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ABSTRACT

Monetary Policy and the Rule of Law*

The translation of legal independence into actual independence is primarily determined by the rule of law. Inspired by the economic growth literature, where the role of institutions already is incorporated, we introduce Institutional Quality Indicators that can be used as reasonable proxies for the rule of law in a country. This idea can be seen as an important extension of the existing empirical research about the relationship between inflation and the institutional design of monetary institutions. With the rule of law factor we will get a better expression of effective central bank independence. Transition economies like former socialist economies in Europe are interesting candidates for the examination of the relationship between the rate of inflation, central bank reforms and the transition process. Legal Transition Indicators will be used as proxy for the rule of law in these countries. The liberalization process seems to be an important condition for the effectiveness of legal central bank independence. With the Cumulative Liberalization Index we incorporate the liberalization process into our analysis.

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1. Introduction

Over the past decades two important changes have taken place in the approach to monetary policymaking with significant consequences for the design of monetary institutions. One change is the increased quest for *price stability* as primary goal of monetary policy. Due to negative experiences of stagflation in the 1970s, negative economic performance of some high-inflation countries like in Latin America in the 1980s and the fast growth of the international capital market in the 1990s a worldwide conviction arises that monetary stability is a necessary condition for long term economic growth.

The second important change is the trend of upgrading the legal independence of the central bank which operates completely autonomely without any interference of the government. Eijffinger and De Haan (1996) give five reasons of the attention for this *legislative approach*. First, the breakdown of institutions to safeguard price stability, like the Bretton Woods system and the European Monetary System (EMS) for example, has led countries to search for alternatives. Second, the success of the Bundesbank as a highly independent central bank is seen as an evidence that central bank independence is an effective institutional device for assuring price stability. Third, the Maastricht Treaty requires an independent central bank as a precondition for membership in the European and Monetary Union (EMU). Fourth, Latin American countries are looking for institutional arrangements that can reduce the likelihood of a return to high and persistent inflation. Fifth, in many former socialist countries the creation of an independent central bank forms a part of a more general attempt to create an institutional framework needed for a well-functioning market economy.

Credibility plays a key role in the actual debate between political and monetary authorities about the optimal institutional design of monetary policy. In times of financial innovations and liberalized financial markets credibility remains the only effective instrument for monetary policy in achieving price stability. The question is whether an independent central bank with an explicit mandate to assure price stability can guarantee credibility in monetary policy. Although legal arrangements are a necessary condition for central bank independence, the translation of these legal arrangements into *actual* practice is much more important. Only the actual practice determines the *effectiveness* of central bank independence in order to achieve price stability. This translation mainly depends on the general *rule of law* in a country. The interrelationship between central bank independence, the rule of law and inflation will be investigated in this paper.

Inspired by the economic growth literature, where the role of institutions already is incorporated, we introduce Institutional Quality Indicators which can be used as reasonable proxies for the rule of law in a country. This idea can be seen as an important extension of the existing empirical research about the relationship between central bank independence and inflation.

The structure of this paper is organized as follows. Section 2 presents three Institutional Quality Indicators (IQIs) and examines the potential relationship between these indicators with central bank independence and inflation in *developed* (industrialized) and *developing* countries. The IQIs are: Repudiation of Contracts by Government, Rule of Law and Bureaucratic Quality. All these indicators have to deal with the *credibility* of governments to protect property rights and enforcements of contracts and may be a good proxy for the rule of law in a country.

In section 3 a close look is taken to the relation between central bank independence and inflation in *transition economies*. The interaction of the transition process in terms of liberalization on

the effectiveness of central bank independence in these countries will be examined. The European Bank for Reconstruction and Development (EBRD) has constructed Legal Transition Indicators which measure the quality of commercial legislation in transition economies by using two criteria: the *extensiveness* and *effectiveness* of commercial legislation. The overall indicator is an unweighted average of these two criteria. These indicators are used as a proxy for the rule of law in transition economies. The impact of liberalization, institutional quality and central bank independence will be investigated at the end of this section.

Section 4 presents a summary and concluding remarks.

2. Central bank independence and institutional quality

The empirical case for central bank independence (CBI) is well documented in the academic literature. The main conclusion from the empirical studies is that, on average, countries with a high level of CBI have lower and more stable rates of inflation in both developed and developing countries. Indeed only an independent central bank can give full priority to low levels of inflation above other considerations such as employment, re-election perspectives of politicians, financing the budget deficit of the government, etc.

The autonomy of the central bank is not easy to quantify. Therefore most empirical research has focused on *legal* aspects of CBI. But what really matters is the level of *actual* independence. For industrial countries legal independence may be a better proxy for actual independence than for developing countries because in industrial countries the spirit of the law is taken more seriously. For the measurement of CBI in developing countries some more behaviourally-oriented indicators have been developed.

What matters is the *actual* independence of the central bank. In other words only the actual practice of central bank independence determines the *effectiveness* of monetary policy to assure price stability. Forder (1996) critized the relevance of independence measures which are based on legal regulations. He argued: “There is no theory that says it matters what rules say. There is only a theory that says it matters what *behaviour* is.” Legal independence is a necessary but not sufficient condition for a truly independent central bank and can be seen as a fundamental basis for building the institutional climate needed for actual independence [Cukierman (1998)].

The translation from legal independence into actual independence is primarily determined by the *compliance with the law* or the *rule of law* in a country. The main objective in this section is the investigation of the impact of the rule of the law factor on inflation and CBI. This will be done by Institutional Quality Indicators as proxy for the rule of law. These Institutional Quality Indicators measure the quality of the legal, political and regulatory framework in a country. When a country has a well developed and credible institutional framework, the rule of law is expected to be relatively higher than in countries with an inadequate legal, political and regulatory framework. Thus the rule of law seems to be directly related to the quality of a country’s institutional environment.

The analysis in this section is basically inspired by the work of Keefer and Knack (1997). These authors employ some Institutional Quality Indicators not previously used in the empirical growth literature. They show that a well developed institutional environment is an important condition for economic growth. Because of lacking institutional frameworks poor countries are not able to

convergence to the more advanced countries. In other words poor countries are falling back rather than catching up.[4]

Following Knack (1996) it is important that governments actively protect property and enforce contracts between private parties as well as refrain from predatory actions undermining the incentives to save, produce and invest. With no *credible* constraints preventing government from being a source of insecurity, firms will have relatively short time horizons and will invest little in fixed capital. Hence it is very crucial to have a credible government. Keefer and Knack (1997) show that various Institutional Quality Indicators are each significantly related to per capita income growth. Furthermore, statistical evidence suggests that per capita growth is more sensitive to these measures at lower levels of initial income.

Several measures from three different sources of data are tested by means of a sensitivity analysis.[5] These measures consist objective evaluations, comparable across countries and over time, of the institutions that protect property and contractual rights. Because of their performance three Institutional Quality Indicators (IQIs) have been selected:[6]

?? Repudiation of Contracts by Government (REP):
This measure indicates the "risk of a modification in a contract taking the form of a repudiation, postponement, or scaling down" due to "budget cutbacks, indigenization pressure, a change in government, or a change in government economic and social priorities".

?? Rule of Law (ROL):
This measure "reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes." Higher scores indicate "sound political institutions, a strong court system, and provisions for an orderly succession power". Lower scores indicate "a tradition of depending on physical force or illegal means to settle claims." Upon changes in government in countries scoring low on this measure, new leaders "may be less likely to accept the obligations of the previous regime."

?? Bureaucratic Quality (BUQ):
High scores indicate "autonomy from political pressure" and "strength and expertise to govern without drastic changes in policy or interruptions in government services"; also the existence of an "established mechanism for recruiting and training."

[4] The neoclassical hypothesis yields that poor countries should grow faster than rich ones (catching up) because of the assumption of diminishing returns to physical capital, which should cause more advanced countries to grow more slowly than less advanced countries, and the fact that less developed countries could take advantage of technological advances.

[5] The measures are provided by two independent international investor risk services (International Country Risk Guide and Business Environmental Risk Intelligence) and by the ICPSR (Inter-university Consortium for Political and Social Research) who produced the Polity III dataset.

[6] These indicators are all from the IRIS dataset of the International Country Risk Guide.

The IQIs are calculated every year for a broad range of countries.[7] The scales of the Institutional Quality Indicators are normalized. A higher score means a better institutional quality and a lower score corresponds with a lack of quality of the institutional environment. The sample group of countries contains both developed and developing countries and the sample period is 1980 – 1989. For the IQIs the median value is taken, i.e. the average value of 1984 and 1985. The IQIs are characterized by a low time variance. This means that the values of the IQIs are relatively stable over time.

Two cases will be investigated. The first case is the investigation of a possible interaction effect between legal CBI and institutional quality. This implies that an upgrading of legal CBI will be more effective in reducing inflation when the quality of the institutional environment is better. If an interaction between legal CBI and the institutional quality indicators exists, the IQIs can be used to construct a measure for *actual* CBI by correcting the indicator of legal CBI with the IQIs. The result is an expression of *effective* CBI. The second case is the investigation of the relationship between inflation and the quality of institutions as a separate variable in the regressions. The sample group would be both developed and developing countries.

The regression equations that will be analized yield:

(1) $D = \beta_0 + \beta_1 Q_i LVAU + \beta_2 TOR + \varepsilon$

(2) $D = \beta_0 + \beta_1 LVAU + \beta_2 Q_i + \beta_3 TOR + \varepsilon$

Where:

D	= the average depreciation in the real value of money in 1980 – 1989;
Qi	= the Institutional Quality Indicator (i = REP, ROL, BUQ or a combination of those);
LVAU	= the indicator of legal central bank independence (the unweighted Cukierman-index);
TOR	= the turnover rate;
?	= a dummy variable with value 1 if TOR > 0.25 and value 0 if TOR ? 0.25;
Qi*LVAU	= the interaction term: the product of Qi and LVAU.

In the sensitivity analysis the rate of inflation is expressed as the average rate of depreciation in the real value of money rather than the average inflation. This variable can be defined as:

(3) $D_t = 1 - \frac{1}{1+\pi_t} = \frac{\pi_t}{1+\pi_t}$

Where:

D_t = the rate of depreciation in the real value of money in year t;

π_t = the rate of inflation in year t.

[7] The REP, ROL and BUQ are all from IRIS time series data, constructed by the IRIS centre (centre for Institutional Reform and the Informal Sector), from data printed from the International Country Risk Guide (ICRG).

Following Cukierman (1992) the choice of D as an expression for inflation is dictated by two considerations. First, the real losses on holding of money balances are better represented by D than by ?. At low rates of inflation the divergence between D and ? is negligible, but at high rates of inflation the divergence becomes more significant. Second, the use of D moderates the effects of outliers on the regression results due to countries with hyperinflation. This is important in the case of countries with wide variations in inflation like developing countries and transition economies.

The turnover rate is used as a control variable. Because the sample group of countries contains both developed and developing countries, a dummy variable is included into the regressions. The main reason for this is, that the turnover rate is a good measure of actual independence when its value exceeds a particular threshold. The cut-off value of 0.25 is chosen to increase the goodness of fit (adjusted R^2). This threshold implies 0.25 turnovers per annum, or an average tenure of four years seems reasonable in the view of the average length of the election cycle of four years.

The individual impact of the IQIs on D will be investigated by splitting the interaction variable into their two components: LVAU and Qi. This will be done in the second regression.

Table 1 presents the results of the regressions. First the individual IQIs are examined. Then two or more IQIs are combined. Regression (1) is the benchmark regression where the relation between D, LVAU and TOR is checked for both developed and developing countries. The indicator of legal CBI seems to be insignificant in the benchmark regression. However the TOR is significantly and positively related with D.

When only the individual IQIs are taken in consideration (REP, ROL and BUQ) the interaction variable (Qi*LVAU) is in all cases not significant. But in comparison with the LVAU in the benchmark regression the levels of significance improve, the coefficient gets a negative sign and the adjusted R^2 increases when LVAU is multiplied by Qi. The interaction with ROL performs the best with a goodness of fit of 0.37.

When two or three IQIs are combined both the levels of significance of the interaction variable and the adjusted R^2 improve further. Except for the combination REP and BUQ all interaction variables become negatively and significantly related with D. This implies that the combination of IQIs delivers a better measurement of the general *rule of law* in a country.

In regression (2) the interaction variable is split in LVAU and Qi. In all cases the adjusted R^2 increases in comparison with the first regression. LVAU stays insignificant and has a positive sign. The IQIs (alone and combined) show a significant and negative relation with D. This means that the quality of the institutional environment *does* matter.

This result can be illustrated with the case of Japan. Looking at the LVAU Japan is characterized with a relatively low level of legal CBI during the eighties. But the institutional quality is relatively high. The IQIs for Japan all have a value near to one.[8] Due to the high quality of the institutional environment Japan reached one of the lowest average rates of inflation during the eighties.[9] A high level of IQI may compensate a low level of legal CBI.

[8] The values of REP, ROL and BUQ are respectively 0.91, 0.83 and 1.

[9] The average D of Japan during the eighties was 0.02 while Germany had an average D of 0.03.

Table 1 Central bank independence and the quality of the institutional environment								
Dependent variable: D								
	Type	**Constant**	**TOR**	**LVAU**	**Qi**	**Qi * LVAU**	**Adj. R^2**	**N**
Benchmark		-0.06	**0.41**	0.10			0.32	44
		(0.32)	**(0.00)**	(0.54)				
i = REP	**(1)**	**0.16**	**0.38**			-0.24	0.35	44
		(0.00)	**(0.00)**			(0.14)		
	(2)	**0.30**	**0.27**	0.07	**-0.32**		0.46	44
		(0.00)	**(0.01)**	(0.62)	**(0.00)**			
i = ROL	**(1)**	**0.16**	**0.39**			-0.26	0.37	44
		(0.00)	**(0.00)**			(0.06)		
	(2)	**0.19**	**0.34**	0.12	**-0.21**		0.44	44
		(0.01)	**(0.00)**	(0.42)	**(0.00)**			
i = BUQ	**(1)**	**0.15**	**0.39**			-0.21	0.35	44
		(0.00)	**(0.00)**			(0.12)		
	(2)	**0.18**	**0.34**	0.09	**-0.17**		0.40	44
		(0.02)	**(0.00)**	(0.56)	**(0.01)**			
i = REP*ROL*BUQ	**(1)**	**0.14**	**0.36**			**-0.26**	0.38	44
		(0.00)	**(0.00)**			**(0.05)**		
	(2)	**0.13**	**0.31**	0.12	**-0.15**		0.40	44
		(0.05)	**(0.00)**	(0.45)	**(0.01)**			
i = REP*ROL	**(1)**	**0.15**	**0.36**			**-0.29**	0.38	44
		(0.00)	**(0.00)**			**(0.04)**		
	(2)	**0.16**	**0.31**	0.11	**-0.19**		0.43	44
		(0.02)	**(0.00)**	(0.46)	**(0.01)**			
i = REP*BUQ	**(1)**	**0.15**	**0.36**			-0.25	0.37	44
		(0.00)	**(0.00)**			(0.06)		
	(2)	**0.16**	**0.30**	0.10	**-0.17**		0.41	44
		(0.02)	**(0.00)**	(0.52)	**(0.01)**			
i = ROL*BUQ	**(1)**	**0.15**	**0.37**			**-0.25**	0.38	44
		(0.00)	**(0.00)**			**(0.04)**		
	(2)	**0.14**	**0.33**	0.11	**-0.15**		0.41	44
		(0.03)	**(0.00)**	(0.46)	**(0.01)**			

Note: Numbers in parenthesis under the coefficients are levels of significance; The bold results are the significant results at the level of confidence of 95%. N is the number of observations;

When the legal index is dropped then the individual impact or robusteness of the IQIs on inflation can be examined by a sensitivity analysis. Table 2 presents the results.

Table 2 The impact of institutional quality on inflation								
Dependent variable: D								
	I	**II**	**III**	**IV**	**V**	**VI**	**VII**	**VIII**
Constant	**0.32**	**0.33**	**0.23**	**0.22**	**0.17**	**0.20**	**0.19**	**0.18**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
TOR	**0.28**	**0.27**	**0.35**	**0.35**	**0.32**	**0.31**	**0.31**	**0.33**
	(0.01)	**(0.01)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
REP	-0.31	**-0.32**						
	(0.17)	**(0.00)**						
ROL	0.07		**-0.20**					
	(0.61)		**(0.00)**					
BUQ	0.06			**-0.17**				
	(0.63)			**(0.01)**				
REP*ROL*BUQ					**-0.15**			
					(0.01)			
REP*ROL						**-0.19**		
						(0.01)		
REP*BUQ							**-0.17**	
							(0.01)	
ROL*BUQ								**-0.15**
								(0.01)
Adj. R^2	0.44	0.47	0.44	0.41	0.41	0.43	0.42	0.42
N	44	44	44	44	44	44	44	44

The dummy for TOR is still included in the regression because the goodness of fit (adjusted R^2) is higher in all cases without large differences in the results. From the first four regressions can be concluded that the REP-variable performs the best. Although in the first regression all IQIs are insignificant, the REP-variable has the best levels of significance in comparison with the other IQIs.

When the IQIs are taken separately, they became all significantly and negatively related with inflation. (see regressions II, III and IV). However the goodness of fit is higher when the REP-variable is taken in consideration. The regressions V, VI, VII and VIII show the impact of combinations of two or three IQIs on inflation. The regression with the combination REP and ROL has the best goodness of fit of these four regressions. The conclusion is that REP is the most effective IQI and that the ROL is more effective than BUQ for reaching price stability.

3. Central bank independence in transition economies

During the fall of the Berlin Wall in 1989 the communist regimes of Central and Eastern Europe collapsed and started with a process of transition from a centrally-planned economy to a democratic market economy. A period of painful stabilization has begun. The economic reforms adopted in early 1990s focused on four broad areas: macroeconomic stabilization, economic liberalization, institutional and legislative reform, and privatization and/or restructuring of state-owned enterprises [Fidrmuc (1999)].

According to the EBRD Transition Report (1997) the transition process reached two phases. The key achievements of the first phase were the privatization of assets, the liberalization of markets and the establishment of a degree of macroeconomic stability. The second phase has to deal with developing and providing effective, market-oriented governance.[10] The magnitude of this phase is building a new institutional infrastructure which establishes a governmental, financial, legal and regulatory framework, needed for a well-functioning market economy. Most of those new institutions have been patterned like institutions in Western democracies.

One important institutional reform is the establishment of a new central bank.[11] In the beginning of the 1990s all former socialist economies created completely new central bank laws at least once and sometimes even twice. The result is quite ambitious. Following the analysis of Cukierman, Miller and Neyapti (1998) many new central bank laws prescribe a level of legal central bank independence like in the developed countries during the eighties. Geographical or cultural closeness to Western Europe in general and to Germany in particular may influence the design of the new central bank. Countries with a geographical location near the European Union have the ambition to join the European Union in the future and therefore to increase the level of legal independence of their central banks meeting the criteria of the Maastricht Treaty. Furthermore the Deutsche Bundesbank in particular is often considered the archetype of what an effective monetary institution should look like.

The transition economies are an interesting group of countries for the examination of the relationship between the rate of inflation, central bank reforms and the transition process, which will be done in this section. A closer look will be taken on the interaction between central bank independence and the liberalization process. In a multi period regression analysis the impact of this interaction on the rate of inflation is analysed.

The *effectiveness* of central bank independence in transition economies is investigated by using Legal Transition Indicators (LTIs). These indicators are provided by the European Bank for Reconstruction and Development (EBRD) and are measures for the quality of the *commercial* legislation. The Legal Transition Indicators may be a good proxy for the *rule of law* in transition economies. This section integrates the LTIs in the regression analysis where the relationship between institutional quality and central bank independence is examined. Also the impact of the liberalization process on institutional quality will be investigated. This section is closed by an integrated regression

[10] Governance implies the manner of governing within enterprises and within the economy as a whole, in particular the building and deepening of institutions and behaviour which are at the heart of a well-functioning market economy.

[11] The old monobank was split up into several banks. One of these banks became the new central bank and the rest became regular banks. This is known as a two-tier banking system.

analysis where the impact of liberalization, institutional quality and central bank independence on inflation will be tested.

3.1 Central bank independence and the liberalization process

During the nineties most transition economies have upgraded the levels of legal independence of their central banks by one or two enactments of the central bank law. In countries that have two enactments the average level of central bank independence of the first law was usually lower than the average level of central bank independence in countries with only one enactment. But the average level of independence embodied in the second law is often substantially higher than that of the first law [Cukierman, Miller and Neyapti (1998)]. The changes of the central bank law followed after high inflation episodes. By upgrading the legal independence of the central banks, the transition economies want to protect their economies from inflationary pressure.

The question is whether the enactment of new central bank laws has a noticeable effect on inflation and what is the impact of the transition process on inflation and on the level of *actual* or *effective* independence of the central bank. This section follows the analysis of Cukierman, Miller and Neyapti (1998). These authors investigated the relation between inflation, central bank independence and liberalization in 26 former socialist economies in a multi period regression analysis.

Their analysis can be seen as an important extension of the work of Lougani and Sheets (1997). They constructed a legal indicator of central bank independence for 12 former socialist economies and related this to the rate of inflation in 1993. One of their conclusions is that increased central bank independence (as reflected in statutes adopted between 1989 and 1992) is significantly correlated with lower inflation in 1993.[12]

Lougani and Sheets (1997) mentioned in their paper three qualitative channels through which causal links from central bank independence to inflation may arise. First, a higher level of central bank independence helps to insulate the central bank from politically powerful but economically weak sectors of the economy. The provision of subsidized loans to these sectors has been a prime source of inflation in transition economies. Second, a central bank with a clear mandate for price stability and political independence may help to offset the inflationary pressure from the political process. Third, an independent central bank may provide strong incentives for the government to limit the size of the budget deficit. It is clear that the *revenue motive* for monetary expansion is more important in transition economies than the *employment motive*. The latter is the main *theoretical* determinant of the inflationary bias. An inefficient welfare state, the privatization of state-owned enterprises and the erosion of the tax base produce a substantial pressure on governmental budgets. When domestic capital markets are narrow and when a country has limited access to foreign financing due to high indebtedness, the revenue motive becomes stronger [Lougani and Sheets (1997)].

Maliszewski (1998) also investigated the relationship between inflation and central bank independence in transition economies. Adjusting the methodology proposed by Grilli, Masciandaro and Tabellini (1991), the author constructed indices for *political* and *economic* independence. His sample covers sixteen countries (seven former Soviet republics and nine Central European countries). Because the countries under investigation vary in the progress of economic transformation, the risk arises that macroeconomic imbalances, inherited from the communist system, may have more significant effects

[12] Because this conclusion is based on one year, it should be treated with caution.

on inflation. Therefore his analysis is restricted to 1996. In this year most of the stabilization shocks should already have vanished. The conclusion is that central bank independence and inflation are negatively related to each other. However, while the relationship between political independence is quite strong, economic independence is weakly associated with lower inflation. This implies that the statistically significant and negative relationship between the overall index of legal independence (political and economic independence) reflects mostly the influence of political independence [Maliszewski (1998)].

The robustness of the regression results in Maliszewski (1998) were checked by including measures of the stabilization progress. The first measure of stabilization progress – *time elapsed from the most successful stabilization effort* – is only marginally significant and does not affect the size and significance of the index of central bank independence. But when this measure of stabilization progress is replaced by *the cumulative liberalization index* as constructed by De Melo, Denizer and Gelb (1996), then the coefficient of the index of central bank independence is lower and slightly less significant. This result probably reflects an interaction between central bank independence and the transformation progress.

Cukierman, Miller and Neyapti (1998) developed extensive new data on legal central bank independence in 26 former socialist economies and constructed indicators of legal CBI for these countries during the 1990s. Following a codification system of sixteen different characteristics of central bank independence in the central bank law, the weighted Cukierman-index (LVAW) has been calculated.[13] This index is useful for comparing the results of legal CBI in transition economies with the results in developed and developing countries during the eighties. Cukierman, Miller and Neyapti (1998) made a comparison of the legal independence embedded in the (latest) central bank law in transition economies with that of developed countries during the eighties. Their conclusion is that, on average, aggregate legal independence of new central banks in transition economies is substantially higher than CBI in developed countries during the eighties.

Besides the LVAW other legal indicators of central bank independence were presented for transition economies. Neyapti (1997) constructed an extended version of the LVAW-index which also takes into account the authority of the central bank to set its own budget and the salary of its high ranking officials (financial independence), the supervisory authority of the central bank and the existence or absence of a provision for emergency credits to private banks. This index - the LVAWX-index - is composed of the same variables underlying the LVAW plus four additional variables which are mentioned above. The correlation coefficient between LVAW and LVAWX is 0.96.

Other legal indicators are the LVES-index and the LVESX-index. These two aggregate indices are based on the insight of Eijffinger and Schaling (1995b), which implies that factors like the allocation of authority for monetary policy, the procedures for resolution of conflicts between government and the central bank and the degree of relative focus on price stability in the central bank law are by far the most important for central bank independence. The LVESX-index is a weighted average of the narrow LVES index and of some additional variables about limitations on lending by the central bank to the government. Cukierman, Miller and Neyapti (1998) shows that the correlation coefficients between LVAW with LVES and LVESX are respectively 0.94 and 0.92.

[13] See chapter 19 of Cukierman (1992) where an overview is given of these sixteen characteristics.

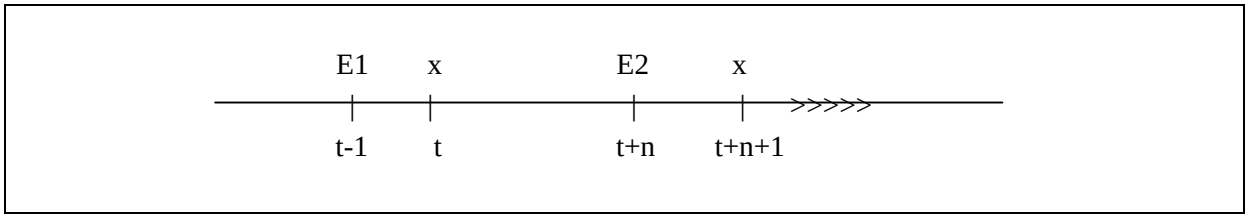
In this section the sample group of transition economies contains 18 countries:

1. Albania	7. Czech Republic	13.Moldova
2. Armenia	8. Estonia	14.Poland
3. Azerbaijan	9. Hungary	15.Romania
4. Belarus	10.Kazakhstan	16.Slovak Republic
5. Bulgaria	11.Kyrgyz Republic	17.Slovenia
6. Croatia	12.Latvia	18.Uzbekistan

Nine countries of the sample group are former Soviet republics. The sample period is 1990-1996. This period is divided into two subperiods: the *pre enactment period* and the *post enactment period*. For countries which had two enactments there are three subperiods: the pre enactment period, the first post enactment period and the second post enactment period.

The pre enactment period is defined as the period prior to the first enactment. The post enactment period starts a year after the enactment. Thus the year of enactment is, by convention, included in the pre enactment period of the appropriate central bank law. The reason for this convention is to build a lag between the average value of D in a subperiod and the time at which the central bank law became effective in that subperiod. Figure 1 presents the subdivision of the sample period.

Figure 1: The subdivision of the sample period



Where:
E1 = first enactment of the central bank law;
E2 = (if present) the second enactment of the central bank law.

The following subperiods can be defined:

?? Pre enactment period: the period before t
?? Post enactment period 1: the period between t and t+n+1
?? Post enactment period 2: the period after t+n+1

The transition process is characterized by the liberalization of the economy. De Melo, Denizer and Gelb (1996) have developed an index which measures the economic liberalization in the transition economies. They also calculated a cumulative index of the liberalization of the economy (CLI). This index is a simple sum of the annual Liberalization Indices (LI). These annual Liberalization Indices have a normalized scale from 0 to 1 and are a weighted average of the following three areas:

I: Internal markets: measures the extent of liberalization of domestic prices and the abolition of state monopolies (weight 0.3);[14]

E: External markets: measures the degree of liberalization of the foreign trade regime including the extent of currency convertibility (weight 0.3);[15]

P: Private sector entry: measures the extent of enterprise privatization and of banking reform (weight 0.4).

The weights used in aggregating the components of the index are notional estimates of the relative impact of *I* and *E*, which represent liberalization through introduction of competitive, flexible-price markets, and *P*, which represents liberalization through changing ownership of fixed assets [De Melo, Denizer and Gelb (1996)]. Thus the CLI is the sum of the liberalization indices of the previous years.

The economic performance in a country is affected by the degree of liberalization at that time, as well as by the length of time that particular reforms have been in effect, although the effects of early reforms may dissipate over time. The CLI is higher in countries that started earlier with the liberalization process, like Slovenia and Hungary, although these countries started already with partial liberalization before 1989 since then pursued more gradual reform policies. In spite of the CLI giving the same weight to the early years of transition as well to the more recent reforms, the measure is a good reflection of the duration as well of the depth of the reform process. De Melo, Denizer and Gelb (1996) find that inflation is negatively related to the CLI.

Cukierman, Miller and Neyapti (1998) pointed out that the association of CLI and legal CBI with inflation is characterized by a substantial *interaction effect*. During early stages of liberalization legal central bank independence should be unrelated to inflation. But when the liberalization process has reached sustained and high levels of liberalization, then, keeping other things the same, legal central bank independence and inflation become significantly and negatively related. Liberalization seems to be an important condition for the *effectiveness* of central bank independence. This hypothesis will be examined in the following multiperiod regression analysis.

In the regression analysis only the *post enactment period* is taken in consideration. The reason for this choice is the reduction of spurious effects of the relative timing of central bank reform and other reforms, which may influence the estimated partial effect of central bank independence on inflation. Some countries started their liberalization process just after the enactment of the central bank law. This is accompanied with large price shocks when prices have to be adjusted to equate demand and supply. Thus countries who have postponed their liberalization process just after the enactment, have to deal with an increase rather than a decrease of the rate of inflation. The higher rate of inflation is not due to the increase of legal central bank independence, but to the timing of the liberalization process. To reduce spurious effects the sample is limited to the post enactment periods.

[14] Countries with an *I* rating near unity may still maintain price controls on a range of non-traded household essentials, in particular rents and household utilities.

[15] The indicators used for *P* are proxies for opening up the economy to a private sector development. They do not capture the overall quality of the legal and regulatory framework or the effectiveness of government in institution-building or in the implementation of reforms, but only because of difficulty in developing comparative measures. Also, land privatization is not included.

The following regressions are examined:

$$(4) \quad D = \beta_0 + \beta_1 WD + \beta_2 CLI + \beta_3 X_i + \varepsilon$$

$$(5) \quad D = \beta_0 + \beta_1 WD + \beta_2 CLI + \beta_3 X_i + \beta_4 \delta_{CLI} X_i + \varepsilon$$

Where:

D = the average rate of depreciation in the real value of money;

WD = war dummy;

CLI = cumulative Liberalization Index: the median value is taken within a subperiod[16];

X_i = the legal indicator of central bank independence: i = LVAW, LVAWX, LVES and LVESX;

δ_{CLI} = a slope dummy which has value 1 if CLI is higher than 2 and value 0 otherwise.

WD is the war dummy. This variable takes into account possible effects of war or regional conflicts on inflation. The dummy has value one for countries which have been involved in a war and a value zero otherwise. Four countries of the sample group have a value of one of the war dummy: Armenia, Azerbaijan, Croatia and Slovenia. The slope dummy reflects the interaction effect between CLI and central bank independence. When CLI has reached a specific level, the slope dummy has a value of one and a value of zero otherwise. The interaction variable is defined as the product of the legal central bank independence index and the slope dummy. D is the average rate of depreciation in the real value of money in the post enactment period. Table 3 shows the results of the regressions.

Regarding the left part of Table 3 the conclusion is that in all cases the CLI is significantly and negatively related with inflation. This conclusion underlines the conclusion of De Melo, Denizer and Gelb (1996). However the legal indices are all insignificant. This means that legal CBI is unrelated to inflation in transition economies.

In the right part of Table 3 the interaction variable between CLI and legal CBI is included in the regression. In all cases the adjusted R^2 is higher than in the left part of Table 3. The CLI stays in nearly all cases significantly and negatively related with inflation. The legal indices remain insignificant while the interaction variables between CLI and the legal indices are significantly and negatively correlated with inflation in nearly all cases. This implies that the negative impact of legal CBI on inflation arises when the cumulative liberalization has reached sufficiently large values. At low levels of CLI no significant relationship exist between legal central bank independence and inflation. Because of the limited number of countries in the sample group some exceptional results may arise due to outliers. The conclusion is that liberalization seems to be a sufficient condition for *effective* CBI.

[16] When the number of years in a subperiod is even, CLI for the subperiod is characterized by the mean value of CLI in the two years in the middle of that subperiod. Since data on CLI is available only until the end of 1995 the value of 1995 is used when the subperiod only includes the years 1995 and 1996.

Table 3 Central bank independence and liberalization process								
Dependent variable: D								
	Regression (4)				**Regression (5)**			
	I	**II**	**III**	**IV**	**I**	**II**	**III**	**IV**
Constant	**0.91**	**0.88**	**0.95**	**0.95**	**0.78**	**0.78**	**0.79**	**0.81**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**	**(0.00)**
WD	0.09	0.09	0.11	0.08	0.06	0.08	0.11	0.07
	(0.29)	(0.21)	(0.26)	(0.33)	(0.37)	(0.27)	(0.14)	(0.31)
CLI	**-0.17**	**-0.17**	**-0.17**	**-0.17**	-0.08	**-0.10**	**-0.09**	**-0.10**
	(0.00)	**(0.00)**	**(0.00)**	**(0.00)**	(0.07)	**(0.03)**	**(0.02)**	**(0.01)**
i = LVAW	-0.04				0.14			
	(0.89)				(0.53)			
i = LVAWX		0.04				0.17		
		(0.86)				(0.46)		
i = LVES			-0.09				0.13	
			(0.67)				(0.47)	
i = LVESX				-0.09				0.11
				(0.72)				(0.59)
$?_{CLI}$ * X_i					**-0.55**	-0.39	**-0.39**	**-0.42**
					(0.01)	(0.07)	**(0.01)**	**(0.01)**
Adj R^2	0.74	0.75	0.69	0.75	0.83	0.79	0.83	0.84
N	18	18	15	18	18	18	15	18

3.2 The effectiveness of central bank independence in transition economies

This subsection introduces new Legal Transition Indicators developed by the European Bank for Reconstruction and Development (EBRD) in the Transition Report of 1997. An assessment of the transition progress is made based on data about legal reforms in three major areas of *commercial* law: pledge law (investment on pledge), bankruptcy law and company law (formation and governance). These institutions are very important for many commercial transactions and for the investment activity in the private sector.

The EBRD provides a numerical assessment of these issues on the basis of two criteria. First, the *extensiveness* of commercial law which is the extent to which commercial legal rules approach laws and rules in developed countries. The rules and laws in developed countries are seen as a benchmark. Second, the *effectiveness* of commercial law which is the extent to which legal rules are clear and accessible and adequately supported administratively and judicially.

The EBRD has constructed indicators both for the extensiveness and for effectiveness of commercial law. An overall indicator has also constructed which is an unweighted average of both

indicators. For the analysis in this section all Legal Transition Indicators are normalized from 0 to 1. A higher score means a better quality of commercial law setting in transition economies.[17]

The Legal Transition Indicators (LTI) may be useful as proxy for the *rule of law* in transition economies. In a regression analysis the interaction effect between the overall Legal Transition Indicator and legal Central Bank Independence is investigated. Also the separate impact of the Legal Transition Indicator on inflation will be investigated. The following regressions are examined:

$$(6) \quad D = \beta_0 + \beta_1 X_i + \varepsilon$$

$$(7) \quad D = \beta_0 + \beta_1 X_i + \beta_2 LTI + \varepsilon$$

$$(8) \quad D = \beta_0 + \beta_1 X_i LTI + \varepsilon$$

Where:

D = the average rate of depreciation in the real value of money;
X_i = legal Central Bank Independence (i = LVAW, LVAWX, LVES, LVESX);
LTI = the overall Legal Transition Indicator: unweighted average of the indicator for *extensiveness* and the indicator for *effectiveness* of commercial law;
X_iLTI = the product of the legal indicator of CBI and LTI.

Table 4 presents the results of these regressions. Regression (6) is the benchmark regression. The adjusted R^2 is relatively low and in nearly all cases the legal index is insignificantly related to D.

When the Legal Transition Indicator is included in the regression (i.e. regression (7)), the adjusted R^2 increases a lot in all cases. The Legal Transition Indicator is significantly and negatively correlated to inflation. The index of legal CBI remains insignificant. This implies that the quality of an effective legal system has a greater impact on inflation than CBI.

In regression (8) the impact of the interaction of legal CBI and LTI on inflation is investigated. In comparison with regression (7) the goodness of fit improves (adjusted R^2) improves in all cases. The interaction variable is significantly and negatively correlated with inflation. This implies that there is some evidence for interaction between legal CBI and the Legal Transition Indicator, and that the Legal Transition Indicator should be useful as a proxy for the *rule of law.* By correcting the legal index of CBI with this proxy an expression arises for *effective* central bank independence. This expression approximate the *actual* independence of the central bank and therefore has a better correlation with inflation.

[17] The indicators do not evaluate banking and taxation laws and regulations, although banking and taxation laws and regulations are pertinent in a well-functioning commercial legal regime.

Table 4 The impact of LTI on inflation and CBI							
Dependent variable: D							
	Type	**Constant**	**Xi**	**LTI**	**X_iLTI**	**Adj. R^2**	**N**
i = LVAW	**(6)**	**0.84**	**-0.82**			0.26	18
		(0.00)	**(0.02)**				
	(7)	**0.91**	-0.38	**-0.55**		0.51	18
		(0.00)	(0.22)	**(0.01)**			
	(8)	**0.71**			**-0.97**	0.54	18
		(0.00)			**(0.00)**		
i = LVAWX	**(6)**	**0.79**	-0.66			0.1	18
		(0.00)	(0.10)				
	(7)	**0.89**	-0.27	**-0.57**		0.5	18
		(0.00)	(0.39)	**(0.00)**			
	(8)	**0.71**			**-0.89**	0.52	18
		(0.00)			**(0.00)**		
i = LVES	**(6)**	**0.68**	-0.4			0.04	18
		(0.01)	(0.24)				
	(7)	**0.92**	-0.25	**-0.57**		0.41	18
		(0.00)	(0.35)	**(0.01)**			
	(8)	**0.71**			**-0.72**	0.49	18
		(0.00)			**(0.00)**		
i = LVESX	**(6)**	**0.59**	-0.27			-0.04	18
		(0.03)	(0.54)				
	(7)	**0.97**	-0.33	**-0.62**		0.51	18
		(0.00)	(0.28)	**(0.00)**			
	(8)	**0.77**			**-1.1**	0.56	18
		(0.00)			**(0.00)**		

The question is whether the liberalization process has an impact on the effectiveness of the legal infrastructure. Many transition economies have undertaken significant reforms of their commercial law and regulations. However these changes have not always been accompanied by effective means for implementation and enforcement. For example large notary fees continue to impede secured lending in countries that have reformed their civil codes and pledge laws [EBRD (1997)].

An interaction may arise between the liberalization process (CLI) and the Legal Transition Indicator. The following regression analysis attempts to investigate the interaction effect between the Cumulative Liberalization Index with the Legal Transition Indicator and Central Bank Independence.

The first regression considers the examination of the interaction effect between the Legal Transition Indicator (LTI) and the Cumulative Liberalization Index (CLI). The regression equation yields:

$$(9) \quad D = \beta_0 + \beta_1 WD + \beta_2 CLI + \beta_3 LTI + \beta_4 \delta_{CLI} LTI + \varepsilon$$

Where:
δ_{CLI} = a slope dummy with value 1 if the CLI > 2 and value 0 otherwise.

The results are presented in Table 5.

Table 5
The interaction between CLI and LTI

Constant	WD	CLI	LTI	δ_{CLI} * LTI	Adj. R	N
0.70	**0.15**	**-0.14**	**0.84**	**-0.74**	0.83	18
(0.00)	**(0.03)**	**(0.01)**	**(0.02)**	**(0.02)**		

Table 5 provides an interesting issue. The Legal Transition Indicator is significantly and positively related with inflation. But if the level of liberalization has reached a sufficient level, the Legal Transition Indicator becomes significantly and negatively correlated with inflation. This means that the extensiveness and effectiveness of commercial law (LTI) need sufficient high levels of liberalization of being effective in reaching low rates of inflation.

This insight can be integrated in the regression analysis of the previous section, where the interaction between CLI and CBI was examined. Instead of the normal legal index of CBI an expression of *effective* CBI (ECBI) will be used. This interaction variable is a product of the legal index of CBI and LTI. This gives the opportunity to investigate the impact of the interaction effects between CLI with LTI and CBI on inflation. The following regression is investigated:

$$(10) \quad D = \beta_0 + \beta_1 WD + \beta_2 CLI + \beta_3 ECBI + \beta_4 \delta_{CLI} ECBI + \varepsilon$$

Where:
ECBI = Effective Central Bank Independence: X_i * LTI (i = LVAW, LVAWX, LVES, LVESX);
δ_{CLI} = slope dummy with value 1 if CLI > 2 and value 0 otherwise.

The results are presented in table 6.

Table 6 Liberalization, institutional quality and central bank independence							
Dependent variable: D							
	Constant	**WD**	**CLI**	**ECBI**	**$?_{CLI}$ * ECBI**	**Adj. R^2**	**N**
LVAW	**0.73**	0.12	**-0.11**	1.20	**-1.34**	0.80	18
	(0.00)	(0.09)	**(0.03)**	(0.06)	**(0.04)**		
LVAWX	**0.74**	0.13	**-0.13**	1.16	-1.18	0.80	18
	(0.00)	(0.07)	**(0.02)**	(0.06)	(0.06)		
LVES	**0.68**	0.14	**-0.10**	1.00	**-1.13**	0.79	15
	(0.00)	(0.10)	**(0.05)**	(0.06)	**(0.03)**		
LVESX	**0.70**	0.13	**-0.10**	**1.03**	**-1.25**	0.83	18
	(0.00)	(0.07)	**(0.03)**	**(0.05)**	**(0.01)**		

The results in Table 6 are compared with the results in the right part of Table 3 in the previous section. The CLI remains significantly and negatively related to inflation. Looking at the indicators of *effective* CBI, the levels of significance has improved a lot in comparison with the legal indicators of CBI in Table 3. The effective LVESX-index is significant and the other indicators of effective CBI are nearly significant at a 95% confidence level. A striking point here is the positive sign of the effective CBI coefficient. The interaction variables of the liberalization process and effective CBI are in nearly all cases significantly and negatively related to inflation.

Table 6 gives some evidence that in early stages of the transition process (characterized with low CLI) the rule of law does not always be effective. The general rule of law is largely destroyed under the communist regime. Transition economies undergo a fundamental institutional restructuring process and in the beginning of this process macroeconomic imbalances, budgetary deficits and unanticipated shocks fuel the temptation to bend the law.

However the quick enactments of the central laws are quite ambitious. Although the *legal* independence of the central banks in transition economies is relatively high, the translation into *actual* independence may be frustrated by ineffective legal provisions. Particular in the beginning of the transition process the independence of the central bank is thoroughly tested in an environment of macroeconomic imbalances, credit-hungry governments and underdeveloped financial systems. Due to the lack of compliance with the law the effectiveness of central bank independence is low. A sufficient level of liberalization is a necessary condition for effective central bank independence.

4. Summary and concluding remarks

The *legislative approach* in designing monetary institutions had a lot of support during the past decades. Inspired by the success of the Bundesbank and probably due to a lack of better institutional solutions to guarantee a credible commitment to price stability, a world wide trend emerges of upgrading the *legal* independence of the central bank. The effectiveness of legal central bank independence is determined by the translation of the legal arrangements into *actual* practice. Legal independence is a necessary but not sufficient condition and has to be seen as a fundamental basis for actual independence. The translation of legal independence into actual independence is primarily determined by the rule of law.
When the spirit of the law is taken seriously then legal and actual independence may coincide. Factors like tradition and norms of society are in turn important determinants of the rule of law.

The main task in this paper is the investigation of the impact of the rule of law factor on inflation and central bank independence. Several Institutional Quality Indicators are integrated in the empirical test between the rate of inflation and central bank independence. When a country has developed a credible institutional framework, the rule of law is expected to be relatively larger than in countries with an inadequate legal, political and regulatory framework. Therefore the Institutional Quality Indicators can be used as a reasonable proxy for the rule of law.

Institutional Quality Indicators (IQIs) are used as a proxy for the rule of law to test empirically the potential interaction between legal central bank independence, the rule of law and inflation. These Institutional Quality Indicators (Repudiation of contracts by government, Rule of law and Bureaucratic quality) measure some aspects of the credibility of the government to protect property rights and the enforcement of contracts.

The individual Institutional Quality Indicators are each significantly and negatively related to the rate of inflation. This result becomes stronger when two or three institutional quality indicators are combined. Although the IQIs are highly correlated to each other, a combination of IQIs may give a more complete picture of the qualitative institutional environment in a country.

The case of Japan (in the eighties) illustrates the meaning of institutional quality on inflation. Institutional quality may compensate the lack of central bank independence in order to realize low rates of inflation. In other words when a country is characterized by a qualitative institutional environment and thus the general rule of law is relatively large, lower levels of legal central bank independence are required in order to achieve a sufficient credible commitment to price stability.

By means of one or two enactments of the central bank laws the transition economies attempt ambitiously to increase the level of legal central bank independence. However the rule of law is mainly destroyed under the communist regime and it will take time to rebuild it. Furthermore the transition process is characterized by large price shocks and macroeconomic imbalances. Narrow capital markets and limited access to foreign financing make legal protections of the independence of the central bank ineffective.

During early phases of liberalization legal central bank independence is unrelated to inflation. But when sufficient high levels of liberalization are reached, and holding other things the same, legal central bank independence and inflation are significantly and negatively related. This means that a sufficient level of liberalization is required to make central bank independence effective in achieving price stability. Legal central bank independence, no matter how high, cannot contain the powerful inflationary impacts during early phases of the transition process.

The effectiveness of Central Bank Independence in transition economies is tested by the investigation of the interaction between the rule of law and legal Central Bank Independence. Legal Transition Indicators (LTI) provided by the EBRD were used to proxy the rule of law in transition economies. These indicators measure the quality of commercial legislation by using two criteria: *extensiveness* and *effectiveness* of commercial law. The overall legal transition indicator is significantly and positively related with inflation during early phases of transition. This result proves that during these phases the ambitious institutional reforms like Western standards are inefficient, because macroeconomic imbalances and huge price shocks enlarge the temptation to bend the law. When liberalization has reached a sufficient high level then the legal transition indicator becomes significantly and negatively related to inflation.

Multiplying the index of legal Central Bank Independence with the Legal Transition Indicator a measure for *effective* Central Bank Independence arises. This measure is nearly significantly and positively related during early phases of transition. This is mainly due to the lack of the rule of law and due to the fact that under the conditions, such as macroeconomic imbalances and huge price shocks, legal limitations on lending to the government and other legal provisions that fortify the legal status of the central bank are not sufficient of discouraging inflationary financing. But at high levels of liberalization the effective central bank variable becomes significantly and negatively related to inflation. The *effectiveness* of central bank independence requires a sufficient level of liberalization in transition economies. Indeed the general rule of law has to be built and it takes time to deserve the reputation as a serious monetary institution with a credible commitment to achieve price stability.

This paper has tried to prove that institutional environment does matter. The quality of the institutional environment is a useful proxy for the general rule of law in a country in order to test the *effectiveness* of central bank independence.

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APPENDIX

DATAMATRIX A							
	Country	**D**	**LVAU**	**TOR**	**REP**	**ROL**	**BUQ**
1	**Argentina**	0.69	0.44	0.93	0.24	0.50	0.50
2	**Botswana**	0.10	0.36	0.41	0.60	0.83	0.67
3	**Chile**	0.17	0.49	0.45	0.53	0.67	0.58
4	**Costa Rica**	0.19	0.42	0.58	0.48	0.67	0.50
5	**Egypt**	0.15	0.53	0.31	0.49	0.46	0.42
6	**Ethiopia**	0.04	0.47	0.20	0.50	0.50	0.17
7	**Ghana**	0.29	0.28	0.28	0.41	0.17	0.25
8	**Honduras**	0.07	0.41	0.13	0.49	0.25	0.17
9	**India**	0.08	0.33	0.33	0.60	0.42	0.63
10	**Israel**	0.46	0.42	0.14	0.68	0.42	0.63
11	**Kenya**	0.10	0.44	0.17	0.60	0.50	0.54
12	**Mexico**	0.38	0.36	0.15	0.46	0.58	0.42
13	**Malaysia**	0.03	0.34	0.13	0.66	0.79	0.67
14	**Nigeria**	0.17	0.33	0.19	0.28	0.17	0.25
15	**Peru**	0.56	0.43	0.33	0.26	0.17	0.33
16	**Philippines**	0.12	0.42	0.13	0.33	0.17	0.29
17	**Panama**	0.03	0.16	0.24	0.48	0.33	0.17
18	**South Korea**	0.07	0.23	0.43	0.69	0.46	0.67
19	**South Africa**	0.13	0.30	0.10	0.70	0.42	1
20	**Singapore**	0.03	0.27	0.37	0.80	0.79	0.83
21	**Tanzania**	0.23	0.48	0.13	0.54	0.50	0.17
22	**Turkey**	0.33	0.44	0.40	0.51	0.50	0.50
23	**Thailand**	0.05	0.26	0.20	0.61	0.50	0.63
24	**Uganda**	0.48	0.37	0.34	0.41	0.17	0.17
25	**Uruguay**	0.36	0.22	0.48	0.68	0.50	0.33
26	**Venezuela**	0.17	0.37	0.30	0.53	0.63	0.50
27	**Zimbabwe**	0.11	0.23	0.15	0.50	0.25	0.63
28	**Belgium**	0.05	0.19	0.13	0.89	1	1
29	**Canada**	0.06	0.46	0.10	0.88	1	1
30	**Denmark**	0.06	0.47	0.05	0.89	1	1
31	**Finland**	0.07	0.27	0.13	0.89	1	1
32	**France**	0.07	0.28	0.15	0.84	0.83	1

33	**Germany**	0.03	0.66	0.10	0.93	0.83	1
34	**Ireland**	0.08	0.39	0.15	0.80	0.67	0.83
35	**Italy**	0.10	0.22	0.08	0.88	0.83	0.67
36	**Japan**	0.02	0.16	0.20	0.91	0.83	1
37	**Netherlands**	0.03	0.42	0.05	0.91	1	1
38	**New Zealand**	0.11	0.27	0.15	0.83	1	1
39	**Norway**	0.08	0.14	0.08	0.93	1	0.92
40	**Spain**	0.09	0.21	0.20	0.71	0.67	0.67
41	**Sweden**	0.07	0.27	0.15	0.90	1	1
42	**Switzerland**	0.03	0.68	0.13	0.99	1	1
43	**UK**	0.07	0.31	0.10	0.95	0.79	1
44	**US**	0.05	0.51	0.13	0.90	1	1

Note: D is the average rate of depreciation in the real value of money between 1980 and 1989 and is natural bounded from zero to one. LVAU is the unweighted Cukierman index of legal central bank independence. TOR is the turnover rate. REP, ROL and BUQ are institutional quality indicators. REP is the repudiation of contracts by the government, ROL is the rule of law and BUQ means the bureaucratic quality. The median value is taken of the sample period 1980 – 1989, i.e. the average value of 1984 and 1985.

Data sources:

D: International Financial Statistics Yearbook 1998, International Monetary Fund (IMF)

LVAU: Cukierman (1992) and Eijffinger and De Haan (1996)

TOR: Cukierman (1992)

REP, ROL and BUQ: IRIS time series data. This dataset is constructed by the IRIS centre (Centre for Institutional Reform and the Informal Sector) from data printed in the International Country Risk Guide (ICRG), published by the PRS Group.

DATAMATRIX B1								
	Country	**D**	**CLI**	**WD**	**LVAW**	**LVAWX**	**LVES**	**LVESX**
1	**Albania**	0.21	2.67	0	0.47	0.38	0.47	0.49
2	**Armenia**	0.60	2.02	1	0.29	0.32	0.47	0.34
3	**Azerbaijan**	0.71	1.25	1	0.22	0.47	na	0.42
4	**Belarus**	0.77	1.31	0	0.73	0.68	0.75	0.67
5	**Bulgaria**	0.46	2.96	0	0.50	0.6	na	0.65
6	**Croatia**	0.37	4.41	1	0.44	0.57	0.60	0.49
7	**Czech Rep.**	0.11	3.61	0	0.69	0.68	0.96	0.73
8	**Estonia**	0.25	3.86	0	0.78	0.78	0.96	0.58
9	**Hungary**	0.19	5.04	0	0.67	0.72	0.79	0.61
10	**Kazakhstan**	0.79	1.60	0	0.32	0.29	0.63	0.56
11	**Kyrgyz Rep.**	0.55	2.22	0	0.52	0.53	0.55	0.55
12	**Latvia**	0.28	2.86	0	0.49	0.59	0.96	0.73
13	**Moldova**	0.71	1.35	0	0.38	0.43	0.84	0.54
14	**Poland**	0.24	4.14	0	0.46	0.39	0.49	0.32
15	**Romania**	0.50	2.29	0	0.31	0.35	0.51	0.33
16	**Slovak Rep.**	0.11	3.96	0	0.62	0.64	0.92	0.73
17	**Slovenia**	0.26	4.16	1	0.60	0.58	0.72	0.52
18	**Uzbekistan**	0.76	1.11	0	0.41	0.60	na	0.71

Note: NA means that data is not available. D is the average rate of depreciation in the real value of money and is natural bounded from zero to one. CLI is the Cumulative Liberalization Index. The median value of the CLI is taken in the sample period. WD is the war dummy with value 1 if countries are involved in war or regional conflicts and value zero if otherwise. LVAW, LVAWX, LVES and LVESX are indices of legal central bank independence in transition economies during the nineties which are all ranged from zero to one.

Data sources:

D: International Financial Statistics Yearbook 1998, International Monetary Fund (IMF)

CLI: De Melo, Denizer and Gelb (1996)

WD: Cukierman, Miller and Neyapti (1998)

LVAW, LVAWX, LVES and LVESX: Cukierman, Miller and Neyapti (1998)

DATAMATRIX B2			
	Country	**Year of enactment(s)**	**Post enactment period**
1	**Albania**	1992	1993 - 1996
2	**Armenia**	1993, 1996	1994 - 1996
3	**Azerbaijan**	1992, 1996	1993 - 1996
4	**Belarus**	1992	1993 - 1996
5	**Bulgaria**	1991	1992 - 1996
6	**Croatia**	1992	1993 - 1996
7	**Czech Republic**	1991	1992 - 1996
8	**Estonia**	1993	1994 - 1996
9	**Hungary**	1991	1992 - 1996
10	**Kazakhstan**	1993, 1995	1994 - 1995
11	**Kyrgyz Republic**	1992	1993 - 1996
12	**Latvia**	1992	1993 - 1996
13	**Moldova**	1991, 1995	1992 - 1995
14	**Poland**	1991	1992 - 1996
15	**Romania**	1991	1992 - 1996
16	**Slovak Republic**	1992	1993 - 1996
17	**Slovenia**	1991	1992 - 1996
18	**Uzbekistan**	1992	1993 - 1996

DATAMATRIX C				
	Country	**LTI**	**EXT**	**EFF**
1	*Albania*	0.29	0.29	0.29
2	**Armenia**	0.57	0.57	0.57
3	**Azerbaijan**	0	0.43	0
4	**Belarus**	0.29	0.29	0.29
5	**Bulgaria**	0.57	0.57	0.57
6	**Croatia**	0.86	0.86	0.86
7	**Czech Rep.**	0.86	0.86	0.86
8	**Estonia**	0.86	0.86	0.86
9	**Hungary**	0.86	0.86	0.86
10	**Kazakhstan**	0.29	0.29	0.29
11	**Kyrgyz Rep.**	0.29	0.57	0.29
12	**Latvia**	0.57	0.71	0.57
13	**Moldova**	0.29	0.57	0.29
14	**Poland**	0.86	0.86	1

15	**Romania**	0.57	0.57	0.57
16	**Slovak Rep.**	0.57	0.57	0.57
17	**Slovenia**	0.57	0.57	0.86
18	**Uzbekistan**	0.29	0.43	0.29

Note: LTI, EFF and EXT are legal transition indicators. LTI is the overall Legal Transition Indicator which is an unweighted average of EFF and EXT. EFF is the indicator which measures the *effectiveness* of commercial legislation and EXT is the indicator which measures the *extensiveness* of commercial legislation. All three indicators are normalized from their original scale.

Data sources:
LTI, EFF and EXT: European Bank for Reconstruction and Development, Transition Report 1997