large-scale privatization, (2) small-scale privatization, (3) enterprise restructuring, (4) price liberalization, (5) trade and foreign exchange systems, (6) competition policy, (7) banking reform and interest rate liberalization, and (8) securities markets and nonbank financial institutions.

[35] The data on school enrollment rates, another measure of human capital, are sketchy for most transition economies; in some cases, data are available only from 1995, and, therefore, cannot be used as initial conditions. Data on life expectancy, available for many countries, are from the World Bank (1999).

[36] Another strand of literature has also investigated the impact of compliance with IMF programs on growth; see Havrylyshyn and others (1999) and Mercer-Blackman and Unigovskaya (2000).

[37] Previous studies of growth in transition economies allowed for a richer set of initial conditions than used in this paper, but these studies mostly excluded the variables that are always included in cross-country growth regressions, such as initial per capita GDP and initial life expectancy (Sala-i-Martin, 1997). The choice of the sample period (i.e., the post-1993 period) used in this paper makes transition economies look somewhat like the nontransition economies used in many large cross-country growth studies and calls for including the same initial conditions in growth regressions as in nontransition economies (i.e., initial per capita GDP and initial life expectancy). In addition, many studies of transition economies have found the role of initial conditions to decline over time (e.g., de Melo and others, 1997; Berg and others, 1999; and Havrylyshyn and van Rooden, 2000). Therefore, initial per capita GDP and initial life expectancy are good proxies for many types of initial conditions used previously in studies of transition economies.

Results are shown in Table 4.[38] They indicate that higher growth is associated with higher initial life expectancy, lower initial income (i.e., the convergence effect), lower corruption, better track record on structural reforms, higher fiscal surplus, and lower inflation. Therefore, structural reforms, macroeconomic policies, and initial conditions are all important to the growth process.

These findings are generally consistent with other studies of growth in transition economies. The fitted regressions that include all of the six variables account for 54 percent of growth variation in the panel data and for 67 percent in the cross-sectional data. In the cross-sectional data, the regression with the structural reform index has a better fit, as judged by the higher adjusted R-squared of 67 percent (column 5), than with the corruption index, whose adjusted R-squared is 60 percent (column 4). However, this ranking is reversed in the panel data, where the regression with the corruption index accounts for 49 percent of the growth variation (column 1) as compared with 39 percent for the structural reform index (column 2).[39]

Fiscal balance and inflation are statistically significant at the 5 percent level in panel data (column 3), but are insignificant in the cross-sectional regressions, indicating that time averaging of the data has eliminated the dynamic relationship between growth and these two variables present in the panel data. Initial real per capita GDP and life expectancy are highly significant (1 percent level) in all the regressions, indicating the importance of these measures of initial conditions. In this respect, transition economies over the period 1994–98 are no different from nontransition economies.

As for the two indices of corruption and structural reforms, each index is significant at the 1 percent level when the other index is excluded from the regression. However, **when both are included, the structural reform index continues to be statistically significant whereas the corruption index becomes insignificant** (Table 4, column 6).

The above results suggest that structural reforms may be the driving force behind the strong impact of corruption on growth found in previous studies that excluded a measure of structural reforms (e.g., Brunetti, Kisunko, and Weder, 1997). However, these results do not indicate by themselves the relative (economic) importance of each variable in accounting for

---

[38] The control variables mentioned earlier were also tried, but did not change the qualitative and quantitative importance of the two indices reported in Table 1. For example, a flexible exchange rate regime, abundant natural resource wealth, and higher initial inequality are all associated with lower growth rate, but these variables are no longer significant once the regression controls for the variables included in Table 1.

[39] One explanation for this finding has to do with the fact that the correlation between the corruption index and inflation is much smaller (0.41) than the correlation between the structural reform index and inflation (0.56). Therefore, in the panel data, when the structural reform index is replaced by the corruption index, inflation is statistically significant, which increases the adjusted R-squared, whereas when the corruption index is replaced by the structural reform index, inflation loses its significance and adjusted R-squared falls subsequently. Results of inflation regressions are consistent with this interpretation.

Table 4. Dependent Variable: Real Per Capita Growth Rate

Independent Variables	Panel			Cross Section		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-187.92***	-280.31***	-184.20	-261.95***	-301.15***	-259.46***
	(-2.44)	(-4.11)	(-2.59)	(-2.59)	(-3.37)	(-2.95)
Corruption index	1.86***		1.35***	2.64***		1.06
	(2.98)		(2.77)	(3.21)		(1.32)
Structural reform index		7.59***	4.79*		7.14***	5.46**
		(3.10)	(1.74)		(4.60)	(2.49)
Initial real per capita GDP	-3.77***	-3.54**	-4.80***	-3.10**	-2.57***	-3.12***
	(-3.78)	(-3.61)	(-3.87)	(-2.15)	(-2.78)	(-3.22)
Initial life expectancy	49.17***	67.73***	47.47***	63.79***	70.99***	61.83***
	(2.68)	(4.15)	(2.82)	(2.63)	(3.35)	(2.98)
Fiscal balance-GDP ratio	0.35*	0.58***	0.42**	0..08	0.33	0.28
	(1.74)	(2.91)	(2.23)	(0.31)	(1.00)	(0.88)
Inflation	-0.02**	-0.12 1/	-0.01**	0.03 1/	0.66 2/	0.04 1/
	(-2.31)	(-0.34)	(-2.29)	(0.23)	(0.05)	(0.41)
Number of observations	80	113	80	25	25	25
Adjusted R-squared	0.49	0.39	0.54	0.60	0.67	0.67

Source: Fund staff estimates.

Notes: Estimation is by OLS; t-statistics are in parentheses, and based on heteroscedastic-consistent standard errors. Initial per capita GDP and initial life expectancy are in logs. A "+" is a surplus for fiscal balance, a "-" is a deficit.

1/ Multiplied by 100.
2/ Multiplied by 10,000.

*** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

growth. To gauge the importance of each variable, two types of decompositions are carried out, using the estimated growth regressions that contain both indices (Table 4, columns 3 and 6). One decomposition shows how much of the growth differential between advanced reformers and slow reformers is due to differences in the two indices and differences in other variables.[40] This type of decomposition is useful as advanced reformers tend to have better performance than slow reformers as characterized by higher growth rates, longer life expectancy, better track record on structural reforms, lower perception of corruption, higher real per capita GDP, lower fiscal balances, and lower inflation rates. The second decomposition indicates how much of the growth can be accounted for, on average, by each index and other variables. This decomposition shows the average behavior of a transition economy and, therefore, does not rely on any a priori country classification. These decompositions are then carried out for both data sets. Results are shown in Tables 5 and 6.

The first decomposition based on the cross-sectional regression (Table 5, column 2) shows that of the 6.3 percent explained growth differential between advanced reformers and slow reformers, 3.3 percent is due to differences in corruption rankings, 5.2 percent due to differences in structural reforms, -4.8 percent due to differences in initial per capita GDP, 1.8 percent due to differences in initial life expectancy, 1 percent due to differences in fiscal balance, and -0.2 percent due to differences in inflation.[41] The large negative contribution for initial per capita GDP (-4.8 percent) reflects the importance of the convergence effect (e.g., that slow reformers would have grown 4.8 percent faster than advanced reformers purely on account of their lower initial per capita GDP). However, there are obviously other factors (those included in the regression and in the decomposition) that tend to widen the gap in per capita income between advanced reformers and slow reformers. The decomposition results based on the panel regression (Table 5, column 1) show that structural reforms are also more important than corruption, although not by as much as the cross-sectional results would indicate. Taken together, corruption and structural reforms are more important than initial conditions and macroeconomic policies. The superiority of structural reforms over macroeconomic policies indicated by this analysis is consistent with that of Berg and others (1999).

The second decomposition shows that structural reforms are two to three times as important as corruption in accounting for average growth performance in 25 transition countries (Table 6). **The two decompositions lend support to the main hypothesis of the paper:**

---

[40] Classification of countries into advanced and slow reformers has been used in many studies of transition economies and is used in this paper as well. See, among others, de Melo, Denizer, and Gelb (1996); and Abed (1998). This is the same classification as in Tables 2 and 3.

[41] The negative entry for inflation is due to the negative sign on inflation in Table 4, column 6.

Table 5. Explaining Growth Differential Between Advanced Reformers and Slow Reformers 1/
(In percent)

	Panel (1)	Cross Section (2)
Growth differential (actual)	5.14	6.76
Growth differential (fitted) due to	5.17	6.28
Corruption index	3.94	3.26
Structural reform	4.06	5.21
Initial real per capita GDP	-7.02	-4.80
Initial life expectancy	1.42	1.84
Fiscal balance-GDP ratio	1.42	0.98
Inflation	1.35	-0.21
Residual	-0.03	0.48

Source: Fund staff estimates.
1/ Based on regressions (3) and (6) in Table 4, and average value of each variable with each country group.

Table 6. Growth Decomposition Based on All Data 1/
(In percent)

	Panel (1)	Cross Section (2)
Growth (actual)	1.58	-0.14
Growth (fitted) due to	1.58	-0.14
Constant	-184.20	-259.46
Corruption index	6.85	4.87
Structural reform	13.30	14.27
Initial real per capita GDP	-32.92	-20.74
Initial life expectancy	201.36	262.02
Fiscal balance-GDP ratio	-1.83	-1.24
Inflation	-0.98	0.14
Residual	0.00	0.00

Source: Fund staff estimates.
1/ Based on regressions (3) and (6) in Table 4, and average value of each variable.

structural reforms are economically more important than corruption in accounting for growth.[42]

B. Inflation

The literature on the determinants of inflation in transition economies has generally emphasized cross-country studies of inflation (e.g., Campillo and Miron, 1996), while incorporating features that are unique to transition economies.[43] In this paper, we follow the lead of Fischer, Sahay, and Vegh (1998) who specify inflation as a function of the choice of the exchange rate regime, fiscal balance, structural reform indices as compiled by de Melo, Denizer, and Gelb (1996) and EBRD (1999b), and a dummy variable representing trade disruptions following the collapse of the CMEA and the breakup of the Soviet Union in January 1992.

The specification of the inflation regression is based on the idea that both structural reforms and macroeconomic policies are important determinants of inflation. A fixed exchange rate regime is expected to result in lower inflation, as it is often seen as a nominal anchor that imposes discipline on both monetary and fiscal policy (Obstfeld, 1985).[44] Structural reforms are expected to result in lower inflation as liberalization of prices, introduction of profit-oriented incentives in enterprises, and the development of a private market tend to reduce cost and price distortions, increase competitiveness, and enhance productivity.[45] Higher corruption may be associated with higher inflation, because (1) corruption can lead to capital flight and tax evasion, which shrink the tax base, thereby increasing government's desire to resort to seigniorage (Al-Marhubi, 2000); (2) businesses may respond to corruption by going underground, thereby increasing reliance on inflation tax (Al-Marhubi, 2000);[46] and (3) high and variable inflation can increase information problems in a principal-agent framework (Braun and di Tella, 2000).[47] Higher deficits are expected to be associated with higher

---

[42] To the extent that corruption is a symptom of poor institutions, the finding that lower corruption is associated with higher growth is consistent with the findings on the importance of institutions in transition economies. See, for example, Brunetti, Kisunko, and Weder (1997); and Havrylyshyn and van Rooden (2000).

[43] Some studies use changes in inflation rate as the dependent variable; see Cottarelli, Griffiths, and Moghadam (1998). As in most studies, we use inflation rate as the dependent variable.

[44] It is important to note that without conditioning on any other variable, transition economies that have a fixed exchange rate regime tend to have, on average, lower inflation, lower monetary growth, and lower deficit.

[45] Structural reforms can lead to higher prices, at least for a period, as such reforms involve the lifting of price controls and removing the suppressed inflation of the planning era.

[46] Al-Marhubi (2000) provides evidence of a positive relationship between corruption and inflation.

[47] Braun and di Tella (2000) show that countries with higher inflation volatility tend to have higher corruption, but do not find level of corruption to be related to inflation.

inflation, as they increase aggregate demand pressures and may induce monetary accommodation.[48] Thus, the baseline specification includes initial fiscal balance and a dummy variable for the choice of the exchange rate regime. To test the main hypothesis of this paper, indices of corruption and structural reforms are then added to the baseline specification.

Results are shown in Table 7 for panel and for cross-sectional data over the period 1994–98. The fit of the regressions, as judged by the adjusted R-squared, is much higher when the structural reform index—rather than the corruption index—is included in the regression. For instance, the regressions that include the structural reform index, but not the corruption index, account for 40 percent and 64 percent of the inflation variation in the panel and cross-sectional data, respectively, as compared with 14 and 55 percent, respectively, when the regression includes the corruption index, but not the structural reform index. The results further indicate that in the regressions that include only one of the indices, each index is statistically significant (at the 1 percent level). However, **when both indices are included (Table 7, columns 3 and 6), it is only the structural reform index that is statistically significant (at the 1 percent level); the corruption index is not significant, even at the 20 percent level.**

As for the signs of each variable, results indicate that lower corruption and deeper structural reforms are associated with lower inflation. The results on the fixed exchange rate regime and the fiscal balance variables are not as strong. While the cross-sectional results show that lower inflation is associated with lower government deficit (significant at the 1 percent level) and a fixed exchange rate regime (statistically insignificant at the conventional levels), the panel data results indicate that neither of these variables is significant nor do they have the expected signs. The latter finding is not consistent with results obtained by Fischer, Sahay, and Vegh (1998). There are at least two reasons that may account for this inconsistency: the choice of the sample period, as these authors use a longer sample during which annual inflation rates fell from over 1,000 percent to below 20 percent, and the choice of the fixed exchange rate regime, which may have mattered more in the early years of the transition in moderating imported inflation rates, given the absence of credible monetary institutions and policies (Wagner, 1998).[49] The mixed evidence on the fixed exchange rate regime variable is consistent with arguments and evidence in the theoretical as well as empirical literature.

---

[48] We use all these variables—except for the dummy variable, as our sample starts in 1994—whereas that of Fischer, Sahay, and Vegh (1998) starts in 1992, the year of the collapse of CMEA. Although the breakup may have lasting inflation effects, we proxy this effect by using initial values of other variables that may matter to inflation, such as the number of years under central planning, initial inflation rate, lagged inflation rate, and initial real per capita GDP. It is worth noting that adding these variables did not affect the reported results. Lagged inflation rate was the only variable found to be significant (with a positive sign, as expected), but this finding did not affect either the significance or the sign of the structural reform index.

[49] In 1994, eight transition economies were on a fixed exchange rate regime, as compared with five in 1998. This is consistent with the observation that many developing countries in the 1990s opted for a more flexible exchange rate arrangement; see Caramazza and Aziz (1998).

Table 7. Dependent Variable: Inflation

Independent Variables	Panel			Cross Section		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	1.04***	3.05***	2.03***	2.12***	3.20***	3.17***
	(4.62)	(7.02)	(4.86)	(4.75)	(8.36)	(7.42)
Corruption index	-0.12***		-0.70 1/	-0.27***		-0.02
	(-3.50)		(-0.22)	(-3.91)		(-0.14)
Structural reform index		-0.95***	-0.57***		-0.93***	-0.89***
		(-6.69)	(-3.50)		(-7.24)	(-2.86)
Initial fiscal surplus-GDP ratio	0.27 1/	-0.14 1/	0.34	-0.02*	-0.03***	-0.02***
	(0.48)	(-0.14)	(0.73)	(-1.93)	(-2.68)	(-3.21)
Exchange rate regime	0.04	0.15	0.06	-0.36	-0.24	-0.24
	(0.26)	(1.12)	(0.39)	(-1.56)	(-1.14)	(-1.13)
Number of observations	82	120	82	24	24	24
Adjusted R-squared	0.14	0.40	0.29	0.55	0.64	0.62

Source: Fund staff estimates.

Notes: Estimation is by OLS; t-statistics are in parentheses and are based on heteroscedastic-consistent standard errors. Dependent variable is in logs.

1/ Multiplied by 100.

*** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

The decomposition of the estimated regressions reveals the relative quantitative significance of the structural reforms vs. corruption. **Of the approximately 131 percent explained inflation differential between advanced reformers and slow reformers, 88 percent is due to differences in structural reforms, whereas only 5 percent is due to differences in corruption rankings;** 28 percent is due to fiscal surplus and 10 percent to the choice of the fixed exchange rate regime (Table 8).[50] **The second decomposition shows that structural reforms are 30 to 50 times as important as corruption in accounting for the average behavior of inflation** (Table 9).

C. Fiscal Balance

Unlike the numerous econometric studies of inflation and growth in transition economies, there are no econometric studies—to our knowledge—of the determinants of fiscal balance across the 25 transition economies.[51] On the other hand, there are many descriptive studies of the evolution of fiscal balance in transition economies and of factors affecting either the expenditure side or the revenue side of the budget.[52] However, given the importance of the fiscal balance in underpinning macroeconomic stability, an important factor itself in improving overall economic performance, we examine the behavior of this indicator in the same manner.

The specification of the fiscal balance regression adopted in this paper follows the analysis of Alesina and others (1999), but is modified to take into account features of the transition economies. The regression specifies the ratio of the fiscal balance to GDP[53] as a function of real per capita GDP growth (a measure of the cyclicality of general economic conditions), the share of agriculture in GDP (a measure of hard-to-tax sectors), the number of years a country lived under a central planning system (a proxy for initial conditions, such as commitment to reform and a reduced role for government), the initial value of the ratio of external debt to GDP (a proxy for past debt obligations of the country),[54] and the choice of the fixed exchange rate regime (a measure of commitment to maintain fiscal discipline to defend the

---

[50] The percentages are approximations, because the dependent variable is defined as logarithm of [1+ (inflation)/100]; this transformation is used in many studies of inflation in transition economies.

[51] An exception is Pirttila (2000).

[52] See Tanzi (1993); de Melo, Denizer, and Gelb (1996); Cheasty and Davis (1996); Barbone and Polackova (1996); Abed (1998); and EBRD (1999b). Tanzi and Tsibouris (forthcoming) provide exhaustive analyses of fiscal reforms in the past ten years in transition economies.

[53] Fiscal balance, as reported in EBRD (1999a), is used as the measure of fiscal balance; limited data prevented us from using primary balance as another measure of fiscal balance. The attraction of this measure is that a surplus on primary balance can be used to pay off interest payments on debt.

[54] Ideally, a measure of government debt (domestic as well as external) is more satisfactory, but domestic data are not available for many transition economies.

Table 8. Explaining Inflation Differential Between Advanced Reformers and Slow Reformers 1/
(In percent)

	Panel	Cross Section
	(1)	(2)
Inflation differential (actual)	-49.3	-126.5
Inflation differential (fitted)	-47.9	-131.3
due to		
Corruption index	-2.0	-4.9
Structural reform	-51.4	-87.9
Initial fiscal surplus-GDP ratio	3.5	-28.3
Exchange rate regime	2.0	-10.2
Residual	-1.4	4.8

Source: Fund staff estimates.
1/ Based on regressions (3) and (6) in Table 7, and average value of each variable within each country group.

Table 9. Inflation Rate Decomposition Based on All Data 1/
(In percent)

	Panel	Cross Section
	(1)	(2)
Inflation (actual)	40.8	95.9
Inflation (fitted)	40.7	96.1
due to		
Constant	203.0	317.0
Corruption index	-3.5	-7.4
Structural reform	-157.3	-231.0
Initial fiscal surplus-GDP ratio	-3.0	23.9
Exchange rate regime	1.5	-6.3
Residual	0.2	-0.2

Source: Fund staff estimates.
1/ Based on regressions (3) and (6) in Table 7, and average value of each variable.

exchange rate). To this regression, we then add indices of corruption and structural reform, one at a time and then jointly, to investigate their relative importance.

Results are shown in Table 10 for both panel and cross-sectional data. Most of the control variables have the expected signs and all are statistically significant at the 1 percent level, except for the corruption index. The fitted regressions explain 63 percent and 81 percent of the variation in the fiscal balance for the panel and cross-sectional data, respectively. The results show that a higher deficit is associated with lower real per capita GDP growth rate, higher share of agriculture in GDP, longer years spent under a central planning system, higher ratio of initial external debt to GDP, a flexible exchange rate regime, and deeper structural reforms. The corruption index has different signs in the panel and cross-sectional regressions. Each of these associations requires an explanation.[55]

The finding that lower growth is associated with higher deficits is consistent with the tax-smoothing argument *and* acyclical government spending pattern,[56] that is, countries tend to build surpluses during booms and run deficits during downturns. The finding that deficit increases with the share of agriculture in GDP is consistent with cross-country empirical models of tax structure where the presence of agriculture (a hard-to-tax sector) constrains the ability of governments to raise revenues (Tanzi, 1987; Stotsky and WoldeMariam, 1997).[57] The results further indicate that the longer a country lived under a central planning system, the higher its subsequent deficit. This result reflects the difficulties faced by a country with an entrenched command economy to either reduce the role of the state by devolving spending or to raise revenues through a modern tax system. The results show that the general government deficit of an advanced reformer would have been higher, on average, by about 1.5 percent of GDP had it lived under a central planning system for as long as a slow-reforming country.[58] This clearly shows an important aspect of initial conditions in transition economies that has not been documented before.

---

[55]Adding measures of urbanization, age dependency ratio (a proxy for demand for government services and pension commitments), and a measure of natural resource wealth does not change the reported results; in fact, all these variables were found to be statistically insignificant.

[56] Acyclicality is indeed true in the panel and cross-sectional data used in this paper.

[57] On average, agriculture represents about 18 percent of GDP in transition economies during 1994–98. Slovenia has the lowest share (4 percent) and Albania has the highest (57 percent). Albania happens to be a country with the highest deficit and the highest share of agriculture in GDP. The reported results do not change when the regressions are estimated on a sample that excludes either or both of these countries.

[58] On average, slow reformers spent 17 more years under a central planning system than advanced reformers. The estimate is obtained by multiplying 17 by the estimated parameter on "years under central planning" in Table 10, column 3.

Table 10. Dependent Variable: Ratio of Fiscal Balance to GDP
(In percent)

Independent Variables	Panel			Cross Section		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	5.86*	8.73***	14.11***	5.86	13.74***	13.17***
	(1.84)	(2.83)	(3.11)	(1.21)	(5.66)	(3.78)
Corruption index	-0.67**		-0.47*	-0.62		0.10
	(-2.31)		(-1.90)	(-1.32)		(0.24)
Structural reform index		-2.37***	-2.58***		-3.54***	-3.65***
		(-3.51)	(-2.98)		(-6.58)	(-6.03)
Real per capita GDP growth	0.10	0.16***	0.15***	0.08	0.18***	0.17***
	(1.43)	(4.12)	(2.50)	(0.69)	(3.17)	(2.63)
Agriculture share of GDP	-0.16***	-0.16***	-0.18***	-0.18***	-0.18***	-0.18***
	(-5.72)	(-7.67)	(-6.40)	(-4.70)	(-11.36)	(-7.96)
Years under central planning	-0.06*	-0.05**	-0.09***	-0.06	-0.08***	-0.08**
	(-1.80)	(-2.29)	(-2.74)	(-1.30)	(-3.52)	(-2.43)
Initial external debt-GDP ratio	-0.04***	-0.04***	-0.04***	-0.03**	-0.03***	-0.03***
	(-3.03)	(-3.26)	(-3.06)	(-2.19)	(-4.61)	(-4.82)
Exchange rate regime	2.63***	1.86***	2.46***	1.49	1.49	1.53
	(3.84)	(3.15)	(3.60)	(1.17)	(1.56)	(1.46)
Number of observations	72	106	72	25	25	25
Adjusted R-squared	0.57	0.60	0.63	0.68	0.82	0.81

Source: Fund staff estimates.

Notes: Estimation is by OLS; t-statistics are in parentheses and are based on heteroscedastic-consistent standard errors. Exchange rate regime is a dummy variable, which takes on value 1 when exchange rate regime is fixed and zero otherwise.

*** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

The finding that countries with higher initial external debt tend to have subsequently higher deficits runs counter to the expectation that countries need to run higher (primary) surpluses (lower deficits) in order to service their debts.[59] However, as the measure of fiscal balance used in the paper includes interest payments on external debt, the finding may simply reflect the inability or unwillingness of the country to undertake fiscal consolidation to reduce the debt burden, hence continuing on a vicious cycle of higher initial debt service leading to higher deficits and, absent fiscal reforms, requiring further borrowing and so on.

The finding that progress on structural reforms is associated with a higher deficit is consistent with the notion that several aspects of structural reform may work on both sides of the budget to increase the deficit.[60] These aspects are the persistent presence of soft budget constraints[61] (e.g., soft government loans to state-owned enterprises, tax offsets, in-kind collection of social contributions), governments shouldering the costs of restructuring of state-owned enterprises arising from payment of severance pay and unemployment benefits; state takeover of social services previously provided by enterprises; payment of subsidies (as social safety nets) to mitigate the burden of higher prices due to price liberalization; and replacement of secure budget transfers from the enterprise sector with a modern tax system whose revenue performance improves only with a lag.[62] In fact, many observers had anticipated that deficits in transition economies would rise with structural reforms, at least for a period. This outcome is attributed to difficulties in reducing government spending combined with revenue shortfalls in the transition to a market-oriented tax system.[63] In fact, the available data indicate that progress on tax reforms and structural reforms go hand in hand. The simple correlation coefficient between a tax reform index and the EBRD structural reform index for a sample of 15 transition economies is quite high (a coefficient of 0.72, with a t-statistic of 3.7).[64] The pickup in revenue performance as a result of these reforms, however, is evident only with a lag.

---

[59] Alesina and others (1999) find a similar result for a group of Latin American countries.

[60] Previous studies of deficit in transition economies have found the opposite result—namely, that progress on structural reforms is associated with lower deficit (e.g., de Melo, Denizer, and Gelb, 1996; and EBRD, 1999b)—but this finding was based solely on the simple correlation coefficient or association between these two variables. In fact, this is exactly the result that we find if we do not condition on other determinants of the fiscal balance.

[61] See Kornai (1986, 1998) and EBRD (1999b).

[62] Using a different specification, Pirttila (2000) also finds that structural reforms, as measured by the EBRD indices, increase deficits.

[63] See Tanzi (1993, 1996), and Aghion and Blanchard (1994); for a recent assessment, see Tanzi and Tsibouris (forthcoming).

[64] The tax reform index is taken from Ebrill and Havrylyshyn (1999).

Higher corruption levels might also be expected to be associated with higher deficits (the cross-sectional regression result confirms the association, but is found to be not statistically significant), as corruption on both sides of tax collection and tax payment may reduce government revenues[65] and as rent-seeking individuals have an incentive to solicit budgetary subsidies and prevent the hardening of soft budget constraints. This is indeed the result one obtains if one simply looks at the correlation coefficient between corruption and the fiscal balance. **However, the regression results reported in Table 10 show that the adverse impact of corruption on the fiscal balance disappears once allowance is made for the impact of structural reforms and other determinants of fiscal balance.**

As in the previous regressions, decomposition analysis of the estimated regressions reveals the relative importance of corruption and structural reforms in explaining the fiscal balance. The results are shown in Tables 11 and 12. Advanced reformers have lower deficits than slow reformers, with a differential of about 3.5 percent of GDP.[66] Given this background and the regression results, the decomposition, based on the panel data regression (Table 11, column 1), shows that **progress on structural reforms decreases the differential in fiscal balance between advanced reformers and slow reformers by about 2.3 percent of GDP. Contribution of corruption is much smaller (about 1.5 percent of the differential) and is lower than the contribution of the variable "years under central planning."** The relative importance of structural reforms increases further in the decomposition based on the cross-sectional regression (Table 11, column 2), to about 3.5 percent, whereas the importance of corruption decreases substantially, to about 0.3 percent. Share of agriculture in GDP accounts for 3 percent of the differential between the two groups of countries.[67] The remaining variables taken together account for about 3.5 percent of the differential.

The decomposition based on the average behavior of each variable is shown in Table 12. **Results show that structural reforms are, on average, the most important factor in accounting for the average behavior of the deficit in the 25 transition economies,** followed by "years under central planning," and share of agriculture in GDP.[68]

---

[65] See Ul Haque and Sahay (1996); Tanzi and Davoodi (1997); and Johnson, Kaufmann, and Zoido-Lobatón (1999).

[66] Other notable features of the two groups of countries, important to the interpretation of decomposition results, are as follows. For advanced reformers as a group, corruption ranking, share of agriculture in GDP, years under central planning, ratio of initial external debt to GDP are all below the averages of slow reformers, whereas structural reform rankings and growth are above the average of slow reformers; in addition, advanced reformers, on average, tend to maintain a fixed exchange rate regime relative to slow reformers.

[67] Share of agriculture in GDP increases the differential fiscal balance, because advanced reformers have a lower share than slow reformers and because agriculture has a positive impact on deficit.

[68] Recall that the impact of structural reforms on deficit can vary by year and country. The reported results are simply averages across countries and over time.

Table 11. Explaining Fiscal Balance Differential Between Advanced Reformers and Slow Reformers 1/
(In percent)

	Panel	Cross Section
	(1)	(2)
Fiscal balance differential (actual)	3.50	3.48
Fiscal balance differential (fitted) due to	3.04	3.39
Corruption index	-1.50	0.31
Structural reform index	-2.29	-3.48
Real per capita GDP growth	0.86	1.15
Agriculture share of GDP	3.07	3.07
Years under central planning	1.58	1.42
Initial external debt-GDP ratio	0.45	0.27
Exchange rate regime	0.87	0.66
Residual	0.46	0.08

Source: Fund staff estimates.

1/ Based on regressions in (3) and (6) in Table 10, and average value of each variable within each country group. Exchange rate regime is a dummy variable, which takes on value 1 when exchange rate regime is fixed and zero otherwise.

Table 12. Fiscal Balance Decomposition Based on All Data 1/
(In percent)

	Panel	Cross Section
	(1)	(2)
Fiscal balance (actual)	-4.41	-4.41
Fiscal balance (fitted) due to	-4.41	-4.41
Constant	14.11	13.17
Corruption index	-2.30	0.44
Structural reform index	-6.96	-9.56
Real per capita GDP growth	0.12	-0.02
Agriculture share of GDP	-3.14	-3.27
Years under central planning	-5.22	-4.47
Initial external debt-GDP ratio	-1.56	-1.09
Exchange rate regime	0.55	0.39
Residual	0.00	0.00

Source: Fund staff estimates.

1/ Based on regressions in (3) and (6) in Table 10, and average value of each variable. Exchange rate regime is a dummy variable, which takes on value 1 when exchange rate regime is fixed and zero otherwise.

D. Foreign Direct Investment

Explaining the pattern of capital flows, particularly foreign direct investment in transition economies, is a complicated task as there are numerous economic, institutional, legal, and political factors that affect investors' choice of countries as well as the volume and timing of their investment. As in the case of the fiscal balance regression, there are no econometric studies of foreign direct investment covering the 25 transition economies, although there are numerous country case studies (e.g., on Russia (Brock, 1998), and on Poland (Floyd, 1996)) and many descriptive studies of the likely factors behind the flow of foreign direct investment (e.g., Lankes and Venables, 1996; EBRD, 1999b).

The approach adopted in this paper builds on Wei (1997a, 1997b, 1999b), who conducted a cross-country study of foreign direct investment with corruption as one explanatory variable, but the specification of the regression in this paper is tailored to take into account specific features of the transition economies. The regression specifies per capita (net) foreign direct investment as a function of natural resource wealth, wage inflation, secondary school enrollment rate, and population. To this regression, the two indices of corruption and structural reforms are added.

Countries with richer natural resource endowments are likely to attract higher flows of foreign direct investment. In the case of transition economies, these countries are primarily Russia, Turkmenistan, Azerbaijan, and Kazakhstan. Wage inflation is included to reflect the cost of labor inputs or more general macrostability factors; therefore, a higher wage inflation is expected to dampen the flow of foreign direct investment. Secondary school enrollment rate is a measure of human capital; a positive coefficient is expected for this variable, as countries with richer human capital are likely to have the complementary skills to work with imported foreign capital. Corruption is expected to deter foreign investment, as in Wei (1997a, 1997b, 1999b) where it serves as an additional tax on foreign investors. Finally, progress on structural reforms is expected to be associated with higher foreign direct investment. The positive impact of structural reforms on foreign direct investment can be justified on many grounds, ranging from structural reforms providing the necessary conditions for the operation of a market-oriented economy, the needed safeguards for the protection of property rights to a sound regulatory environment, and a liberal trade and exchange regime.

The regression results are shown in Table 13. The fitted regressions account for 35 percent and 56 percent of the variation in per capita foreign direct investment in the panel and cross-sectional data, respectively. The sign of each variable generally conforms to prior expectations. Countries with higher per capita foreign direct investment tend to be less corrupt, more advanced on structural reforms, and better endowed with natural resources; they also tend to have lower wage inflation, a higher secondary school enrollment rate,

Table 13. Dependent Variable: Per Capita Foreign Direct Investment
(In U.S. dollars per capita)

Independent Variables	Panel			Cross Section		
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-470.92***	-453.46***	-459.70***	-402.91**	-455.48***	-424.28**
	(-4.19)	(-4.85)	(-4.80)	(-2.13)	(-2.64)	(-2.27)
Corruption index	13.57**		5.07	21.37***		14.12
	(2.30)		(0.77)	(3.53)		(1.47)
Structural reform index		65.27***	71.66***		71.09***	34.52
		(5.86)	(3.83)		(3.73)	(1.21)
Natural resource wealth	63.55***	59.60***	72.80***	53.06***	61.28**	58.80**
	(3.55)	(4.57)	(3.59)	(2.84)	(2.33)	(2.35)
Initial wage inflation	-15.74**	-7.45*	-2.48	-4.86	-5.49	-1.55
	(-2.36)	(-1.62)	(-0.35)	(-0.63)	(-0.74)	(-0.20)
Initial secondary enrollment rate	112.59***	79.64***	71.22***	83.44*	75.96**	74.28*
	(4.45)	(3.97)	(3.36)	(1.97)	(2.00)	(1.84)
Population	-0.68***	-0.74***	-0.88***	-0.52***	-0.76***	-0.64***
	(-4.25)	(-5.79)	(-4.81)	(-2.82)	(-3.73)	(-2.95)
Number of observations	82	120	82	24	24	24
Adjusted R-squared	0.29	0.37	0.35	0.56	0.53	0.56

Source: Fund staff estimates.

Notes: Estimation is by OLS; t-statistics are in parentheses and are based on heteroscedastic-consistent standard errors. Initial wage inflation and initial secondary enrollment rate are in logs. Natural resource wealth is a dummy variable, which takes on value of 1 for Russia, Turkmenistan, Azerbaijan, and Kazakhstan, and zero otherwise.

*** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

and a lower population size.[69] Natural resource wealth, secondary school enrollment rate, and population size are statistically significant at the conventional levels in all regressions. **The structural reform index is significant in the panel data at the 1 percent level, but the corruption index is not significant in either the panel or cross-sectional regressions when the structural reform index is also included.** These results thus indicate that structural reforms are more important than reduced corruption in attracting foreign direct investment.

The decomposition results are shown in Tables 14 and 15. Of the explained $85 per capita foreign direct investment differential between advanced reformers and slow reformers (Table 14, column 1), $14 is due to differences in corruption, $59 due to differences in structural reforms, -$17 due to differences in natural resource wealth,[70] $3 due to differences in wage inflation, $11 due to differences in secondary school enrollment rates, and $14 due to differences in population size. By comparison, the **decomposition results based on cross-sectional regression (Table 14, column 2) show that corruption is more important than structural reforms ($42 vs. $31), although the estimated parameter for either index is not statistically significant in the regression.** The decomposition results based on average data are shown in Table 15. These results indicate that progress on structural reforms, on average, contributes more to foreign direct investment than reducing corruption—about 1.4 to 8 times as important as corruption.

IV. DETERMINANTS OF CORRUPTION

The evidence presented so far indicates that: (1) the statistical significance of corruption is reduced substantially once the structural reform index is added to the regression, (2) the fit of the regression for various measures of economic performance is generally higher with the structural reform index than with the corruption perception index, and (3) structural reforms are economically more important than corruption when both are included in the regression. These results are indirect evidence that structural reforms may be the driving force behind the influence of corruption.

---

[69] These results do not change when the regression also controls for real per capita GDP, years under central planning system, real GDP growth, and GDP as another measure of size. We also added top marginal corporate income tax rate, which was found to be associated with lower foreign direct investment, as in Wei (1997a, 1997b), but these results are tentative because there were few observations on the tax rate variable.

[70] The negative contribution reflects the notion that advanced reformers are not endowed with rich natural resources; therefore, slow reformers tend to attract $17 per capita more than advanced reformers merely because they have a richer natural resource wealth.

Table 14. Explaining Per Capita Foreign Direct Investment Differential
Between Advanced Reformers and Slow Reformers 1/
(In U.S. dollars per capita)

	Panel (1)	Cross Section (2)
Actual differential	95.09	89.41
Fitted differential due to	85.08	79.81
Corruption index	14.50	42.32
Structural reform index	59.47	30.62
Natural resource wealth	-17.04	-11.76
Initial wage inflation	2.94	1.90
Initial secondary enrollment rate	11.05	8.85
Population	14.16	7.88
Residual	10.01	9.60

Source: Fund staff estimates.

1/ Based on regressions in (3) and (6) in Table 13, and average value of each variable, within each country group. Natural resource wealth is a dummy variable, which takes on value of 1 for Russia, Turkmenistan, Azerbaijan, Kazakhstan, and zero otherwise.

Table 15. Decomposition of Per Capita Foreign Direct Investment Based on All Data 1/
(In U.S. dollars per capita)

	Panel (1)	Cross Section (2)
Actual	68.46	56.83
Fitted due to	68.46	56.83
Constant	-459.70	-424.28
Corruption index	25.41	66.36
Structural reform index	199.53	92.17
Natural resource wealth	9.77	7.35
Initial wage inflation	-3.18	-2.29
Initial secondary enrollment rate	313.99	328.03
Population	-17.35	-10.50
Residual	0.00	0.00

Source: Fund staff estimates.

1/ Based on regressions in (3) and (6) in Table 13, and average value of each variable.

In this section, more direct evidence is provided on whether the structural reform index is indeed a possible determinant of corruption, given other factors. Chart 2 shows the fitted cross-sectional regression of the corruption index on the structural reform index. The fitted regression indicates that 74 percent of the cross-country variation in the corruption perception index may be explained by variations in the structural reform index. Furthermore, the chart indicates that countries that are perceived to be less corrupt tend to have made more progress on structural reforms.[71]
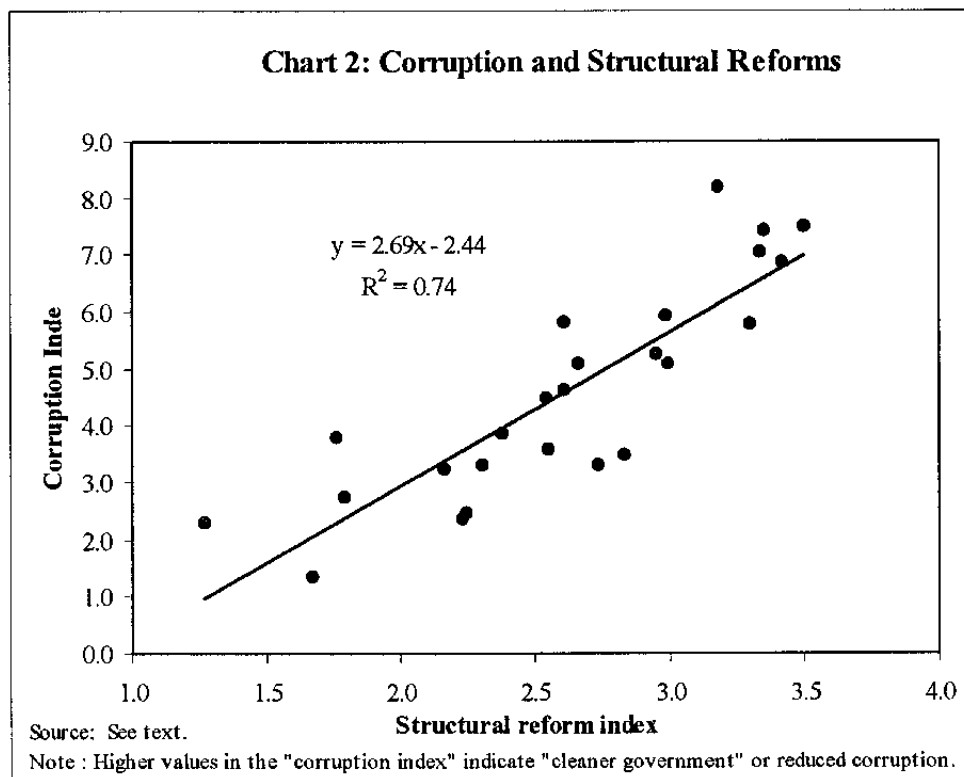
The fitted regression, however, does not control for other factors that may affect corruption. The intention of this section is not to carry out a systematic investigation of the determinants of corruption in transition economies, because this would go beyond the scope of this study; instead, we simply regress the corruption perception index on the structural reform index and five other variables that can be regarded as potential determinants of corruption. This regression is estimated over the period 1994–98, the same sample as in the previous regressions. The five variables are (1) years lived under central planning prior to beginning the reform; (2) per capita GDP; (3) a measure of natural resource wealth; (4) a measure of the decentralized form of government (referred to as "state" below); and (5) the ratio of imports to GDP.[72]

To reduce the problem of simultaneity, we use initial value of all the variables (1994 or earlier), including that of the structural reform index. Thus, all variables are predetermined with respect to the future evolution of corruption. The choice of included variables has been motivated by the recent research on the causes of corruption (Ades and Di Tella, 1999; Treisman, 2000) and our reading of factors specific to transition economies. For example, the number of years that a country lived under a central planning system is a reasonable proxy for an environment that is conducive to corruption and the presence of illicit rent-seeking activities. Therefore, we expect corruption to be higher in countries that lived longer under a central planning system.[73] This variable is likely to determine the pace of structural reforms as well; so its inclusion makes sure that one does not attribute a stronger role to structural reforms than is warranted. Previous research (Ades and Di Tella, 1999; and Treisman, 2000) found that countries with lower corruption tend to have a higher per capita income, a higher ratio of imports to GDP (a proxy for competition with domestic producers), a natural resource-poor economy, and a nonfederal form of government. A natural question of interest is whether similar results are also obtained for the transition economies.

---

[71] Results are the same if a separate chart is done for each year.

[72] Treisman (2000) provides an exhaustive analysis of causes of corruption and uses additional indicators beyond those listed above; however, sufficient data for these indicators are not available for the transition economies.

[73] This variable may also be a reasonable proxy for the "exposure-to-democracy" variable used by Treisman (2000).

Chart 2: Corruption and Structural Reforms

$y = 2.69x - 2.44$

$R^2 = 0.74$

Source: See text.

Note : Higher values in the "corruption index" indicate "cleaner government" or reduced corruption.

The results of the regression for various specifications are shown in Table 16. Column (1) regresses corruption on the structural reform index, years under a central planning system, and initial per capita GDP. Column (2) adds three more variables: a measure of natural resource wealth, "state," and ratio of imports to GDP. Columns (3) and (4) are the same as (1) and (2) except that initial value of the structural reform index is used instead of its current value. These results are then reported for both panel and cross-sectional data. They show that corruption perception index is higher in countries that lived longer under a central planning system,[74] have a lower per capita GDP, and have made slow progress on structural reforms. These variables alone account for about 69 percent and 86 percent of variation in corruption rankings for the panel and cross-sectional data, respectively.[75] The estimated coefficients on each of these variables are all statistically significant at the 1 percent level for either panel data or cross-sectional data. These conclusions still hold when the current value of the

---

[74] This variable is quantitatively important as well. Slow reformers lived, on average, 17 years longer under a central planning system. This translates, given the regression results, into a higher corruption ranking of slow reformers by 0.85 points, large enough to equalize the difference in average corruption rankings between advanced reformers and slow reformers in 1998; see Table 3.

[75] Thus, the addition of just two other variables—years under central planning and initial per capita GDP— to the regression (depicted in Chart 2) increases the adjusted R-squared from 74 percent to 86 percent.

Table 16. Determinants of Corruption

	Panel				Cross Section			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	4.40***	4.39***	4.46***	4.81***	3.03*	3.43	4.04**	5.01*
	(3.38)	(2.85)	(3.21)	(3.15)	(1.99)	(1.22)	(2.34)	(1.97)
Structural reform index	1.05***	1.02***			1.36***	1.32***		
	(3.16)	(2.89)			(3.55)	(2.62)		
Initial structural reform index			0.87***	0.86***			0.97***	0.92**
			(3.07)	(2.99)			(2.67)	(2.19)
Years under central planning	-0.05***	-0.05***	-0.05***	-0.04**	-0.04***	-0.05*	-0.04**	-0.05**
	(-4.81)	(-3.32)	(-3.05)	(-2.41)	(-3.26)	(-1.91)	(-2.29)	(-1.78)
Initial per capita GDP 1/	0.44***	0.45***	0.46***	0.48***	0.42***	0.42***	0.46***	0.47***
	(3.60)	(3.45)	(3.89)	(3.91)	(4.69)	(3.83)	(5.43)	(5.37)
Natural resource wealth		-0.29		-0.41		0.03		-0.19
		(-0.77)		(-1.04)		(0.07)		(-0.37)
State 2/		0.87		-0.10		-0.05		-0.20
		(0.04)		(-0.49)		(-0.15)		(-0.58)
Ratio of imports to GDP 2/		-0.36		-0.81		-0.20		-0.89
		(-0.54)		(-1.40)		(-0.11)		(-0.56)
Number of observations	84	84	84	84	25	25	25	25
Adjusted R-squared	0.69	0.68	0.68	0.67	0.86	0.84	0.83	0.82

Source: Fund staff estimates.

Notes: Estimation is by OLS; t-statistics are in parentheses and are based on heteroscedastic-consistent standard errors. The variable "state" is a categorical and takes a value of 2 if a country was an independent state at the beginning of the reform, 1 if a country was a member of a decentralized federal state (Yugoslav Republics) or was the core state of a centralized federal state (Russia, Czech Republic), 0 otherwise (de Melo and others, 1997). Natural resource wealth is a dummy variable, which takes on value of 1 for Russia, Turkmenistan, Azerbaijan, and Kazakhstan, and zero otherwise.

1/ Coefficients are multiplied by 1,000.
2/ Coefficients are multiplied by 100.

*** significant at 1 percent; ** significant at 5 percent; * significant at 10 percent.

structural reform index is replaced with its value at the beginning of the reform.[76] The structural reform index is quantitatively important as well, because one-half the difference in corruption ranking between advanced and slow reformers is due to differences in structural reforms.[77]

The above results show that progress in structural reforms reduces corruption and the regressions results in Section III have shown that lower corruption in general tend to improve economic performance, although not as much as structural reforms. We can now calculate the indirect impact of structural reforms (through corruption given in Table 16), and compare the results with its direct impact for each measure of economic performance as measured in Section III.[78] Following the main theme of the paper, the idea is to ascertain if the indirect impact is as quantitatively significant as the direct impact.[79] The indirect contribution combines the information from the regression results in Section IV with those in Section III.

The combined direct and indirect impact is calculated assuming that the structural reform index would increase by 0.25. This value seems to be reasonable since it represents the average increase in the structural reform index for slow reformers over the period 1994–98 and the average value of the standard deviation of slow reformers. In a sense, we are assuming that slow reformers on average maintain their recent pace of structural reforms. The results of this exercise are shown in Table 17. They indicate that the indirect contribution of structural reforms is economically significant for two variables: growth and foreign direct investment. Real per capita GDP growth would be higher on average by about 0.35 percentage points, a significant result, given the slow reformers' average real per capita GDP growth of -2.57 percent. In addition, per capita foreign direct investment of slow reformers would be higher by US$5, a significant increase given their average per capita foreign direct investment of US$23.

---

[76] As regards other variables, corruption is higher in countries with rich natural resources, although the effect is not statistically significant. The other two variables, state and ratio of imports to GDP, have no relation to corruption and have signs that are different from previous studies.

[77] This is based on point estimate of the structural reform index given in Table 16, column (5), and on average values of corruption and structural reform indices given in Tables 2 and 3.

[78] The indirect impact is calculated by multiplying the coefficient on the structural reform index in Table 16 by 0.25 and by the coefficient on the corruption index for each regression in Tables 4, 7, 10, and 13.

[79] This analysis holds other variables constant and does not take account of the indirect effects of structural reforms through these variables. Allowing for these additional factors will tend to increase the indirect contribution of structural reforms, given the results in Section III.

Table 17. Direct and Indirect Contribution of Structural Reforms to Economic Performance

Measure of Economic Performance	Panel			Cross Section		
	Direct 1/	Indirect 2/	Total 3/	Direct 1/	Indirect 2/	Total 3/
Real per capita GDP growth rate (percent)	1.20	0.35	1.55	1.37	0.36	1.73
Inflation (percent)	-0.14	0.00	-0.14	-0.22	-0.01	-0.23
Fiscal balance (percent of GDP)	-0.65	-0.12	-0.77	-0.91	0.03	-0.88
Foreign direct investment (U.S. Dollars per capita)	17.92	1.33	19.25	8.63	4.80	13.43

Source: Fund staff estimates.

Notes: The estimates in the table show the impact of improving the structural reform index by 0.25.

1/ From Tables 4, 7, 10, and 13.
2/ From Tables 4, 7, 10, 13, and 16.
3/ Sum of direct and indirect contributions.

V. CONCLUSION

With reference to the various studies that have shown the adverse impact of corruption on economic performance, this paper has sought to probe deeper by identifying the underlying conditions that give rise to corruption in transition economies. The paper considers corruption to be mostly, but not entirely, a symptom of underlying policy distortions and weak economic institutions, thereby anchoring anticorruption strategies firmly in the context of structural and institutional reforms. Indeed, when the importance of corruption is tested against that of structural reforms in explaining economic performance, at least for the transition economies, the explanatory power of corruption, as measured by the widely used corruption perception indices, is found to be relatively minor. Relying both on regression and decomposition analyses, this paper finds that progress on structural reforms—defined broadly to comprise the rationalization of state functions, reliance on market-based pricing, and the establishment of a sound regulatory environment—is both statistically more significant and economically more important than corruption in explaining differences in economic performance as reflected in growth, inflation, the fiscal balance, and foreign direct investment. Furthermore, this paper provides direct evidence that structural reform is an important factor in lowering corruption levels, given other factors that influence corruption. By reducing corruption, structural reforms are also shown to significantly increase economic growth and foreign direct investment above and beyond any direct effects.

Clearly, the increased attention to corruption and its adverse impact on economic performance has been helpful in stimulating a broader discussion of economic reform. However, to enhance the usefulness of recent studies of corruption in the formulation of economic policy, these studies would need to probe deeper into the link between corruption and the underlying weaknesses in policies and institutions. By shedding more light on the mechanisms by which such weaknesses create opportunities for illicit rent seeking and abuse of authority, the study of corruption can lead to the design of specific institutional and structural reform measures to underpin a credible anticorruption strategy. This paper has

sought to probe this vital link, and, although the analysis is applied to the transition economies, the validity of the results is likely to hold in a wider context and merits further study.

If structural reforms are indeed more important to economic performance than reducing corruption, why have they received less attention in recent studies? And, more important, why have these reforms not been undertaken more vigorously in the transition and other economies even though great interest has been shown in the fight against corruption? Regarding the first question, it may be that the study of "corruption" is more appealing as a topic of analysis or public discourse than "structural reforms." It may also be that the wider availability of corruption perception indices for an increasing number of countries has stimulated economists' interest in studying the relationship between corruption and economic performance. One implication of this analysis would be to call for greater effort toward assessing and measuring structural reforms.[80]

The answer to the second question must lie, at least in part, in a political economy argument. Implementation of structural reforms tend to be slow and difficult, in part because the vested interests associated with the status quo are usually stronger and more vocal than those allied with a reformed, if yet untested, state of affairs. It is important to emphasize, however, that once these reforms are initiated and sustained, they tend to reduce opportunities for corruption and increase prospects for better economic performance. Clearly, much has been written on the political economy of embracing structural reforms, the role of a committed leadership in spearheading such reforms, and the influence of international institutions. Further analysis of these issues is certainly called for, at least in the context of transition economies. However, such probing would go beyond the scope of this paper.

---

[80] Bredenkemp and Schadler (1999) construct a structural reform index for 30 low income countries participating in the Enhanced Structural Adjustment Facility of the IMF.

Bibliography

Abed, George, 1998, "Governance and the Transition Economies," paper presented at the conference sponsored by the Kyrgyz Republic and the IMF on "Challenges to the Economies in Transition: Stabilization, Growth, and Governance," Bishkek, Krygyz Republic, May.

Ades, Alberto, and Rafael Di Tella, 1999, "Rents, Competition, and Corruption," *American Economic Review*, Vol. 89 (September), pp. 982–93.

Aghion, Phillipe, and Olivier Blanchard, 1994, "On the Speed of Adjustment in Central Europe," in *NBER Macroeconomics Annual*, Vol. 9, ed. by S. Fischer and J. Rotemberg (Cambridge, Massachusetts: MIT Press), pp. 284–320.

Alesina, Alberto, Ricardo Hausmann, Rudolf Hommes, and Ernesto Stein, 1999, "Budget Institutions and Fiscal Performance in Latin America," *Journal of Development Economics*, Vol. 59 (August), pp. 253–73.

Al-Marhubi, Fahim, 2000, "Corruption and Inflation," *Economics Letters*, Vol. 66 (February), pp. 199–202.

Barbone, Luca, and Hana Polackova, 1996, "Public Finances and Economic Transformation," *MOCT-Most, Economic Policy in Transition*, Vol. 6, pp. 35–61.

Becker, Gary S., 1968, "Crime and Punishment: An Economic Approach," *Journal of Political Economy*, Vol. 76 (March/April), pp. 169–217.

Berg, Andrew, Eduardo Borensztein, Ratna Sahay, and Jeromin Zettelmeyer, 1999, "The Evolution of Output in Transition Economies: Explaining the Differences," IMF Working Paper 99/73 (Washington: International Monetary Fund).

Braun, Miguel, and Rafael Di Tella, 2000, "Inflation and Corruption" (unpublished; Cambridge, Massachusetts: Harvard University).

Bredenkemp, Hugh, and Susan Schadler, 1999, *Economic Adjustment and Reform in Low-Income Countries* (Washington: International Monetary Fund).

Brock, Gregory J., 1998, "Foreign Direct Investment in Russia's Regions, 1993–95: Why So Little and Where Has it Gone?" *Economics of Transition*, Vol. 6 (November), pp. 349–60.

Brunetti, Aymo, Gregory Kisunko, and Beatrice Weder, 1997, "Institutions in Transition: Reliability of Rules and Economic Performance in Former Socialist Countries," World Bank Policy Research Working Paper No. 1809 (Washington: World Bank).

————, 1998, "Credibility of Rules and Economic Growth: Evidence from a Worldwide Survey of the Private Sector," *World Bank Economic Review*, Vol. 12 (September), pp. 353–84.

Brunetti, Aymo, and Beatrice Weder, 1999, "A Free Press is Bad News for Corruption," Discussion Paper No. 9809 (Basel, Switzerland: University of Basel).

Campillo, Marta, and Jeffrey Miron, 1996, "Why Does Inflation Differ Across Countries?" NBER Working Paper No. 5540 (Cambridge, Massachusetts: National Bureau of Economic Research).

Caramazza, Francisco, and Jahangir Aziz, 1998, "Fixed or Flexible, Getting the Exchange Rate Right in the 1990s," *Economic Issues*, No. 13 (April) (Washington: International Monetary Fund).

Central European Economic Review, 1995–96, "The Great Growth Race," Vol. 3 (December-January), pp. 8–14.

————, 1997–98, "Welcome to the World," Vol. 5, pp. 14–21.

Cheasty, Adrienne, and Jeffrey M. Davis, 1996, "Fiscal Transition in Countries of the Former Soviet Union: An Interim Assessment," *MOCT-Most, Economic Policy in Transition*, Vol. 6, pp. 7–34.

Cottarelli, Carlo, Mark Griffiths, and Reza Moghadam, 1998, "The Nonmonetary Determinants of Inflation: A Panel Data Study," IMF Working Paper 98/23 (Washington: International Monetary Fund).

Crotty, John, 1997, "Measures to Address Corruption Problems in Tax and Customs Administrations," paper presented at the Eighth International Anti-Corruption Conference, in Lima, Peru, September.

de Melo, Martha, Cevdet Denizer, and Alan Gelb, 1996, "From Plan to Market: Patterns of Transition Countries," *World Bank Economic Review*, Vol. 10 (September), pp. 397–424.

————, and Stoyan Tenev, 1997, "Circumstance and Choice: The Role of Initial Conditions and Policies in Transition Economies," Policy Research Working Paper No. 1866 (Washington: World Bank).

Easterly, William, and Ross Levine, 1997, "Africa's Growth Tragedy: Policies and Ethnic Divisions," *Quarterly Journal of Economics*, Vol. 112 (November), pp. 1203–50.

Ebrill, Liam, and Oleh Havrylyshyn, 1999, *Tax Reform in the Baltics, Russia, and Other Countries of the Former Soviet Union*, IMF Occasional Paper No. 182 (Washington: International Monetary Fund).

Ehrlich, Isaac, and Francis T. Lui, 1999, "Bureaucratic Corruption and Endogenous Growth," *Journal of Political Economy*, Vol. 107, pp. S270–93.

European Bank for Reconstruction and Development, 1999a, *Transition Report Update* (London).

———, 1999b, *Transition Report* (London).

Fischer, Stanley, and Ratna Sahay, 2000, "The Transition Economies After Ten Years," IMF Working Paper 00/30 (Washington: International Monetary Fund).

———, and Carol A. Vegh, 1998, "From Transition to Market: Evidence and Growth Prospects," IMF Working Paper 98/52 (Washington: International Monetary Fund).

Floyd, David, 1996, "Foreign Direct Investment in Poland: Is Low Cost Labor Really the Sole Determinant?" *Economic Issues*, Vol. 1 (September), pp. 29–39.

Garamfalvi, Laszlo, 1997, "Corruption in the Public Expenditure Management Process," paper presented at the Eighth International Anti-Corruption Conference in Lima, Peru, September.

Goel, Rajeev K., and Michael A. Nelson, 1998, "Corruption and Government Size: A Disaggregated Analysis," *Public Choice*, Vol. 97 (October), pp. 107–220.

Gupta, Sanjeev, Hamid Davoodi, and Rosa Alonso-Termé, 1998, "Does Corruption Affect Income Inequality and Poverty?" IMF Working Paper 98/76 (Washington: International Monetary Fund).

Havrylyshyn, Oleh, Ivailo Izvorski, and Ron van Rooden, 1998, "Recovery and Growth in Transition Economies, 1990–97: A Stylized Regression Analysis," IMF Working Paper 98/141 (Washington: International Monetary Fund).

Havrylyshyn, Oleh, and others, 1999, *Growth Experience in Transition Countries, 1990–98*, IMF Occasional Paper No. 184 (Washington: International Monetary Fund).

Havrylyshyn, Oleh, and Ron van Rooden, 2000, "Institutions Matter in Transition, But So Do Policies," IMF Working Paper 00/70 (Washington: International Monetary Fund).

Heidenheimer, Arnold J., Michael Johnston, and Victor T. LeVine, eds., 1999, *Political Corruption: A Handbook* (New Brunswick and London: Transaction Publishers).

Hernandez-Cata, Ernesto, 1997, "Liberalization and the Behavior of Output During the Transition from Plan to Market," *Staff Papers*, International Monetary Fund, Vol. 44 (December), pp. 405–29.

Hindriks, Jean, Michael Keen, and Abhinay Muthoo, 1999, "Corruption, Extortion and Evasion," *Journal of Public Economics*, Vol. 74 (December), pp. 395–430.

Hines, James R., Jr., 1995, "Forbidden Payment: Foreign Bribery and American Business After 1997," NBER Working Paper No. 5266 (Cambridge, Massachussetts: National Bureau of Economic Research).

Huntington, Samuel, 1968, *Political Order in Changing Societies* (New Haven, Connecticut: Yale University Press).

Johnson, Simon, Daniel Kaufmann, and Andrei Shleifer, 1997, "The Unofficial Economy in Transition," *Brookings Papers on Economic Activity: 2*, Brookings Institution, pp. 159–239.

Johnson, Simon, Daniel Kaufmann, and Pablo Zoido-Lobatón, 1999, "Corruption, Public Finances and the Unofficial Economy," World Bank Discussion Paper Series No. 2169 (Washington: World Bank).

Kaufmann, Daniel, Aart Kraay, and Pablo Zoido-Lobatón, 1999a, "Aggregating Governance Indicators," World Bank Discussion Paper Series No. 2195 (Washington: World Bank).

———, 1999b, "Governance Matters," World Bank Discussion Paper Series No. 2196 (Washington: World Bank).

Klitgaard, Robert, 1988, *Controlling Corruption* (Berkeley: University of California Press).

———, 1997, "Cleaning up and Invigorating the Civil Service," *Public Administration and Development*, Vol. 17 (December), pp. 487–509.

Kornai, Janos, 1986, "The Soft Budget Constraint," *Kyklos*, Vol. 39, pp. 3–30.

———, 1998, "The Place of the Soft Budget Constraint Syndrome in Economic Theory," *Journal of Comparative Economics*, Vol. 26 (March), pp. 11–17.

Lambsdorff, J. G., 1998, "Corruption in Comparative Perception," in *Economics of Corruption*, ed. by Arvind K. Jain (Boston: Kluwer Academic Publishers).

Langseth, Petter, Rick Stapenhurst, and Jeremy Pope, 1999, "National Integrity Systems," in *Curbing Corruption: Toward a Model for Building National Integrity*, ed. by Rick Stapenhurst and Sahr J. Kpundeh (Washington: World Bank).

Lankes, Hans-Peter, and A. J. Venables, 1996, "Foreign Direct Investment in Economic Transition: The Changing Pattern of Investments," *Economics of Transition*, Vol. 4 (October), pp. 331–47.

Leff, Nathaniel, 1964, "Economic Development Through Bureaucratic Corruption," *American Behavioral Scientist*, Vol. 8 (November), pp. 8–14.

Mauro, Paulo, 1995, "Corruption and Growth," *Quarterly Journal of Economics*, Vol. 110 (August), pp. 681–712.

Mercer-Blackman, Valerie, and Anna Unigovskaya, 2000, "Compliance with IMF Program Indicators and Growth in Transition Economies," IMF Working Paper 00/47 (Washington: International Monetary Fund).

Myrdal, Gunar, 1968, *Asian Drama: An Inquiry into the Poverty of Nations* (New York: Pantheon).

Obstfeld, Maurice, 1985, "Floating Exchange Rates: Experience and Prospects," *Brookings Papers on Economic Activity: 2*, Brookings Institution, pp. 369–450.

Ofosu-Amaah, Paatii W., Raj Soopramanien, and Kishor Uprety, 1999, *Combating Corruption: A Comparative Review of Selected Legal Aspects of State Practices and Major International Initiatives* (Washington: World Bank).

Pirttila, Jukka, 2000, "Fiscal Balance and Structural Reforms in Transition Economies: An Empirical Analysis" (unpublished; Bank of Helsinki).

Political Risk Services, International Country Risk Guide (CD-Rom version); access via the Joint Bank-Fund Library Network Website, http://Jolis.

Pope, Jeremy, 1999a, "Elements of a Successful Anticorruption Strategy," in *Curbing Corruption: Toward a Model for Building National Integrity*, ed. by Rick Stapenhurst and Sahr J. Kpundeh (Washington: World Bank).

———, 1999b, "Enhancing Accountability and Ethics in the Public Sector," in *Curbing Corruption: Toward a Model for Building National Integrity*, ed. by Rick Stapenhurst and Sahr J. Kpundeh (Washington: World Bank).

Rauch, James E., and Peter B. Evans, 2000, "Bureaucratic Structure and Bureaucratic Performance in Less Developing Countries," *Journal of Public Economics*, Vol. 75 (January), pp. 49–71.

Rose-Ackerman, Susan, 1978, *Corruption: A Study in Political Economy* (New York: Academic Press).

———, 1999, *Corruption and Government: Causes, Consequences, and Reform* (Cambridge, England: Cambridge University Press).

Sala-i-Martin, 1997, "I Just Ran Two Million Regressions," *American Economic Review, Papers and Proceedings,* Vol. 87 (May), pp.178–83.

Shleifer, Andrei, and Robert Vishny, 1993, "Corruption," *Quarterly Journal Of Economics,* Vol. 108 (August), pp. 599–617.

Stotsky, Janet, and Asegedech WoldeMariam, 1997, "Tax Effort in Sub-Saharan Africa," IMF Working Paper 97/107 (Washington: International Monetary Fund).

Tanzi, Vito, 1987, "Quantitative Characteristics of the Tax Systems of Developing Countries," in *The Theory of Taxation for Developing Countries,* ed. by David M.G. Newbery and Nicholas Herbert Stern (New York: Oxford University Press).

———, 1993, "The Budget Deficit in Transition," *Staff Papers,* International Monetary Fund, Vol. 40 (September), pp. 697–707.

———, 1995, "Corruption, Arm's-Length Relationships, and Markets," in *The Economics of Organized Crime,* ed. by Gianluca Fiorentini and Sam Peltzman (Cambridge, England: Cambridge University Press).

———, 1996, "Fiscal Developments: An Overview," *MOCT-Most, Economic Policy in Transition,* Vol. 6, pp. 1–5.

———, 1998, "Corruption Around the World: Causes, Consequences, Scope and Cures," *Staff Papers,* International Monetary Fund, Vol. 45 (December), pp. 559–94.

———, 2000, "The Role of the State and the Quality of the Public Sector" (unpublished; Washington: International Monetary Fund).

———, and Hamid Davoodi, 1997, "Corruption, Public Investment and Growth," IMF Working Paper 97/139 (Washington: International Monetary Fund).

Tanzi, Vito, and George Tsibouris, forthcoming, "Fiscal Reform Over Ten Years of Transition," in The Proceedings of the Fifth Dubrovnik Conference on Transition Economies.

Transparency International, "Corruption Perception Indices," available via Internet, http://www.transparency.de.

Treisman, Daniel, 2000, "The Causes of Corruption: A Cross-National Study," *Journal of Public Economics,* Vol. 76 (June), pp. 399–458.

Ul Haque, N., and Ratna Sahay, 1996, "Do Government Wage Cuts Close Budget Deficits? Costs of Corruption," *Staff Papers,* International Monetary Fund, Vol. 43 (December), pp. 754–78.

Van Rijckeghem, Caroline, and Beatrice Weder, 1997, "Corruption and Rate of Temptation: Do Low Wages in the Civil Service Cause Corruption?" IMF Working Paper 97/93 (Washington: International Monetary Fund).

Wade, Robert, 1982, "The System of Administrative and Political Corruption: Canal Irrigation in South India," *Journal Of Development Studies,* Vol. 18 (April), pp. 287–328.

Wagner, Helmut, 1998, "Central Banking in Transition Countries," IMF Working Paper 98/126 (Washington: International Monetary Fund).

Weber, Max, 1947, *The Theory of Social and Economic Organization* (London: Free Press of Glencoe).

Wei, Shang-jin, 1997a, "How Taxing is Corruption on International Investors?" NBER Working Paper No. 6030 (Cambridge, Massachusetts: National Bureau of Economic Research).

———, 1997b, "Why is Corruption So Much More Taxing Than Tax?" NBER Working Paper No. 6255 (Cambridge, Massachusetts: National Bureau of Economic Research).

———, 1999a, "Corruption in Economic Development: Beneficial Grease, Minor Annoyance, or Major Obstacle," World Bank Discussion Paper Series No. 2048 (Washington: World Bank).

———, 1999b, "Does Corruption Relieve Foreign Investors of the Burden of Taxes and Capital Controls?" Policy Research Working Paper No. 2209 (Washington: World Bank).

Wolf, Thomas, and Emine Gürgen, 2000, "Improving Governance and Fighting Corruption in the Baltic and CIS Countries: The Role of the IMF," IMF Working Paper 00/1 (Washington: International Monetary Fund).

World Bank, 1997, *World Development Report 1997: The State in a Changing World* (NewYork: Oxford University Press).

———, 1999, World Development Indicators Database.