

Central Bank Transparency: Where, Why, and to What Effect?¹
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1. Introduction

The transparency with which central banks go about their business is the most dramatic difference between central banking now and central banking in earlier historical periods.² Central banks originated as closely held, privately owned suppliers of credit to the government. Because they competed for business with other financial institutions, they were less than forthcoming about their pricing and portfolio decisions. Because they had a privileged relationship with the state – often with the head of state himself – they treated information as confidential, as properly known only to the banker and his client. That they were less than transparent about their decision making is understandable given the circumstances of the time.

As part of this bargain, central banks gradually acquired their modern competency of regulating supplies of money and credit. Typically they acquired it in the era of commodity money. The obligation of converting their liabilities into specie at a fixed rate of exchange added an important element of transparency to their operations.

¹ State Planning Organization, Ankara, and University of California, Berkeley, respectively. This paper was prepared for a conference on central banking hosted by the Cournot Center, Paris, 30 November-1 December 2006.

² Here we use “transparency” to mean information disclosure. This minimal definition of course leaves unspecified whether or not the information set has more than one dimension and if so which dimension is relevant. These questions are too subtle for us, although there is a sense in which we are forced to grapple with them in the empirical analysis below. For a more heroic attempt at discussion, see Siklos (2002). There is also the issue of information about what: the conventional taxonomy in the literature on central banking (following e.g. Geraats 2002) distinguishes political transparency (openness about policy objectives), economic transparency (openness about data, models and forecasts), procedural transparency (openness about the way decisions are taken, achieved mainly through the release of minutes and votes), policy transparency (openness about the policy implications, achieved through prompt announcement and explanation of decisions), and operational transparency (openness about the implementation of those decisions, in other words about control errors and macroeconomic disturbances affecting their magnitude). We return to this below.

Observers knew something about the institution's objective function: the central bank assigned a high weight, if not always absolute priority, to the maintenance of convertibility. Observers knew something about the model that the central bank used to assign its instruments to objectives: typically, how it used changes in the rate at which it discounted other obligations to regulate currency fluctuations, and the other measures that it took to render that discount rate "effective".³ The success with which the central bank maintained the price of specie at the level fixed by statute could be observed by market participants. Reflecting the public or semi-public nature of this commitment, central banks published information on changes in gold reserves that were used by market participants to forecast likely future policies.⁴ In modern empirical studies, economists treat the existence of a pegged exchange rate as a dimension of transparency: central banks committed to maintaining a peg are regarded as conducting policy more transparently, other things equal.⁵ So it was in this earlier period. Insofar as transparency enhances accountability, the existence of at least this modicum of transparency was what made it socially acceptable to assign not inconsequential public-policy functions to entities that often had private shareholders, mixed motives, and a good deal of bureaucratic autonomy.

The persistence of currency pegs through much of the 20th century and the tendency to regard as aberrant and exceptional periods when those pegs were in abeyance is one way of understanding why there was not more intense pressure for central banks to reveal further information about their operations. It was easy enough to judge, on the

³ Meaning that changes had an immediate impact on market conditions.

⁴ And, increasingly, on other portfolio aggregates that were deemed relevant to the prospective future maintenance of convertibility.

⁵ In practice, other things are far from equal, as we will see below.

basis of events in foreign exchange markets, whether the central bank was pursuing its mandate. This perspective similarly suggests that it is no coincidence that the tendency to make other aspects of central banking more transparent in the last ten years coincided with an accelerating shift toward more flexible exchange rates.⁶ In a growing number of countries, the one thing that had done the most to lend transparency to monetary policy had disappeared. The result was pressure to increase other aspects of transparency, if for no other reason than to enhance society's ability to hold central banks accountable to their ultimate stakeholders.

Of course, this shift toward greater exchange rate flexibility was not exogenous. It did not occur in isolation from other events in economy and society. As one of us has argued elsewhere, it is best understood as reflecting two other late-20th century trends: financial liberalization and political liberalization.⁷ Financial liberalization (the deregulation of domestic financial markets and the removal of controls on international financial flows, two things that are necessarily interrelated) made it impossible for central banks and governments to use one instrument to hit two targets: to continue to peg the exchange rate while at the same time using monetary policy to pursue other goals. Political liberalization (democratization) made it more difficult to privilege the exchange rate – to credibly commit to pegging the exchange rate without regard to the implications for other socially relevant economic variables. When unemployment rose to crisis levels, for example, the political pressure in democratic societies for the central bank to do

⁶ Evidence on this trend in exchange rate regimes can be found in Eichengreen and Razo-Garcia (2006). The authors show that the share of soft pegs in all exchange rate regimes has fallen from about 70 per cent in 1990 to 45 percent in 2004. The evacuees move to hard pegs (including monetary union, in the case of European countries) and floats in a ratio of 3 to 4. Note that, since the euro floats against other currencies, one would want to group the members of the euro area together with the floating rate countries for purposes of this argument.

⁷ See Eichengreen (1996).

something about it became irresistible. In an environment of deregulated financial markets and capital flows, the exchange rate peg was increasingly a casualty. This was a first channel through which there was impetus to develop further other aspects of central bank transparency.

There were also other channels linking democratization and financial liberalization to central bank transparency. Democratization directly increased demands for public accountability, which intensified demands for transparency. Democratic governments are intrinsically more open about their affairs as a way of achieving accountability to their constituents; in this sense central bank transparency (the central bank being an agency of the government) is only a specific instance of the general point. This said, it is striking how little pressure many central banks felt via this channel and how long it took to work its effects. Still, it is surely not coincidental that the rise in central bank transparency in Latin America, in Eastern Europe and in Asian countries from Korea to the Philippines coincided with the third wave of democratization that prominently affected all these regions.

In addition, democratization strengthened the argument for central bank independence, a trend that is closely related to increased transparency. In democratic societies, political pressures are intense (in a sense, this is the very definition of democracy), and there are a variety of arguments for why central banks should be sheltered from those pressures, to an extent, via independence.⁸ With the grant of

⁸ The standard approach to this problem focuses on time inconsistency and inflationary bias when the central bank adopts the objective function of the median voter. Independence is then a way of permitting the appointment of central bankers who are more conservative than the median voter as a way of offsetting the inflationary bias that results for inability to precommit. But there are other models that also suggest a link from democratization to central bank independence, such as models of the political business cycle suggesting that a politically-dependent central bank feel pressure to inefficiently loosen in the run-up to elections.

independence come demands for adequate accountability; central banks are expected to provide more information about their operations as a way of enabling citizens and their representatives to evaluate the central bank's actions, praise it for its achievements, and take it to task for its failures. In addition, independence may render the central bank more willing to volunteer information about its operations; when a central bank is dependent on the government, keeping information private may be one way that it can advance its own goals relative to those of its political masters.⁹

Finally, financial liberalization made it important that central bank actions would have a stable and predictable impact on market variables. Deregulation eliminated the authorities' ability to control market outcomes directly. The growth of financial markets and transactions consequent on deregulation made the market response to policies all the more essential for achieving the central bank's ultimate objectives. Volatility, when it occurred, was even more disruptive than before. This made it all the more important that the central bank communicate with market participants in a way that inspired confidence and avoided causing excessive volatility. Given that communication means the regularized transmission of information, the implication was at least a limited increase in the extent of central bank transparency.¹⁰

It is against this backdrop that we ask: what exactly is the state of central bank transparency? And what has been the impact on economic outcomes?

While there have been a few pioneering studies along these lines, remarkably little is still known about actual trends in transparency, their correlates, and their

⁹ On these arguments see Geraats (2002) and below.

¹⁰ To what extent this desire to avoid excessive volatility and avoid destabilizing financial markets, while advancing the central bank's other goals, implies the desirability of greater transparency is a disputed issue, as we will see below.

implications. Theory has provided useful insights as we shall see below, but most of its implications remain less than general. Our goal in this study is therefore to contribute new evidence on these questions. We develop a new index of central bank transparency, distinguishing its components and dimensions. We estimate its value for a larger sample of countries and range of years than in previous studies. Both the time dimension and the international dimension enable us to shed light on recent trends in transparency. They allow us to ask questions like: in what countries have central banks been growing more transparent, and why? If recent experience is a guide, how much further can we expect this trend to go? Next we analyze the impact of transparency on the behavior of economic outcomes, such as inflation variability and inflation persistence. An advantage of considering both the determinants of transparency and the effects is that we can use our analysis of the determinants to identify instrumental variables that address the concern that an observed correlation between outcomes and transparency reflects the impact of the former on the latter, rather than the other way around. We are not aware of a study that has attempted this before.

2. Theory

Economists are instinctually of the view that more information is better. In the present context they argue that having a central bank more fully communicate its objectives, its assessment of the linkages between policy actions and the economy, and its information about economic conditions will lead to a more efficient allocation of resources.¹¹ Policy will become more predictable. It will be easier for market participants to align their decisions with the central bank's. The economy will adjust more smoothly

¹¹ See Faust and Svensson (2001) and the discussion below.

to the low inflation and other conditions that are the authorities' objectives if agents can more accurately forecast the time path of interest rates on the basis of the information provided by the central bank.

By the same token, the theory of the second best suggests that removing one distortion may not always lead to a more efficient allocation of resources when other distortions are present. Thus, theorists have been able to come up with models formalizing counterexamples where greater transparency may not lead to a welfare improvement. Clever counterexamples are the economist's stock in trade; the question is how seriously to take them when formulating policy.

One way of characterizing the literature is in terms of which parameter or variable is not known with certainty: the weight the central bank attaches to different objectives and the realization of the stochastic disturbance in response to which the central bank acts. Consider first the case where there is uncertainty about the authorities' objectives. Faust and Svensson (2001) analyze a benchmark model where there is uncertainty about whether and how an independent central bank's objectives shift over time. When the central bank communicates those objectives more fully, the public is able to more accurately forecast future policy actions and economic outcomes, resulting in a more efficient allocation. Their set-up is the familiar Barro-Gordon (1983) model of inflationary bias due to the central bank's inability to precommit. In this model, if the central bank suddenly becomes more adverse to increases in the output gap, it will be more inclined to respond to them with surprise inflation; in response, the public raises its expectations of inflation, resulting in no change in the output gap but a higher level of inflation. Here having the central bank announce an inflation target (think of this as

greater transparency) allows the public to recognize more quickly that policy makers' objectives have changed. Because inflation expectations rise more quickly, surprise inflation becomes less attractive. Walsh (1999) provides a similar analysis in which the central bank can reduce uncertainty about its objectives by making public its inflation target. If the central bank incurs costs as a result of missing its target, more information about objectives reduces the average inflation bias.¹²

Geraats (2002) shows that the implications of greater transparency about objectives are more complex in a two-period set-up where the public uses observed inflation in period 1 to update its priors about the central bank's objectives when making decisions in period 2. As in Faust and Svensson, greater transparency about the central bank's objective eliminates uncertainty about inflation and output, improving outcomes. But, in addition, it removes the central bank's incentive to curtail inflation in period 1 in order to signal its type and increase the likelihood of a low-inflation outcome in period 2.

Assuming that inflation expectations are set by the private sector acting strategically instead of by agents passively forming rational expectations may also reverse the result that more transparency about objectives enhances welfare. Sorensen (1991) considers the case where wages are set by a risk-averse labor union whose demands depend on inflation expectations. Again, uncertainty about the central bank's objective raises the variance of inflation and output. But since the union is risk averse, it may demand wages lower than those corresponding to its unbiased forecast of inflation in order to limit volatility. This second effect will work to reduce the level of inflation and

¹² Assuming that the target equals the socially optimal rate.

increase the level of output.¹³ But this effect disappears if the central bank makes its objectives public information, so that the risk aversion of the wage-setting union no longer matters.

A second class of models uses a similar set-up to analyze transparency or sharing of information about economic conditions (the shocks hitting the economy) as opposed to sharing of information about the central bank's objectives. One can think of this as the central bank publishing its forecasts for the economy. Cukierman (2001) shows that if the central bank shares its private information about shocks, monetary policy loses the ability to stabilize disturbances, which can result in lower welfare. Cukierman (2001) and Gersbach (1998) show that full revelation of information about shocks may also cause inflation to become more variable. The higher variance of both output and inflation means that full central bank transparency about economic conditions reduces social welfare.¹⁴

As in all this literature, results are sensitive to specification. For example, Geraats (2000) removes the assumption that the central bank seeks to target a level of output above the natural rate. Here there is no inflationary bias. But if the central bank cuts interest rates to stabilize output in response to a negative demand shock that it observes but the private sector does not, it may encourage the private sector to expect additional

¹³ In a similar set-up, Gruner (2002) demonstrates that if the union is sufficiently risk averse, not only the level but also the variance of inflation may turn out to be lower as a consequence of greater uncertainty about the central bank's objectives.

¹⁴ Not surprisingly, the precise effects depend on what one assumes about the mechanism through which monetary policy affects output and inflation. In an alternative set-up where output depends not on the deviation of inflation from expectations but on the real interest rate, Cukierman (2001) shows that greater transparency about economic conditions has no impact on the variability of output and inflation, but it increases the volatility of interest rates (which may itself be costly). More generally, this is a reminder that the Barro-Gordon model of surprise inflation, which assumes that the central problem for monetary policy is inability to precommit, is a very special approach whose attractions may owe more to its analytical tractability and resonance with the inflationary 1970s and 1980s, when the model was developed, than to its applicability to other circumstances (including today's).

inflation. The central bank may then have an incentive to smooth interest rates in order to avoid undesirable shifts in inflation expectations, limiting its ability to fully offset demand shocks. Transparency (having the central bank share its information about economic conditions) will then free up stabilization policy and enhance welfare.¹⁵

This selective survey suffices to make the point. General conclusions based solely on theory remain elusive. Results are sensitive to what one assumes about the structure of the economy (the determinants of aggregate supply and demand, the channels through which monetary policy affects output and inflation), the stochastic structure (what relationships are subject to disturbances), the information environment (what the central bank knows that the private sector does not), the timing of actions and decisions, and the institutional setting (whether the central bank has the political independence to take decisions on the basis of an objective function that differs from that of the private sector or the government). Not surprisingly, the theoretical literature provides little guidance about how much transparency is desirable, where, and with what effects.

3. Previous empirical work

Empirical studies of the extent and effects of central bank transparency are still in their infancy. Most of these take the form of detailed studies of individual central banks,

¹⁵ Note, moreover, that most of this modeling assumes that the central bank is independent of the government and has a well-defined mandate. If, in fact, the central bank is not effectively independent and feels political pressure to adapt its policies to meet the needs of the government or special interest groups, it may wish to withhold information (limit transparency) in order to achieve a strategic advantage and better maximize its own objective function. Where commitment is impossible, making for an inflationary bias, and monetary policy is delegated to conservative central bankers, this strategic advantage may raise not just the central bank's welfare but that of society as well (Geraats 2000). Similarly, when the central bank's mandate is not well defined, it may have an incentive to obscure its targets, forecasts and model to insulate itself from criticism that it is failing to achieve its goals. Thus, Siklos (2002) argues that central banks were transparent in the 1950s and 1960s because the Keynesian doctrine of the time assigned to them an ability to stabilize output that they did not in fact possess. Correspondingly, the move to greater transparency and accountability was associated with increased precision and consistency in the definition of the objectives of monetary policy.

which describe the disclosure practices of the institution in detail and/or attempt to identify an effect of changes in disclosure practices on various financial and economic variables using time-series data.¹⁶ They are valuable for demonstrating the feasibility of bringing the concept of transparency to the data. Their limitations are the difficulty of knowing how far to generalize the findings of individual cases and the difficulty of identifying the impact of increased transparency on the basis of a time series, especially when there may be only one significant change in disclosure practices in the sample period and other things were going on at the same time.

More recently there have been a number of studies attempting to compare measure the degree of transparency of different central banks. But these studies attempt to measure transparency either for a very limited number of central banks or a single point in time. Examples include Eijffinger and Geraats (2002), who distinguish five dimensions of transparency: the political (that is, openness about policy objectives), economic (openness about data, models and forecasts), procedural (openness about the way decisions are taken, achieved mainly through the release of minutes and votes), policy (openness about the policy implications, achieved through prompt announcement and explanation of decisions), and operational (openness about the implementation of those decisions, in other words about control errors and macroeconomic disturbances affecting their magnitude), and three subcategories within each of these five dimensions.

¹⁶ Examples of studies that attempt to estimate the impact of greater disclosure include Muller and Zelmer (1999) for Canada, Chadha and Noland (2001) for the UK, Haldane and Read (2000) for the UK and US, and Kuttner and Posen (2000) for the US, Germany and Japan. There is a related literature examining the association of having an inflation-targeting regime with various measures of economic performance. This is a good point at which to observe that transparency is generally regarded as integral to the effective implementation of inflation targeting, although countries conventionally characterized as inflation targeters tend to differ in exactly how transparent they are, and inflation targeting as conventionally defined entails more than simply the disclosure of information. Thus, while the concepts overlap, they are distinct. It follows that empirical indices of whether or not a central bank targets inflation and how transparent it is, while correlated, measure different things.

Their overall index is the sum (equally weighted average) of the subindices for these five dimensions. The strength of this approach is its comprehensive, multidimensional definition of transparency; its limitation is that it is constructed for just nine central banks as of June 2001 (Reserve Bank of Australia, Bank of Canada, ECB, Bank of Japan, Reserve Bank of New Zealand, Swedish Riksbank, Swiss National Bank, Bank of England, and Federal Reserve). The results point to sharp differences between more and less transparent central banks as of this date (with the Reserve Bank of New Zealand, the Bank of England and the Swedish Riksbank at the top in terms of transparency, the Reserve Bank of Australia, the Bank of Japan and the Swiss National Bank at the bottom).

A related study is Bini-Smaghi and Gros (2001), who like Eijffinger-Geraats consider 15 aspects of central bank transparency.¹⁷ They implement their index for four countries: the Fed, the Bank of England, the Bank of Japan, and the ECB. De Haan, Amtembrink and Waller (2004) develop a similar index for six countries.¹⁸ Siklos (2002) expands coverage to 20 central banks, all from advanced industrial countries. Methodologically there is again considerable overlap with the contemporaneous work of Eijffinger-Geraats and Bini-Smaghi-Gros.¹⁹ Siklos' ranking has the Bank of England, the Fed and the Riksbank as one, two and three, and the Austrian National Bank, the Bank of France, and the National Bank of Belgium bringing up the rear.

¹⁷ Although they group these into three broad categories rather than five.

¹⁸ In an unpublished companion paper (De Haan and Amtembrink 2002) two of the authors apply a similar methodology to 15 countries.

¹⁹ Siklos takes an unweighted average of 11 subindices, whereas Eijffinger and Geraats take an unweighted average of five. But Eijffinger and Geraats distinguish three equally-weighted aspects of each of their five dimensions, making for a total of 15 questions. Siklos distinguishes subtopics in the case of three of his 11 questions.

The most comprehensive such study of which we are aware is Fry et al. (2000). The advantage of their measure (which is why we consider it further below) is its wide country coverage, based on a survey of 94 central banks. Its corresponding limitation is a more restrictive definition of transparency. Their measure is an equally-weighted index made up of three elements: a measure of whether the central bank provides prompt public explanations of its policy decisions, a measure of the frequency and form of forward-looking analysis provided to the public, and a measure of the frequency of bulletins, speeches and research papers. But one can question the unbiasedness of an index constructed on the basis of a survey of central banks, especially when that survey is administered by the International Monetary Fund, which has a known interest in transparency. Finally, that their data are for 1998 is less than ideal, given the changes in transparency practices in subsequent years.

A number of authors have used these measures to examine their relationship with various economic and financial variables. Demertzis and Hughes Hallett (2003) employ the Eijffinger-Geraats index to examine the relationship between central bank transparency and the level and variability of inflation and the output gap. The results suggest a negative relationship between inflation variability and central bank transparency, but not between the level of inflation and transparency. The former relationship appears to be driven by the subindices for economic and operational transparency (whether the central bank discloses information about data, its models, its forecasts, and the disturbances to which monetary policy is subject). There is no relationship between transparency and average output deviations but a strong positive relationship between transparency and the variability of output. The latter relationship

seems to be driven mainly by the subindex for operational transparency. Note that the positive association of transparency with output variability is consistent with theoretical studies suggesting that more transparency may make for more volatile inflation expectations, to which a central bank may respond by using its monetary instruments less actively, limiting its effectiveness as an instrument of stabilization policy.²⁰ That said, it is clear that one should not put too much weight on empirical results when there are only nine observations and nothing is done to control for other country characteristics and the possibility of reverse causality.

Chortareas et al. (2001) and Cecchetti and Krause (2001) utilize the Fry et al. index in similar analyses. Chortareas et al. focus on whether the central bank publishes a forward-looking analysis of economic prospects: they find that this measure of disclosure reduces average inflation, even in the presence of controls.²¹ Cecchetti and Krause examine the impact of transparency on inflation and output variability and find a weak negative association with a weighted average of these two variability measures.

Evidently, existing empirical studies do not all point to consistent conclusions. Many are based on very limited country samples or utilize evidence for a single point in time. Cross sections, unlike panel data, do not permit the inclusion of country fixed effects, giving grounds for worrying that an observed correlation between transparency and economic outcomes may be picking up the effects of other country characteristics that are difficult to capture. Moreover, central banks that are transparent about their policies are not likely to be selected randomly from the larger population. The theoretical literature suggests that there are systematic reasons, having to do with a country's history,

²⁰ See Eijffinger, Hoeberichts and Schaling (2000) as well as the citations above.

²¹ Not surprisingly, it does not hold for countries with pegged exchange rates, for which inflation is given by foreign conditions.

its economic structure, and even the behavior of the economic and financial variables of interest, why its central bank may opt for more or less transparency.

4. Our Indices

Our approach seeks to combine the strengths of these previous studies. Thus, we follow Eijffinger and Geraats in acknowledging that there exist multiple dimensions of central bank transparency, rather than focusing on a small handful as in Fry et al. We draw our data from information found on central banks' websites, statutes, annual reports, and other published documents, rather than sending a survey instrument to the central banks themselves and relying on the subjectivity of the responding staff. But we follow Fry et al. by gathering this information for as large a number of central banks as possible.

In addition, we add a time dimension by gathering the same information for every year from 1998 through 2005. The starting year of 1998 facilitates comparisons of our measure with that of Fry et al. Our analysis uses only the observations through 2004, since some of the ancillary variables used in the econometrics are not yet available for 2005. Where there was a change in some aspect of transparency over the course of a calendar year, we took the value that prevailed for the majority of the year. Adding this time dimension was particularly challenging, since many central bank websites describe current practice but not that of prior years. For this we had to rely mainly on published documents.²²

²² We were able to access a relatively complete run of these on the basis of holdings in the University of California and Joint IMF-World Bank libraries. We are grateful to the staff of the Joint Bank-Fund library for granting us access to their collection.

We were able to assemble this information for 100 central banks. This is the vast majority of central banks in the world (recall that there are more countries than there are central banks, given the existence of monetary unions). Most of the omissions are central banks of micro-states: our sample includes the central banks of all large, systemically significant countries.²³

The 15 criteria forming our index of central bank transparency, adapted from Eijffinger and Geraats, are shown in the appendix. These are designed to capture five broad aspects of transparency: political, economic, procedural, policy and operational. The resulting index thus runs from 0 to 15.

Table 1 shows the results by country and region. The most transparent central banks in 2005, according to our coding, were, in descending order, the Reserve Bank of New Zealand, the Swedish Riksbank, the Bank of England, the Czech National Bank, the Bank of Canada, the ECB, and the Central Bank of the Philippines. We see here most of the usual suspects that have received high marks for transparency in previous studies (New Zealand, Sweden, the UK, Canada) but also some additions (the Czech Republic, the Philippines), which is a reminder of the advantages of broad country coverage and of the fact that a number of countries with relatively opaque central banking practices have been moving rapidly in the direction of greater transparency in recent years. The seven least transparent central banks in the sample were those of Aruba, Bermuda, Ethiopia,

²³ But there are a few additional omissions, reflecting cases where we were not able to glean information from a central bank's website or its publications. And in cases where the central bank provides this information only in the language of its own country and we could not translate it. Among the prominent omissions from our sample are Bolivia, Ecuador, Chad, Iran, and Afghanistan. We are aware that this creates a form of sampling bias: we tend to oversample more transparent central banks. There exist econometric corrections for this bias (involving strong assumptions), although we have not implemented these yet. Our defense is that the number of consequential omissions is relatively slight.

Kuwait, Libya, Saudi Arabia and Yemen. Table 2 shows our coding of the 15 individual components for these 14 countries as of 2005.

In terms of broad regional patterns (taking unweighted averages of the countries making up a region), we see the highest level of transparency in Australia-New Zealand, followed by Western Europe, Northern Europe, South East Asia, Southern Africa, and North America. What may catch the reader's eye is that South East Asia and Southern Africa are scored as more transparent than North America. The explanation, obviously, is that there is considerable variation within regions, and especially where a region is composed of a relatively small number of countries one outlier can make a big difference.²⁴ When we instead take GDP-weighted averages, the most transparent regions, in descending order, are Europe (led by Northern Europe), Oceania, Southern Africa (led by South Africa) and North America (lower weights on its relatively transparent small economies causes South East Asia to drop down). Either way, the lowest levels of transparency, starting from the bottom, are those of Northern Africa, Eastern Africa, Western Africa, and Melanesia – no surprises here.

We can also compare different dimensions of central bank transparency. In 2005, 63 central banks received relatively high scores (2 or more) for political transparency (inter alia, providing a quantitative definition of their objectives to the public).²⁵ Economic transparency (disclosing data, the policy model and forecasts to the public) is less is far less; only 5 central banks receive the highest possible rating. The picture is similar for procedural transparency (the release of minutes and votes), where only three

²⁴ Thus, the score for North America is dragged down by the low value for Bermuda.

²⁵ Up from 47 in 1998.

central banks receive the highest possible score.²⁶ And again for policy transparency (prompt announcement and comprehensive explanation of policy decisions), where only the Reserve Bank of New Zealand, the Swedish Riksbank and the Fed receive a score of 2.5. Again, no central bank receives a perfect score of 3 for operational transparency (release of information about disturbances, control errors, etc.).

We can compare our index (denoted DE) for 1998 with that of Fry et al. for the same year for the 67 countries that are common to the two samples. Figure 1 shows that the two measures are positively correlated (the correlation coefficient is 0.57). For ease of comparison we have scaled both indices so that they run from zero to 100. It is not surprising that central bank staff, when asked their subjective opinion of the transparency of their own institution, rank it higher than we rate it on the basis of published information. The case where our estimate of transparency exceeds that of Fry et al. by the most is Uruguay, while that for which the opposite is true is Indonesia.²⁷ We do not have a ready explanation for the coding differences for these particular observations.

An innovation of our study is to trace central bank transparency over time. The average transparency score in our sample rose from 3.4 in 1998 and 5.2 in 2005. Exactly zero of our 100 countries moved in the direction of less transparency over this year period. Figure 2 is a scatter diagram comparing our measure of transparency in 1998 and 2005 (with 2005 on the vertical axis). There are only 11 countries on the diagonal, indicating no increase in transparency, while the remaining 89 cases are all above and to the left of it.

²⁶ Up from 2 in 1998, where the addition is Sweden.

²⁷ The other two exceptions are Mauritius and Bahrain.

Figure 3 shows transparency by level of economic development. Consistent with the preceding discussion, central banks in the advanced countries are more transparent than central banks in emerging markets (defined as middle-income countries with significant links to international financial markets), which in turn are more transparent than central banks in developing countries. Consistent with the implication of Figure 2 above, there have been increases in central bank transparency in all three country groups. Perhaps most strikingly, the increase among emerging markets is, on average, as large in absolute value as the increase among advanced countries; the corresponding increase among developing countries is smaller.

5. Regression Analysis

We now use regression analysis to characterize more systematically differences in central bank transparency across countries and over time. Our goals here are two-fold: to work toward an explanation for these variations, and to find instruments that can be used in our analysis of the effects of transparency. We start with cross-section results for 1998-2004, with all variables averaged over the period.²⁸ We regress transparency on a vector of potential economic determinants: inflation history (defined as the lagged log first difference of the consumer price index), openness (the ratio of exports to GDP), and financial depth (defined as the ratio of M2 to GDP). In addition we include a range of potential political determinants of transparency: rule of law, political stability, voice and accountability, and government efficiency (all taken from Kaufmann, Kraay and

²⁸ 2004 being the most recent year for which all the ancillary variables are available). The results for individual years show the same patterns but lower levels of significance. This makes sense, insofar as changes in central-bank practice develop gradually and are unlikely to respond to changes in economic or political conditions in a single year; looking at longer-period averages thus increases the signal-to-noise ratio.

Mastruzzi, 2005). These political variables are noticeably correlated with one another, so in Table 3 we include them one at a time.

The results suggest that central banks of countries with a history of inflation tend to be more transparent, other things equal, presumably as part of a credibility-building strategy. This is not something that would have been anticipated from the contrast between transparency in advanced and developing countries. (In fact, interpretation of this variable is a bit complex; we will have more to say about this below.) Central banks in more open economies appear to be less transparent; again, this is not something that we would have anticipated from high-profile cases like New Zealand or Sweden. Again, we will have more to say about this correlation below. Finally, we find that central banks tend to be more transparent in countries with better developed financial markets, as if communication with the markets is important, although the statistical significance of this last effect varies.

The political variables all have their expected signs and are significant at the 99 per cent confidence level when entered individually. Greater transparency characterizes central bank operations in countries that rank higher in terms of rule of law, that have more stable political systems, that have higher ratings in terms of voice and accountability, and that are more favorably regarded in terms of government efficiency. The correlation of these political variables with central bank transparency will be useful when we consider the impact of transparency on economic and financial variables below. Whereas it is not hard to come up with an argument for why the transparency of monetary policy should affect inflation, financial markets, or the development of trade, it is harder to concoct a story for why it should have a first-order effect on, say, rule of law,

which depends on the larger political and social setting and is the product of a country's history. It can thus be argued that such political variables satisfy the two criteria for a valid instrument: exogeneity and correlation with the explanatory variable of interest.

Table 4 shows that these results carry over to specifications in which we include several of these political variables simultaneously. Past inflation, openness and financial depth enter with the same signs and significance levels as before. The political variables all enter positively, although because of the inevitable multicollinearity (they all measure different aspects of the same phenomenon) not all of them are individually significant.²⁹

We can also use this specification to consider factors influencing evolution in central bank transparency over time. In Tables 5 and 6 we pool the annual observations and estimate fixed-effects models, including separate intercepts for each country. (The standard Hausmann and Breusch-Pagan tests reject random effects and simple pooling in favor of fixed effects.) The resulting estimates are now driven by the time series variation in the data; they thus tell us something about why central bank practice is evolving in the direction of greater transparency. Note that several of the economic variables have different signs than in Tables 3-4. While financial depth is still associated with greater monetary-policy transparency, as before, the coefficients on past inflation and openness have reversed signs. The interpretation would be that as countries bring down inflation, they are better able to operate a transparent, predictable monetary policy, and as they become more open they find it even more important to communicate with the markets. This provides an intuitive explanation of the economic conditions conducive to the most to greater central bank transparency in recent years.

²⁹ F-tests uniformly reject the null of joint insignificance for the political variables as a group in each equation of Table 4.

Less intuitive is that greater political and social stability now appears to have a negative impact on monetary-policy transparency. This does not appear to be a spurious correlation; we find the same thing when we include different political variables, individually or in combination. The result is not intuitive because as Figure 4 shows there is a positive cross-section correlation between the two variables. Recall, however, that fixed-effects regressions eliminate the cross section variation. We suspect that what we are seeing is the fact that advanced countries with highly-transparent central banks and stable political systems cannot move much further in those directions (they contribute relatively little to the variation in the data), while countries that are not as admirable in terms of political stability and rule of law (Brazil? Colombia? Indonesia? Thailand? Philippines?) have been moving in the direction of greater central bank transparency precisely in order to insulate monetary policy from political problems.

We can also analyze the determinants of the components of the transparency index to gain further insight into exactly how practice responds to these economic and political factors. Table 7 shows the determinants of political transparency (the public provision of a quantitative definition of the objectives of monetary policy). Not surprisingly, political transparency is a positive function of political development and stability (whether this is measured by rule of law, political turnover, voice and accountability or government efficiency). The cross-section regressions for 2004 also suggest, more surprisingly, that political transparency appears to decline with financial depth. However, regressions for other years and for the period averages indicate that this result is not robust.

Economic transparency (the public disclosure of data, the policy model and forecasts) is again positively related to political development and stability (Table 8). It is positively related to financial development, as one would expect. More surprisingly, it appears to be less in more open economies, other things equal. Procedural transparency (the release of minutes and votes) is related, again positively, only to political development and stability (Table 9). In contrast, policy transparency (prompt announcement and comprehensive explanation of policy decisions) is greater in countries with more stable and open political systems but also less in more open economies, or so the regressions on the period averages suggest (Table 10). Finally, it would appear that operational transparency (release of information about disturbances, control errors, etc.) is again greater in countries with more stable political systems but also in countries with more developed financial markets, while it is less in more open economies (Table 11).

Overall, the analysis of components confirms that transparency is greater in countries with more stable and developed political systems and deeper and more developed financial markets. The one surprise is the negative association between some components of transparency and economic openness, although the robustness of this association may be questioned.

6. Effects of Transparency

We now explore the effects of monetary policy transparency. Some previous studies (viz. Mishkin 2004) suggest that greater transparency should be associated with a reduction in uncertainty about future policy actions and thus with a reduction in inflation volatility. Others (viz. Ball and Sheridan 2005) have found evidence of a reduction in the

average rate of inflation (but not in the rate or volatility of growth). Here we consider the impact on inflation variability and persistence and on output variability. In contrast to previous studies we account for the endogeneity of monetary policy transparency by using the political variables utilized to explain the degree of transparency in Section 5 above as instruments for transparency in this section's (second-stage) regressions.

Table 12 reports the estimates for the determinants of inflation variability. Past inflation is positively related to inflation variability, while financial depth is negatively related to inflation variability (at least in column 5); however, the signs and significance of these two variables change when they are entered together, since they are correlated. The coefficient on transparency is negative and, in most cases, statistically significant. (To repeat, transparency is treated as endogenous and instrumented accordingly.) This result is consistent with mainstream theories suggesting that more transparency in the conduct of monetary policy allows the public to respond more quickly to policy adjustments, in turn discouraging the authorities from attempting to manipulate inflation in the pursuit of other objectives.

Table 13 considers the determinants of inflation persistence. In most cases transparency, appropriately instrumented, enters negatively, and in about half the specifications it is significant either at the 90 or 95 per cent confidence level. Again this is consistent with the notion that greater policy transparency allows the public to adjust more quickly, in turn limiting the incentive for the central bank to run persistently inflationary policies in the effort to achieve objectives other than the maintenance of price stability.

Table 14 considers an alternative specification, where the dependent variable is current inflation and the explanatory variables include lagged inflation (the coefficient on which picks up inflation persistence) and also the interaction of lagged inflation with the fitted value of transparency from the first-stage regression. Here the coefficient on the interaction term tells us whether inflation persistence is greater, lesser or no different in countries where the conduct of monetary policy is more transparent. The coefficient on that interaction is negative, consistent with earlier results, but not significant at standard confidence levels.

Finally, in Table 15 we consider the determinants of output variability. Here analytical work offers competing predictions: as noted above, some models suggest that greater policy transparency should be associated with more stability because it allows the public to adjust more quickly and smoothly to policy actions; but others suggest that a more transparent monetary policy may be associated with more output volatility because it prevents the authorities from using policy as actively to offset output fluctuations (policy actions instead feeding through more quickly into inflation and hence deterring policy activism). Our results should be regarded as tentative, since we have only annual data on output for the broad sample of countries that is our subject, forcing us to measure output variable as the standard deviation of the growth rate over the most recent three year period.³⁰ For what they are worth, our preliminary regressions suggest a negative impact of monetary policy transparency on output variability. Significance levels vary depending on specification.

³⁰ The current calendar year and its two immediate predecessors.

7. Conclusion

The move toward greater transparency in central bank operations is the most dramatic change in the conduct of monetary policy in recent years. We understand this as a political response to other changes in the monetary policy environment. It is a way of ensuring the accountability of policy makers when the traditional mechanisms for doing so – public monitoring of compliance with an exchange rate commitment and direct oversight by a government with formal control – are in decline, reflecting the shift to flexible exchange rates and central bank independence.

In this paper we have assembled new information on the extent of the trend and provided some preliminary analysis of its effects. The trend is general – a large number of central banks have moved in the direction of greater independence in recent years. The question is whether it will prove durable or be a passing phase. In part, the answer depends on the consequences. Our preliminary analysis suggests broadly favorable if relatively weak impacts on inflation and output variability. If institutional arrangements that produce favorable results retain public support, then this suggests that the trend toward greater monetary policy transparency is here to stay.

The other way of approaching this question is to ask whether the changes in the larger policy environment that precipitated the move toward greater transparency in monetary policy might themselves be rolled back. We see the abandonment of pegged exchange rates as a response to financial liberalization and greater central bank independence as a way of insulating the conduct of monetary policy from short-term political pressures in democracies. If financial globalization and political

democratization are here to stay, then so too is greater transparency in the conduct of monetary policy.

Data Appendix

This appendix describes the construction of the transparency index. The index is the sum of the scores for answers to the fifteen questions below (min = 0, max = 15).

1. Political Transparency

Political transparency refers to openness about policy objectives. This comprises a formal statement of objectives, including an explicit prioritization in case of multiple goals, a quantification of the primary objective(s), and explicit institutional arrangements.

(a) Is there a formal statement of the objective(s) of monetary policy, with an explicit prioritization in case of multiple objectives?

No formal objective(s) = 0.

Multiple objectives without prioritization = 1/2.

One primary objective, or multiple objectives with explicit priority = 1.

(b) Is there a quantification of the primary objective(s)?

No = 0.

Yes = 1.

(c) Are there explicit institutional arrangements or contracts between the monetary authorities and the government?

No central bank, contracts or other institutional arrangements = 0.

Central bank without explicit instrument independence or contract = 1/2.

Central bank with explicit instrument independence or central bank contract although possibly subject to an explicit override procedure) = 1.

2. Economic Transparency

Economic transparency focuses on the economic information that is used for monetary policy. This includes economic data, the model of the economy that the central bank employs to construct forecasts or evaluate the impact of its decisions, and the internal forecasts (model based or judgmental) that the central bank relies on.

(a) Is the basic economic data relevant for the conduct of monetary policy publicly available? (The focus is on the following five variables: money supply, inflation, GDP, unemployment rate and capacity utilization.)

Quarterly time series for at most two out of the five variables = 0.

Quarterly time series for three or four out of the five variables = 1/2.

Quarterly time series for all five variables = 1.

(b) Does the central bank disclose the formal macroeconomic model(s) it uses for policy analysis?

No = 0.

Yes = 1.

(c) Does the central bank regularly publish its own macroeconomic forecasts?

No numerical central bank forecasts for inflation and output = 0.

Numerical central bank forecasts for inflation and/or output published at less than quarterly frequency = 1/2.

Quarterly numerical central bank forecasts for inflation and output for the medium term (one to two years ahead), specifying the assumptions about the policy instrument (conditional or unconditional forecasts) = 1.

3. Procedural Transparency

Procedural transparency is about the way monetary policy decisions are taken. It involve an explicit monetary policy rule or strategy that describes the monetary policy framework, an account of policy deliberations and how the policy decision was reached.

(a) Does the central bank provide an explicit policy rule or strategy that describes its monetary policy framework?

No = 0.

Yes = 1.

(b) Does the central bank give a comprehensive account of policy deliberations (or explanations in case of a single central banker) within a reasonable amount of time?

No, or only after a substantial lag (more than eight weeks) = 0.

Yes, comprehensive minutes (although not necessarily verbatim or attributed) or explanations (in case of a single central banker), including a discussion of backward and forward-looking arguments = 1.

(c) Does the central bank disclose how each decision on the level of its main operating instrument or target was reached?

No voting records, or only after substantial lag (more than eight weeks) = 0.

Non-attributed voting records = 1/2.

Individual voting records, or decision by single central banker = 1.

4. Policy Transparency

Policy transparency means prompt disclosure of policy decisions. In addition, it include an explanation of the decision, and an explicit policy inclination or indication of likely future policy actions.

(a) Are decisions about adjustments to the main operating instrument or target promptly announced?

No, or after a significant lag = 0.

Yes, at the latest on the day of implementation = 1.

(b) Does the central bank provide an explanation when it announces policy decisions?

No = 0.

Yes, when policy decisions change, or only superficially = 1/2.

Yes, always and including forwarding-looking assessments = 1.

(c) Does the central bank disclose an explicit policy inclination after every policy meeting or an explicit indication of likely future policy actions (at least quarterly)?

No = 0.

Yes = 1.

5. Operational Transparency

Operational transparency concerns the implementation of the central bank's policy actions. It involves a discussion of control errors in achieving operating targets and (unanticipated) macroeconomic disturbances that affect the transmission of monetary policy. Furthermore, the evaluation of the macroeconomic outcomes of monetary policy in light of its objectives is included here as well.

(a) Does the central bank regularly evaluate to what extent its main policy operating

targets (if any) have been achieved?

No, or not very often (at less than annual frequency) = 0.

Yes, but without providing explanations for significant deviations = 1/2.

Yes, accounting for significant deviations from target (if any); or, (nearly) perfect control over main operating instrument/target = 1.

(b) Does the central bank regularly provide information on (unanticipated) macroeconomic disturbances that affect the policy transmission process?

No, or not very often = 0.

Yes, but only through short-term forecasts or analysis of current macroeconomic developments (at least quarterly) = 1/2.

Yes, including a discussion of past forecast errors (at least annually) = 1.

(c) Does the central bank regularly provide an evaluation of the policy outcome in light of its macroeconomic objectives?

No, or not very often (at less than annual frequency) = 0.

Yes, but superficially = 1/2.

Yes, with an explicit account of the contribution of monetary policy in meeting the objectives = 1.

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Figure 1. Comparison of DE and Fry et al. Indices for 1998

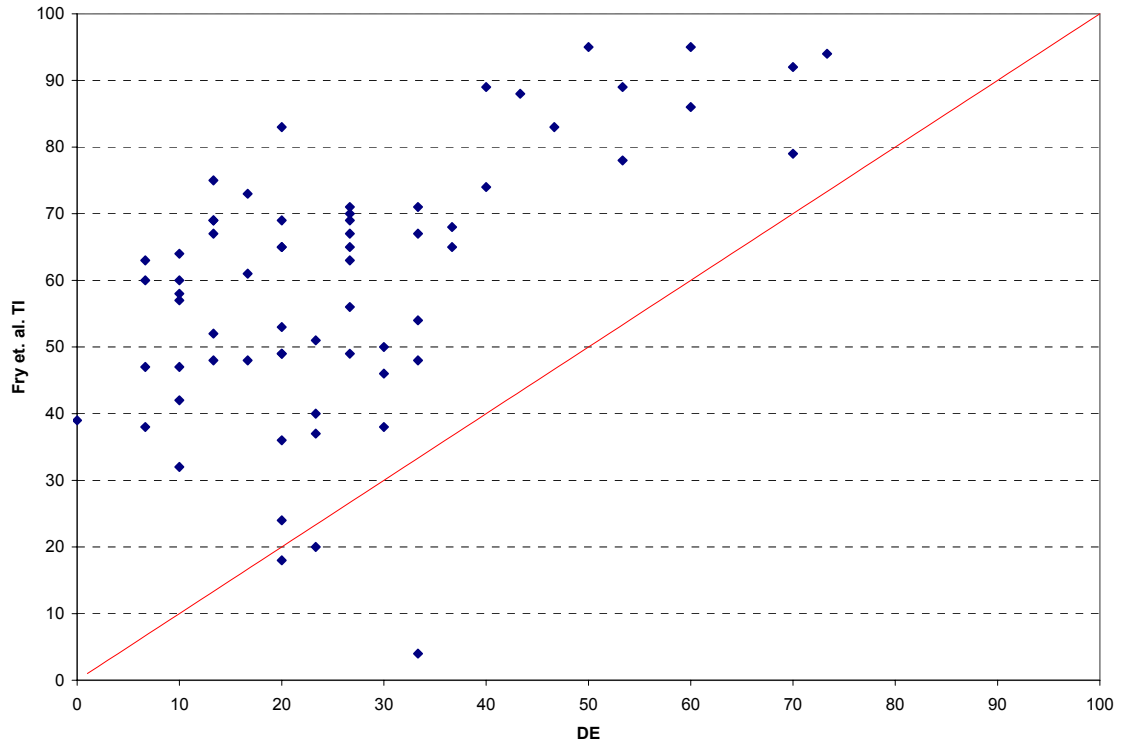


Figure 2. Comparison of Transparency in 1998 and 2005

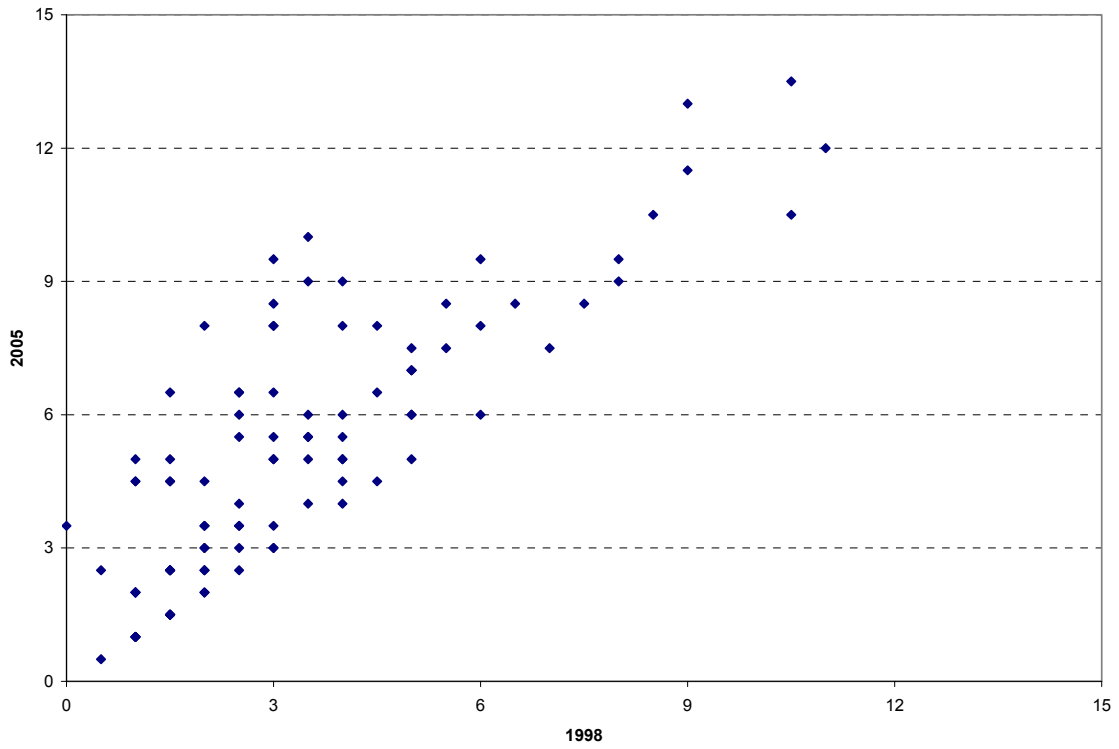


Figure 3. Trends in Transparency by Level of Economic Development

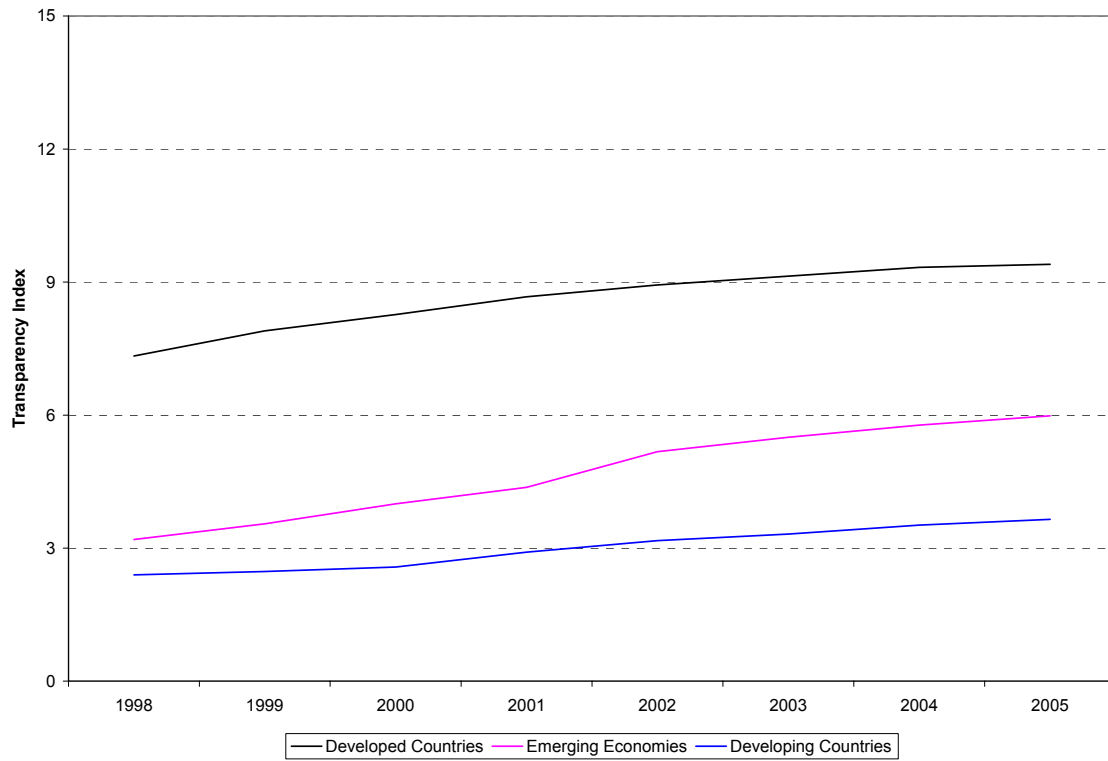


Figure 4. Transparency and Rule of Law

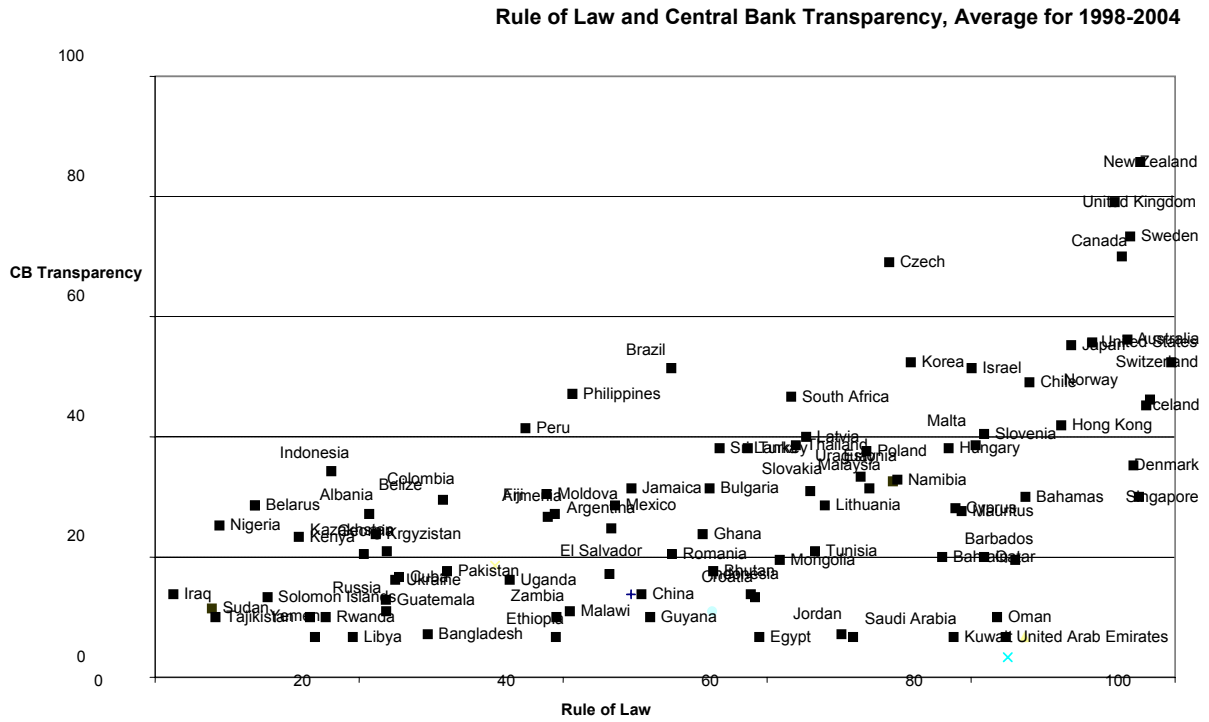


Table 1. Transparency, by Region

	1998	1999	2000	2001	2002	2003	2004	2005
Africa	2.2	2.2	2.5	3.0	3.2	3.5	3.5	3.9
Eastern Africa	1.7	1.8	1.9	2.4	2.6	2.6	2.6	2.8
Ethiopia	1	1	1	1	1	1	1	1
Kenya	2	2	2.5	4.5	4.5	4.5	4.5	4.5
Malawi	0.5	0.5	0.5	2.5	2.5	2.5	2.5	2.5
Mauritius	3.5	3.5	3.5	3.5	5	5	5	5
Rwanda	1.5	1.5	1.5	1.5	1.5	1.5	1.5	2.5
Uganda	2	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Zambia	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Northern Africa	1.4	1.4	1.6	1.6	2.0	2.0	2.0	2.3
Egypt	1	1	1	1	1	1	1	2
Libyan Arab Jamahiriyah	1	1	1	1	1	1	1	1
Sudan	1	1	2	2	2	2	2	2
Tunisia	2.5	2.5	2.5	2.5	4	4	4	4
Southern Africa	3.0	3.0	3.7	5.0	5.3	5.7	6.0	7.2
Lesotho	1	1	1.5	1.5	1.5	2.5	2.5	4.5
Namibia	4	4	4.5	4.5	5.5	5.5	6.5	8
South Africa	4	4	5	9	9	9	9	9
Western Africa	2.7	2.7	2.7	2.8	2.8	3.5	3.5	3.5
Ghana	3	3	3	3	3	5	5	5
Nigeria	3.5	3.5	3.5	4	4	4	4	4
Sierra Leone	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5

(con't.) Table 1. Transparency, by Region

	1998	1999	2000	2001	2002	2003	2004	2005
Americas								
<i>Latin America and the Caribbean</i>								
East Caribbean	2.7	2.8	2.9	3.4	3.7	3.8	4.0	4.0
Aruba	2.5	2.5	3	5.5	5.5	5.5	5.5	5.5
Bahamas	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Barbados	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Cuba	2.5	3	3	3	3	3	3	3
Jamaica	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Trinidad and Tobago	3	3	3	4.5	6.5	6.5	6.5	6.5
	3.5	3.5	3.5	3.5	3.5	4	5.5	5.5
<i>Central America</i>								
Belize	2.4	2.4	2.4	3.0	3.0	3.1	4.1	4.1
El Salvador	2	2	2	3.5	3.5	3.5	3.5	3.5
Guatemala	2	2	2	3	3	3	3	3
Mexico	1.5	1.5	1.5	1.5	1.5	1.5	4.5	4.5
	4	4	4	4	4	4.5	5.5	5.5
<i>South America</i>								
Argentina	3.9	4.3	4.9	5.1	5.7	6.1	6.1	6.1
Brazil	3	3	3	3	3	5.5	5.5	5.5
Chile	3.5	5.5	9	9	9	9	9	9
Colombia	7	7	7.5	7.5	7.5	7.5	7.5	7.5
Guyana	2.5	3.5	3.5	3.5	6	6	6	6
Peru	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Uruguay	4.5	4.5	4.5	6	8	8	8	8
	5	5	5	5	5	5	5	5
	9	9.5	9.5	9.5	9.5	9.5	9.5	9.5
<u>Northern America</u>								
Bermuda	6.3	6.7	6.7	6.7	6.7	6.7	6.7	6.7
Canada	1	1	1	1	1	1	1	1
United States of America	10.5	10.5	10.5	10.5	10.5	10.5	10.5	10.5
	7.5	8.5	8.5	8.5	8.5	8.5	8.5	8.5

(con't.) Table 1. Transparency, by Region

	1998	1999	2000	2001	2002	2003	2004	2005
Oceania								
Australia and New Zealand								
Australia	5.4	6.4	6.4	6.8	7.3	7.3	7.4	7.4
New Zealand	9.3	10.5	10.5	10.5	11.3	11.3	11.3	11.3
	8	8	8	8	9	9	9	9
	10.5	13	13	13	13.5	13.5	13.5	13.5
Melanesia								
Fiji	1.5	2.3	2.3	3.1	3.3	3.3	3.5	3.5
Papua New Guinea	1.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Solomon Islands	1	1	1	3.5	4	4	5	5
Vanuatu	2	2	2	2	2	2	2	2
	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5
Asia								
	3.0	3.2	3.5	3.8	4.3	4.6	4.9	5.1
Central Asia								
Kazakhstan	2.7	2.7	2.7	3.0	3.0	2.7	3.3	4.0
Kyrgyzstan	3.5	3.5	3.5	3.5	3.5	3.5	3.5	5.5
Tajikistan	3	3	3	4	4	3	5	5
	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Eastern Asia								
China	4.6	4.8	5.2	5.2	5.7	6.3	6.6	6.6
Hong Kong	1	1	1	1	1.5	4.5	4.5	4.5
Korea	5	6	6	6	7	7	7	7
Japan	6.5	6.5	8	8.5	8.5	8.5	8.5	8.5
Mongolia	8	8	8.5	8	8	8	9.5	9.5
	2.5	2.5	2.5	2.5	3.5	3.5	3.5	3.5
Southern Asia								
Bangladesh	2.3	2.3	2.3	2.4	3.0	3.5	3.9	3.9
Bhutan	0	0	0	0.5	0.5	3	3.5	3.5
India	2	2	2	2	3.5	3.5	3.5	3.5
Pakistan	2	2	2	2	2	2	2	2
Sri Lanka	2.5	2.5	2.5	2.5	2.5	2.5	3.5	3.5
	5	5	5	5	6.5	6.5	7	7

(con't.) Table 1. Transparency, by Region

	1998	1999	2000	2001	2002	2003	2004	2005
South-Eastern Asia								
Indonesia	3.0	3.9	4.9	5.5	6.4	7.1	7.3	7.5
Malaysia	3	4.5	4.5	4.5	4.5	7	8	8
Philippines	4	4	5	5	5	5	5	5
Singapore	3.5	5	5	6	10	10	10	10
Thailand	2.5	4	4	5.5	4.5	5.5	5.5	6.5
	2	2	6	6.5	8	8	8	8
Western Asia								
Armenia	2.3	2.4	2.5	2.8	3.2	3.2	3.3	3.4
Bahrain	4	4	4	4	4	4	4	4
Cyprus	3	3	3	3	3	3	3	3
Georgia	2.5	2.5	2.5	3.5	6	6	6.5	6.5
Iraq	3	3	3	3	3	3.5	3.5	3.5
Israel	2	2	2	2	2	2	2.5	2.5
Jordan	5.5	7	7.5	8.5	8.5	8.5	8.5	8.5
Kuwait	1	1	1	1	1	1	1.5	2
Oman	1	1	1	1	1	1	1	1
Qatar	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Saudi Arabia	3	3	3	3	3	3	3	3
Turkey	1	1	1	1	1	1	1	1
United Arab Emirates	3	2	4	5.5	8.5	8.5	8.5	8.5
Yemen	1	1	1	1	1	1	1	2
	1	1	1	1	1	1	1	1

(con't.) Table 1. Transparency, by Region

	1998	1999	2000	2001	2002	2003	2004	2005
Europe	5.2	5.5	5.8	6.2	6.7	7.1	7.4	7.5
Eastern Europe	3.4	3.9	4.3	4.5	5.4	5.5	6.0	6.4
Belarus	1.5	3.5	5	5	5	5	5	5
Bulgaria	4.5	4.5	4.5	4.5	4.5	4.5	6	6.5
Czech Republic	9	10	10	10	10.5	11.5	11.5	11.5
Hungary	3	3	4.5	5.5	8	8	8	9.5
Poland	3	5	5	6.5	6.5	6.5	7	8
Republic of Moldova	4	4	4	5	5	5	5	5
Romania	1.5	1.5	1.5	1.5	4.5	4.5	6.5	6.5
Russian Federation	1.5	1.5	1.5	1.5	1.5	1.5	2.5	2.5
Slovakia	4	4	4.5	3.5	5.5	5.5	5.5	6
Ukraine	2	2	2	2	3	3	3	3
Northern Europe	6.4	6.6	6.9	7.2	7.6	7.8	7.8	7.9
Denmark	5	5	5	5	5	6	6	6
Estonia	5	5	5.5	5.5	5.5	5.5	5	6
Iceland	5.5	5.5	7	7	7.5	7.5	7.5	7.5
Latvia	6	6	6	6	6	6	6	6
Lithuania	4	4	4	4.5	4.5	4.5	4.5	4.5
Norway	6	6	6	7.5	7.5	7.5	8	8
Sweden	9	9	10	10	13	13	13	13
United Kingdom	11	12	12	12	12	12	12	12
Southern Europe	3.8	3.8	3.9	4.1	4.8	5.5	5.8	5.8
Albania	3.5	3.5	3.5	3.5	3.5	5	6	6
Croatia	1.5	1.5	1.5	2.5	2.5	2.5	2.5	2.5
Malta	5	5	5.5	5.5	5.5	7	7	7
Slovenia	5	5	5	5	7.5	7.5	7.5	7.5
Western Europe	7.3	7.8	8.0	9.0	9.0	9.5	10.0	10.0
Switzerland	6	7	7.5	8	8	9	9.5	9.5
European Union	8.5	8.5	8.5	10	10	10	10.5	10.5

Table 2. Components of the Index for the 14 countries with extreme values

	TI	1a	1b	1c	2a	2b	2c	3a	3b	3c	4a	4b	4c	5a	5b
New Zealand	13.5	1	1	1	1	1	1	1	1	1	1	0.5	1	1	0.5
Sweden	13	0.5	1	0.5	1	1	1	1	1	1	1	0.5	1	1	1
UK	12	1	1	1	0.5	1	1	1	1	1	1	0.5	0	1	0.5
Czech Republic	11.5	1	1	1	1	1	1	1	1	0.5	1	0.5	0	0	0.5
Canada	10.5	1	1	1	1	1	0.5	1	0	0	1	1	0	1	0.5
Euro area	10.5	1	1	1	1	1	1	1	0	0	1	0.5	0	1	0.5
Philippines	10	1	1	1	1	0	1	1	1	0.5	1	0.5	0	0	0.5
Bermuda	1	0.5	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Ethiopia	1	0.5	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Kuwait	1	0.5	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Libya	1	0.5	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Yemen	1	0.5	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Aruba	0.5	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0
Saudi Arabia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 3. Determinants of Transparency: Linear Regression Models for 1998-2004 Average

	I	II	III	IV
Constant	1.46* (2.09)	2.25* (3.42)	1.01 (1.60)	0.84 (1.19)
Past inflation	1.38 (1.27)	0.55 (0.49)	1.08 (1.11)	1.60 (1.53)
Openness	-0.01 (-1.58)	-0.01* (-2.44)	-0.01 (-1.83)	-0.01 (-1.38)
Financial Depth	0.00 (0.30)	0.01 (1.34)	0.01 (1.69)	-0.00 (-0.10)
Rule of Law	0.06* (5.55)			
Political Stability		0.05* (4.96)		
Voice and Accountability			0.06* (7.56)	
Government Efficiency				0.07* (6.41)
R-Squared	0.33	0.29	0.46	0.39

* denotes significance at 5%

Table 4. Further Determinants of Transparency: Linear Regression Models for 1998-2004 Average

	I	II	III	IV	V	VI
Constant	1.54* (2.18)	0.84 (1.30)	0.80 (1.12)	0.99 (1.58)	0.90 (1.25)	0.48 (0.73)
Past inflation	1.19 (1.08)	1.23 (1.26)	1.61 (1.53)	1.05 (1.08)	1.51 (1.42)	1.44 (1.50)
Openness	-0.01 (-1.81)	-0.01 (-1.85)	-0.01 (-1.30)	-0.01 (-1.93)	-0.01 (-1.46)	-0.01 (-1.76)
Financial Depth	0.00 (0.42)	0.01 (1.08)	-0.00 (-0.08)	0.01 (1.51)	-0.00 (-0.04)	0.00 (0.56)
Rule of Law	0.04* (2.39)	0.01 (1.07)	-0.01 (-0.47)			
Political Stability	0.02 (0.96)			0.01 (0.63)	0.01 (0.50)	
Voice and Accountability		0.05* (4.51)		0.06* (5.02)		0.05* (4.03)
Government Efficiency			0.08* (2.77)		0.06* (3.59)	0.03* (2.24)
R-Squared	0.34	0.46	0.39	0.46	0.39	0.49

* denotes significance at 5%

Table 5. Determinants of Transparency, Fixed Effects Models

	I	II	III	IV
Constant	5.15 (0.02)	2.56 (0.01)	1.73 (0.01)	1.80 (0.01)
Past inflation	-0.77* (-2.08)	-0.58* (-1.50)	-0.60 (-1.56)	-0.70 (-1.73)
Openness	0.01* (2.62)	0.02* (3.32)	0.02* (3.48)	0.02* (3.42)
Financial Depth	0.02* (2.54)	0.03 (2.78)	0.03* (3.12)	0.03* (3.01)
Rule of Law	-0.06* (-6.36)			
Political Stability		-0.02 (-3.01)		
Voice and Accountability			-0.01 (-0.82)	
Government Efficiency				-0.01 (-1.01)
R-Squared	0.89	0.88	0.88	0.88

* denotes significance at 5%

Table 6. Determinants of Transparency Index, Fixed Effects Models, Multiple Political Variables

	I	II	III	IV	V	VI
Constant	5.52 (0.02)	4.89 (0.01)	4.94 (0.01)	2.41 (0.01)	2.63 (0.01)	2.16 (0.01)
Past inflation	-0.78* (-2.08)	-0.77* (-2.07)	-0.65 (-1.68)	-0.57 (-1.48)	-0.60 (-1.49)	-0.70 (-1.75)
Openness	0.01* (2.30)	0.01* (2.51)	0.01* (2.55)	0.02* (3.29)	0.02* (3.32)	0.02* (3.46)
Financial Depth	0.02* (2.37)	0.02* (2.51)	0.02* (2.40)	0.03 (2.76)	0.03* (2.76)	0.03* (3.01)
Rule of Law	-0.06* (-5.54)	-0.06* (-6.35)	-0.06* (-6.47)			
Political Stability	-0.01 (-0.12)			-0.02 (-2.95)	-0.02* (-2.84)	
Voice and Accountability		0.01 (0.80)		0.00 (0.38)		-0.01 (-0.77)
Government Efficiency			0.01 (1.31)		-0.00 (-0.17)	-0.01 (-0.97)
R-Squared	0.89	0.89	0.89	0.88	0.88	0.88

* denotes significance at 5%

Table 7a. Linear Regression Models for 2004: Determinants of Political Transparency Index

	I	II	III	IV
Constant	1.95* (7.14)	2.03* (8.36)	1.65* (6.24)	1.71* (5.57)
Past inflation	-0.82 (-0.42)	-1.10 (-0.58)	-0.74 (-0.40)	-0.30 (-0.15)
Openness	0.00 (1.10)	0.00 (0.44)	0.00 (0.63)	0.00 (1.24)
Financial Depth	-0.01* (-2.59)	-0.01 (-2.16)	-0.01 (-2.20)	-0.01* (-3.14)
Rule of Law	0.01* (2.05)			
Political Stability		0.01* (2.42)		
Voice and Accountability			0.01* (4.64)	
Government Efficiency				0.01* (3.05)
R-Square	0.11	0.13	0.27	0.17

* denotes significance at 5%

Table 7b: Linear Regression Models for 1998-2004 Average: Determinants of Political Transparency Index

	I	II	III	IV
Constant	1.46* (6.50)	1.58* (7.72)	1.32* (6.24)	1.25* (5.41)
Past inflation	0.92 (1.30)	0.65 (0.94)	0.89 (1.35)	1.20 (1.74)
Openness	-0.00 (-0.17)	-0.00 (-0.63)	-0.00 (-0.24)	-0.00 (-0.11)
Financial Depth	-0.00 (-1.15)	-0.00 (-0.72)	-0.00 (-0.74)	-0.00 (-1.62)
Rule of Law	0.01* (2.89)			
Political Stability		0.01* (2.77)		
Voice and Accountability			0.01* (4.23)	
Government Efficiency				0.01* (3.92)
R-Square	0.09	0.09	0.18	0.16

* denotes significance at 5%

Table 8a. Linear Regression Models for 2004: Determinants of Economic Transparency Index

	I	II	III	IV
Constant	0.14 (0.70)	0.44* (2.14)	-0.08 (-0.43)	-0.17 (-0.91)
Past inflation	-0.07 (-0.05)	-1.02 (-0.77)	-0.45 (-0.32)	0.53 (0.140)
Openness	-0.00 (-1.53)	-0.00 (-1.81)	-0.00 (-1.85)	-0.00 (-1.49)
Financial Depth	0.00 (1.48)	0.01* (2.02)	0.01* (2.66)	0.00 (0.98)
Rule of Law	0.01* (3.47)			
Political Stability		0.01* (1.93)		
Voice and Accountability			0.02* (5.21)	
Government Efficiency				0.02* (5.02)
R-Square	0.21	0.34	0.34	0.29

* denotes significance at 5%

Table 8b. Linear Regression Models for 1998-2004 Average: Determinants of Economic Transparency Index

	I	II	III	IV
Constant	-0.14 (-0.76)	0.11 (0.60)	-0.24 (-1.38)	-0.31 (-1.56)
Past inflation	0.97 (1.63)	0.49 (0.79)	0.81 (1.49)	1.19* (2.03)
Openness	-0.00* (-2.65)	-0.00* (-3.10)	-0.00* (-2.88)	-0.00* (-2.54)
Financial Depth	0.00 (1.62)	0.01* (2.67)	0.01* (3.19)	0.00 (1.38)
Rule of Law	0.02* (5.48)			
Political Stability		0.01* (4.30)		
Voice and Accountability			0.02* (6.98)	
Government Efficiency				0.01* (6.04)
R-Square	0.37	0.30	0.46	0.41

* denotes significance at 5%

Table 9a. Linear Regression Models for 2004: Determinants of Procedural Transparency Index

	I	II	III	IV
Constant	0.29 (1.11)	0.48* (2.07)	0.12 (0.50)	0.11 (0.41)
Past inflation	0.32 (0.24)	-0.26 (-0.20)	0.12 (0.10)	0.67 (0.51)
Openness	0.00 (0.68)	0.00 (0.35)	0.00 (0.43)	0.00 (0.82)
Financial Depth	-0.00 (-0.56)	-0.00 (-0.10)	0.00 (0.18)	-0.00 (-0.90)
Rule of Law	0.01* (2.00)			
Political Stability		0.01 (1.48)		
Voice and Accountability			0.01* (3.67)	
Government Efficiency				0.01* (2.76)
R-Square	0.10	0.07	0.20	0.14

* denotes significance at 5%

Table 9b. Linear Regression Models for 1998-2004 Average: Determinants of Procedural Transparency Index

	I	II	III	IV
Constant	0.00 (0.00)	0.16 (0.91)	0.08 (-0.45)	-0.17 (-0.88)
Past inflation	1.01 (1.72)	0.69 (1.18)	0.91 (1.65)	1.24* (2.16)
Openness	-0.00 (-0.37)	-0.00 (-0.92)	-0.00 (-0.40)	-0.00 (-0.26)
Financial Depth	0.00 (0.52)	0.00 (1.26)	0.00 (1.48)	0.00 (0.17)
Rule of Law	0.01* (3.96)			
Political Stability		0.01* (3.51)		
Voice and Accountability			0.01* (5.02)	
Government Efficiency				0.01* (4.83)
R-Square	0.21	0.18	0.28	0.27

* denotes significance at 5%

Table 10a. Linear Regression Models for 2004: Determinants of Policy Transparency Index

	I	II	III	IV
Constant	-0.12 (-0.49)	0.18 (0.75)	-0.11 (-0.44)	-0.30 (-1.21)
Past inflation	2.29 (1.36)	1.35 (0.72)	1.38 (0.80)	2.53 (1.52)
Openness	-0.00 (-1.31)	-0.00* (-2.19)	-0.00 (-1.35)	-0.00 (-1.05)
Financial Depth	0.00 (0.21)	0.00 (1.10)	0.00 (1.30)	-0.00 (-0.14)
Rule of Law	0.01* (4.56)			
Political Stability		0.01* (3.75)		
Voice and Accountability			0.01* (4.54)	
Government Efficiency				0.02* (5.08)
R-Square	0.25	0.21	0.27	0.27

* denotes significance at 5%

Table 10b. Linear Regression Models for 1998-2004 Average: Determinants of Policy Transparency Index

	I	II	III	IV
Constant	-0.10 (-0.60)	0.09 (0.58)	-0.13 (-0.85)	-0.23 (-1.30)
Past inflation	0.34 (0.65)	-0.08 (-0.16)	0.12 (0.24)	0.51 (0.98)
Openness	-0.00* (-2.93)	-0.01* (-3.84)	-0.00* (-3.02)	-0.00* (-2.73)
Financial Depth	0.00 (0.12)	0.00 (1.15)	0.00 (1.70)	-0.00 (-0.06)
Rule of Law	0.02* (6.29)			
Political Stability		0.01* (6.08)		
Voice and Accountability			0.01* (7.11)	
Government Efficiency				0.02* (6.53)
R-Square	0.40	0.38	0.45	0.41

* denotes significance at 5%

Table 11a. Linear Regression Models for 2004: Determinants of Operational Transparency Index

	I	II	III	IV
Constant	0.47 (1.73)	0.51 (2.31)	0.18 (0.76)	0.30 (1.01)
Past inflation	1.60 (0.99)	1.49 (0.96)	1.99 (1.24)	2.02 (1.26)
Openness	-0.00 (-0.74)	-0.00 (-0.70)	-0.00 (-1.10)	-0.00 (-0.80)
Financial Depth	0.00 (1.59)	0.00 (1.77)	0.00 (1.88)	0.00 (1.20)
Rule of Law	0.00 (0.34)			
Political Stability		0.00 (0.21)		
Voice and Accountability			0.01* (2.36)	
Government Efficiency				0.00 (1.14)
R-Square	0.04	0.03	0.12	0.06

* denotes significance at 5%

Table 11b. Linear Regression Models for 1998-2004 Average: Determinants of Operational Transparency Index

	I	II	III	IV
Constant	-0.03 (-0.20)	0.12 (0.80)	-0.12 (-0.85)	-0.13 (-0.82)
Past inflation	1.17* (2.37)	0.88 (1.78)	1.10 (2.43)	1.31* (2.66)
Openness	-0.00 (-1.57)	-0.00* (-2.03)	-0.00 (-1.72)	-0.00 (-1.46)
Financial Depth	0.00 (1.35)	0.00 (2.16)	0.00* (2.44)	0.00 (1.15)
Rule of Law	0.01* (4.08)			
Political Stability		0.01* (3.40)		
Voice and Accountability			0.01* (5.54)	
Government Efficiency				0.01* (4.47)
R-Square	0.24	0.20	0.34	0.27

* denotes significance at 5%

Table 12. Effect of Transparency on Inflation Variability (instrumental variables pooled regressions)

	I	II	III	IV	V	VI
Constant	7.90* (8.13)	5.60* (3.49)	10.67* (5.27)	2.59 (1.14)	5.65* (4.15)	2.00 (1.49)
Transparency Index	-1.23* (-5.79)	-1.74* (-4.62)	-2.86* (-2.16)	-0.46 (-1.30)	-0.52* (-2.48)	-0.24 (-1.53)
Openness		0.05* (2.00)			0.04* (2.29)	-0.02 (-0.92)
Financial Depth			0.08 (1.02)		-0.09* (-5.04)	26.08* (3.66)
Past Inflation				24.42* (2.69)		0.01 (0.34)
Number of observations	580	538	559	576	524	523
Sum of Sq. Res.	24552	31671	48270	9121	21243	8650

* denotes significance at 5%

Table 13. Effect of Transparency on Inflation Persistence (instrumental variables pooled regressions)

	I	II	III	IV	V	VI
Constant	0.80* (17.48)	0.73* (10.71)	0.66* (6.12)	1.20* (4.19)	0.72* (12.04)	0.88* (7.47)
Transparency Index	-0.02* (-2.00)	-0.04* (-2.40)	0.08 (1.21)	-0.08 (-1.75)	0.01 (1.51)	0.01 (0.40)
Openness		0.01 (1.62)			0.01 (1.22)	-0.01* (-2.88)
Financial Depth			-0.01 (-1.60)		-0.01* (-3.77)	0.01 (1.56)
Past Inflation				-1.84 (-1.63)		-1.05 (-1.71)
Number of observations	569	530	544	565	516	515
Sum of Sq. Res.	52	57	68	126	43	62

* denotes significance at 5%

Table 14. Alternative Specification for Inflation Persistence (dependent variable is inflation), instrumental variables pooled regressions

	I	II	III
Constant	0.02* (3.07)	0.02* (2.69)	0.02* (3.01)
Lag_inf	0.53* (2.62)	0.53* (2.64)	0.50* (2.55)
Lag_inf* transparency	-0.04 (-0.95)	-0.04 (-1.01)	-0.04 (-1.09)
Openness		0.01 (-0.41)	0.01* (2.43)
Financial Depth			-0.01* (-3.19)
R-Squared	0.41	0.41	0.43

* Denotes significance at 5%. Transparency is the estimated value with the political variables.

**Table 15. Effects of Transparency on Output Variability
(instrumental variables pooled regressions)**

	I	II	III	IV	V	VI
Constant	3.73* (13.75)	3.62* (3.30)	3.54* (13.27)	2.45* (4.27)	2.28 (1.57)	3.58 (4.54)
Transparency Index	-0.31* (-4.95)	-0.37* (-3.66)	-0.12* (-1.92)	-0.13 (-1.68)	-0.13 (-1.83)	-0.40* (-2.96)
Openness		0.00 (0.28)			0.02 (1.00)	-0.00 (-0.42)
Financial Depth			-0.01* (-2.06)		-0.03* (-2.19)	0.01 (1.05)
Past Inflation				6.65 (1.88)		2.71 (0.56)
Number of obs.	604	538	626	607	586	557
R-Square	0.52	0.49	0.53	0.52	0.46	0.48

* denotes significance at 5%