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Central bank transparency and financial market expectations: The case of emerging markets

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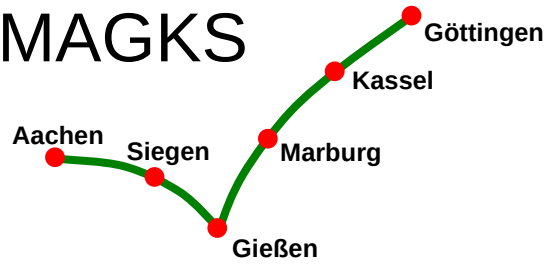

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Central Bank Transparency and Financial Market Expectations: The Case of Emerging Markets

Abstract

In this paper, we study the influence of central bank transparency on the formation of money market expectations in emerging markets. The sample covers 25 countries for the period from January 1998 to December 2009. We find, first, that transparency reduces the bias (the difference between the money market rate and the weighted expected target rate over the contract period) in money market expectations. The effect is larger for non-inflation targeters, countries with low income, and countries with low financial depth. However, the bias-reducing effect of transparency prevails only if inflation is relatively low. Second, three subcategories of the Eijffinger and Geraats (2006) lead to a smaller bias in expectations: operational, political, and economic transparency, with the effect being the largest for operational transparency. Finally, an intermediate level of transparency is found to have the most favourable influence on money market expectations. Neither complete secrecy nor complete transparency is optimal.

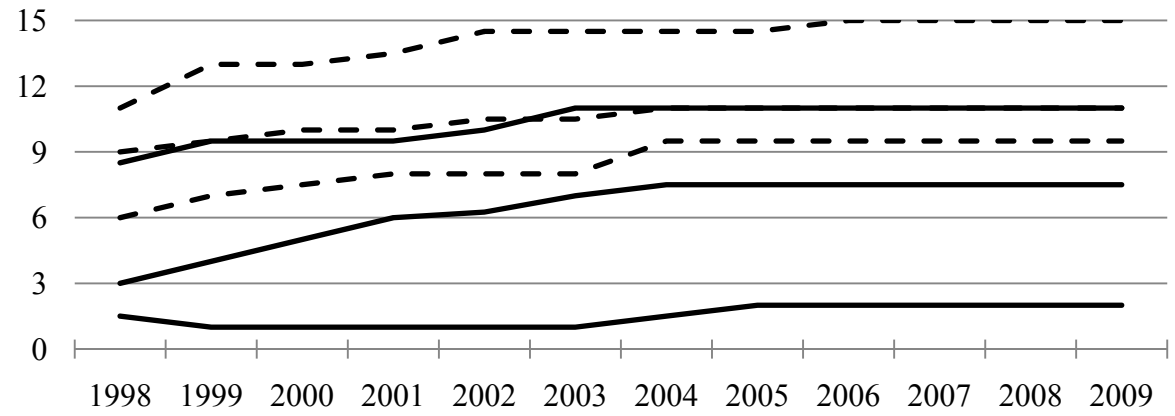
JEL: E52, E58

Keywords: Central Bank Transparency, Emerging Markets, Financial Market Expectations, Interest Rates, Monetary Policy, Money Market

1. Introduction

Over the past two decades, central banks have expended a great deal of effort on increasing their transparency. Central bank objectives and goals have been specified and quantified, macroeconomic forecasts are published, interest rate decisions are announced and explained immediately, and some central banks provide indications of the likely course of monetary policy in the near future. Consequently, there is a vast empirical literature on central bank transparency, one that mostly finds beneficial effects. Van der Cruijsen and Eijffinger (2010) review the literature and conclude that transparency (i) improves consensus across forecasters, (ii) lowers inflation and anchors inflation expectations, (iii) improves the credibility, reputation, and flexibility of central banks, (iv) has no obvious influence on output and output variability, and (v) improves policy anticipation.[1] The major part of this literature focuses on mature economies, but central banks in emerging markets have also been hard at work on increasing their transparency. Figure 1 shows the minimum, median, and maximum transparency index for the 25 emerging markets in our sample[2] versus nine advanced economies[3] typically studied in the literature. Transparency is higher in advanced economies, but there is a noticeable trend of increasing transparency in emerging markets.

Figure 1: Transparency Index for 25 Emerging Markets and Nine Advanced Economies



Source: Siklos (2011) and own calculations.
Note: The solid lines show the minimum, median, and maximum transparency index observed in our sample of 25 emerging markets. The dashed lines show the corresponding measures for nine advanced economies.

[1] A more detailed and stylised overview of the empirical results can be found in van der Cruijsen (2008, 30).
[2] Sample countries: Argentina, Brazil, Bulgaria, Chile, Colombia, the Czech Republic, Hong Kong, Hungary, India, Indonesia, Jordan, Korea, Kuwait, Latvia, Lithuania, Pakistan, Peru, Philippines, Poland, Romania, Russia, Singapore, South Africa, Thailand, and Turkey. Sample selection is explained in the next section.
[3] Australia, Canada, the European Monetary Union, Japan, New Zealand, Sweden, Switzerland, the United Kingdom, and the United States.

Despite this trend, empirical evidence for the influence of central bank transparency on emerging markets is scant. Fatás et al. (2007) analyse the effect of a formal quantitative target for monetary policy (exchange rate target, money growth target, inflation target) in 42 advanced and emerging countries over the period 1960–2000. They find that a de jure target tends to lower inflation and smooth business cycles and that hitting the target de facto increases the positive effects. Chortareas et al. (2002a) construct a transparency index based on central bank forecasts from 87 central banks worldwide covering the period 1995–1999. These authors find that greater transparency in forecasts is associated with lower inflation, particularly for countries with an inflation target or a monetary target, but not for countries with an exchange rate anchor. Output variability is unaffected by the degree of transparency. In addition, Chortareas et al. (2002b) examine the influence of transparency in forecasting and decision-making on the costs of disinflation. The sacrifice ratio is negatively related to transparency in forecasting but not to transparency in the decision-making process.

Dincer and Eichengreen (2009) construct a broader index of transparency for 100 central banks and document a significant movement toward higher transparency during their sample period (1998–2006). Using transparency as an explanatory variable, they find that higher transparency is associated with less inflation variability. However, inflation persistence is not significantly affected by this trend. Van der Cruijsen et al. (2010) employ an index based on the same questionnaire but arrive at a different conclusion. They discover that transparency significantly reduces inflation persistence, but also detect an optimal intermediate degree of transparency (between 5.5 and 7.5) at which inflation persistence is minimised. Thus, central banks might not necessarily benefit from further increasing transparency. Middeldorp (2011) examines 24 emerging and advanced economies using the Dincer and Eichengreen (2009) data set. He finds that transparency increases the accuracy and reduces the volatility of professional interest forecasts.

To date, the literature provides no emerging-market-specific conclusions and tends to focus on the impact transparency has on inflation and output (for an exception, see Middeldorp, 2011). However, for sound monetary policy it is particularly important to know whether or not central bank actions are being correctly anticipated by financial markets.[4] In this context, Neuenkirch (2011) concludes—for nine mature economies—that a higher degree of central bank transparency improves the expectation formation process. Transparency reduces the expectation bias in the money market (namely, the difference between the money

[4] Woodford (2001) argues that if a central bank is more predictable, a larger number of counter-parties should be available to trade with the bank at a given (expected) price. The consequence is that a smaller change in the market price will be required to absorb a given change in the supply of a particular instrument.

market rate and the weighted expected target rate over the contract period) and dampens variation in expectations. Coppel and Connolly (2003) find that the extent to which market participants anticipate changes in the policy rate has gradually increased since the late 1980s, as has the speed of reaction to interest rate announcements. Andersson and Hoffmann (2009) find evidence that the three central banks in their sample (the Reserve Bank of New Zealand, the Norges Bank, and the Riksbank) have been highly predictable in their monetary policy decisions, regardless of whether forward guidance involved publication of an own interest rate path.[5]

This paper fills the gap in the literature pertaining to emerging markets and examines the impact of transparency on the course of short-term interest rates. Our survey covers 25 emerging market countries for the period January 1998–December 2009. Econometrically, we employ an unbalanced panel least squares model to assess the following research questions. *First, does transparency decrease the expectation bias in money markets? If so, is there a difference in this effect between countries with an inflation target and those with an exchange rate peg or, alternatively, is there any difference due to various macroeconomic variables? Second, are there subcategories of transparency (political, economic, procedural, policy, and operational) that are particularly important for the formation of expectations? Third, is more transparency always beneficial or is there an optimal intermediate degree of it?* We employ a variant of the bias indicator put forward in Neuenkirch (2011) and examine the influence of transparency as measured by Eijffinger and Geraats's (2006)broad index[6] (and its subcomponents) on the course of short-term interest rates.

The remainder of this paper is organised as follows. Section 2 introduces the data set and explains our econometric methodology. Section 3 presents the results for the influence of transparency on the central bank ability to manage financial market expectations. Section 4 concludes.

2. Data and Econometric Methodology

Bias Indicator

As the dependent variable, we employ a variant of the indicator put forward in Neuenkirch (2011) that captures the deviation of money market rates from the expected target rate.

[5] Many papers find beneficiary effects of transparency on policy anticipation in a single country: for instance, Demiralp (2001), Rafferty and Tomljanovich (2002), Lange et al. (2003), and Swanson (2006) for the United States, Lildholdt and Wetherilt (2004) for the United Kingdom, and Muller and Zelmer (1999) for Canada.

[6] Dincer and Eichengreen (2009) use the same questionnaire as Eijffinger and Geraats (2006). There are other indices, for instance, Crowe and Meade (2008), who use the data of Fry et al. (2000). However, these indices are not available as a time series covering the sample period investigated in this paper.

Consider a bond with a maturity of *n* periods. According to the term structure of interest rates, the bond's return equals a weighted average of the expected target for the overnight rate over that period. Equation (1) describes the relationship:

$$(1)\ interest\ rate_t^n = \prod_{i=0}^{n} E_t(target\ rate_{t+i})^{1/n},$$

where 'interest rate' denotes the revenues on the bond with a maturity of *n* periods and $E_t(target\ rate_{t+i})$ the expected target rate *i* periods in the future based on all information available at the beginning of period *t*. Modern central banking is often described as the 'art of managing expectations' (see, e.g., de Haan et al., 2007, 2). Thus, if a central bank is able to manage financial market expectations perfectly, the expectation operator on the right-hand side of Equation (1) disappears:

$$(2)\ interest\ rate_t^n = \prod_{i=0}^{n} target\ rate_{t+i}^{1/n}.$$

In the case of perfect management, the actual and 'optimal' interest rate implied by the term structure of interest rates should be equal. Thus, the absolute difference between the interest rates—the 'bias'—is a good proxy for the central bank's effectiveness:

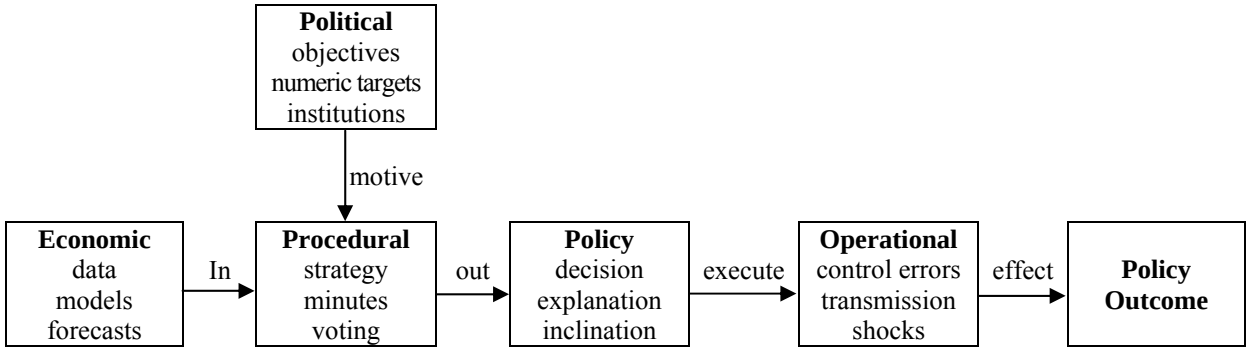
$$(3)\ bias_t^n = \left| interest\ rate_t^n - \prod_{i=0}^{n} target\ rate_{t+i}^{1/n} \right|,$$

where 'bias' measures the absolute difference between the actual interest rate and 'optimal' interest rate.

Transparency Index

In the next step, we need to parameterise central bank transparency. Geraats (2002) provides a theoretical framework for explaining the rationale behind increasing central bank transparency and the effects of different types of transparency. She differentiates between five types of transparency (see Figure 2). Eijffinger and Geraats's (2006) index, which was updated by Dincer and Eichengreen (2009) and Siklos (2011), captures all categories of this theoretical framework and is available as a yearly time series covering our sample period. For each category, three questions are asked about different aspects of transparency (an excerpt of the Eijffinger and Geraats (2006) questionnaire can be found in the Appendix). The index is available for every question and the total index is created as a sum of the scores for the 15 questions.

Figure 2: Theoretical Framework for Central Bank Transparency



Source: Geraats (2002, 541).

It seems reasonable that each of the index's five subcategories would have a positive impact on the ability to steer financial market expectations or, put differently, to cause a decline in the bias. *Political transparency* reveals the central bank's policy objectives, ranks them according to their priority in the case of multiple goals, or quantifies a primary objective. *Economic transparency* refers to the economic information on which monetary policy is based, such as economic data, forecasts, or the central bank's economic model, thus allowing market participants to discover the central bank's view of the economy. *Procedural transparency* involves an explicit monetary policy rule or strategy, an account of policy deliberations, and how a policy decision was reached. *Policy transparency* aims to provide prompt disclosure (and explanation) of policy decisions and an explicit indication of likely future policy actions. *Operational transparency* involves discussing control errors in achieving operating targets and (unanticipated) macroeconomic disturbances. In addition to employing the overall index as an explanatory variable, we take advantage of the subindices and individual questions to discover which transparency factors are particularly important.

Money Market Data

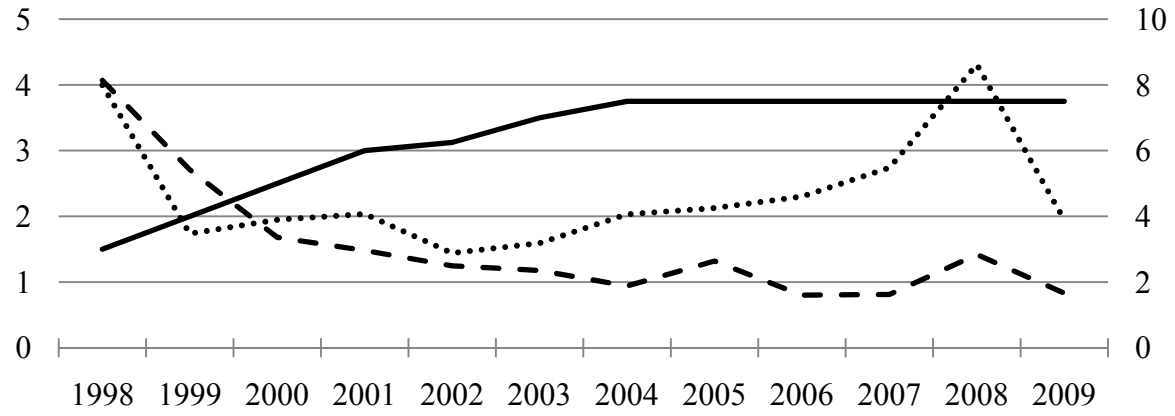
For our financial market data, we utilise target rates and three-month money market rates at a monthly frequency to estimate the bias in money market expectations for 25 emerging market countries over the period January 1998–December 2009.[7] The countries in our data set are: Argentina, Brazil, Bulgaria, Chile, Colombia, the Czech Republic, Hong Kong, Hungary,

[7] Source: IMF and national central banks. We choose monthly data as systematic daily data are available for only a handful of these countries.

India, Indonesia, Jordan, Korea, Kuwait, Latvia, Lithuania, Pakistan, Peru, the Philippines, Poland, Romania, Russia, Singapore, South Africa, Thailand, and Turkey.[8]

Figure 3 plots the median bias (in percentage points; dashed line, left axis) and the median transparency index (solid line, right axis) for these countries. The figure indicates a negative relationship between both variables; this conjecture is supported by descriptive statistics (correlation coefficient: –0.92). However, some of these countries faced relatively high and volatile inflation rates during the sample period. Hence, it might be insightful to analyse the influence of inflation as further factor explaining the bias. Consistent with this argument, the figure shows a positive relationship between median inflation (in percent; dotted line, right axis) and the median bias (correlation coefficient: 0.42).[9]

Figure 3: Bias, Inflation, and Transparency Index for 25 Emerging Market Countries



Source: Siklos (2011), IMF, national central banks, and own calculations.
Note: The solid line shows the median transparency index (right axis), the dashed line the median bias (in percentage point; left axis), and the dotted line median inflation (in percent; right axis) observed in our sample of 25 emerging markets.

Empirical Methodology

Our econometric setup consists of an unbalanced panel least squares model[10] with country fixed effects to analyse the influence of inflation and transparency on the bias in money market expectations. The general specification is:

[8] A country is considered as an emerging market if it is mentioned as such in at least one of the lists by Dow Jones, Standard and Poor's, and *The Economist* in 2009. Some emerging market countries are omitted from the analysis as (i) there is no transparency index available for them (Morocco and Taiwan), (ii) they became members of the euro area during the sample period (Estonia and Slovakia), or (iii) the data are insufficient (Bahrain, China, Egypt, Malaysia, Mauritius, Mexico, Oman, Qatar, Saudi Arabia, Sri Lanka, and the United Arab Emirates).

[9] Although transparency is found to reduce inflation and inflation expectations, this effect obviously lags behind the increase in transparency. In line with this idea, the contemporaneous relationship between median transparency and median inflation is relatively low (correlation coefficient: –0.14).

[10] There are some missing observations for seven of our sample countries.

$$(4)\ bias_{t,j} = \alpha_j + \beta\ inflation_{t,j} + \gamma\ transparency_{t,j} + \varepsilon_{t,j},$$

where α, β, γ, and δ are parameters and ε the error term. Inflation is measured as the annual growth rate in the consumer price index.[11] Transparency also enters Equation (4) as a yearly measure.

3. Empirical Results

Empirical Results for Various Subsamples

Table 1 shows the results for the estimation of Equation (4).

Table 1: Explaining the Bias in Money Market Expectations

	All Countries	Inflation < 5%	Inflation > 5%
Inflation	0.21 **	0.07	0.23 **
Transparency	–0.38 **	–0.44 **	–0.28
R^2	0.29	0.26	0.27
σ	6.92	2.22	9.87
Periods	144	144	144
Cross-Sections	25	23	24
Observations	3448	1852	1596

	No IT	IT	No FX Peg	FX Peg
Inflation	0.29 **	0.11 **	0.24 **	0.32 **
Transparency	–0.91 **	–0.42 **	–0.58 **	–0.55 **
R^2	0.27	0.76	0.26	0.51
σ	9.00	1.47	9.85	4.15
Periods	144	144	144	144
Cross-Sections	21	13	18	21
Observations	1962	1486	1186	2262

	Low FD	High FD	Low Income	High Income
Inflation	0.21 **	0.08 **	0.18 **	0.06 **
Transparency	–0.48 **	–0.25 **	–0.34 *	–0.19 **
R^2	0.26	0.50	0.30	0.65
σ	9.63	1.01	9.06	1.58
Periods	144	144	144	144
Cross-Sections	18	17	19	17
Observations	1755	1693	1847	1601

Note: Results for the estimation of Equation (4) using various subsamples. **/* indicates significance at the 1%/5% level, respectively. Country fixed effects are included in the models. IT = Inflation Target; Low FD: M2/GDP < 0.5; High FD: M2/GDP ≥ 0.5; Low Income: GDP per Capita < $10,000; High Income: GDP per Capita ≥ $10,000.

[11] Source: IMF.

The results for the full sample indicate that a 1 percentage point (pp) rise in inflation increases the bias in money market expectations by 0.21 pp. Also, and as expected, a one unit increase in the transparency index reduces the bias by 0.38 pp. Both effects are significant at the 1 percent level. Hence, transparency is helpful in decreasing the bias in money market expectations.

Examination of the various subgroups reveals several interesting patterns. In line with our expectations, low inflation countries[12] show no unfavourable effect of inflation, but do exhibit a significant bias-decreasing effect of transparency (–0.44 pp). In contrast, high inflation countries are characterised by a bias-increasing reaction to inflation (0.23 pp) but show no response to changes in the transparency index. Thus, a subdued level of inflation is a necessary condition for transparency to be helpful in managing money market expectations.

Countries with no inflation target[13] show a larger detrimental effect of inflation (0.29 pp) than do countries with an explicit target. The beneficial effect of transparency is also larger for non-inflation targeting countries (–0.91 pp vs. –0.42 pp). Both results seemingly are driven by the fact that these countries have on average a larger bias (3.86 pp vs. 1.82 pp). Put differently, the existence of an inflation target itself has a positive effect on money market expectations (for the influence on inflation and the business cycle, see Fatás et al., 2007). The results for countries with and without a pegged exchange rate[14] do not differ much in our sample: the influence of inflation is slightly lower for countries with a floating exchange rate (0.24 pp vs. 0.32 pp), whereas transparency has a marginally larger impact (–0.58 pp vs. –0.55 pp).

GDP per capita and the degree of financial depth (Dincer and Eichengreen, 2009) are employed as further criteria to split the sample.[15] Countries with a higher per capita income (GDP/Capita $\geq$ \$10,000) or larger financial depth (M2/GDP $\geq$ 0.5) exhibit a smaller reaction to both variables than do their counterparts. Not surprisingly, the former countries have on average lower biases in money market expectations (GDP/Capita: 1.76 pp vs. 4.05 pp; M2/GDP: 1.24 pp vs. 4.66 pp). Inflation increases the bias by 0.18 pp (0.21 pp) in low income (low financial depth) countries but by only 0.06 pp (0.08 pp) in the respective counterparts. Transparency mitigates the bias by 0.34 pp (0.19 pp) in low (high) income countries and by 0.48 pp (0.25 pp) in countries with a low (high) degree of financial depth.

[12] Median inflation in our sample is approximately 5 percent.
[13] Source: IMF (2005) and national central banks.
[14] Source: IMF. The IMF exchange rate classification distinguishes 10 different exchange rate regimes (of which eight can be loosely classified as some sort of a peg).
[15] Source: Money and quasi-money as percentage of GDP (World Bank), gross domestic product per capita based on purchasing power parity, and current international dollar (IMF).

In general, transparency is beneficial in mitigating the bias in money market expectations. The effect is larger for non-inflation targeters, countries with low income, and countries with low financial depth vis-á-vis their respective counterparts but does not differ for countries with and without an exchange rate peg. The larger reaction in the former countries can be (partly) attributed to higher average biases. Finally, the bias-reducing effect of transparency prevails only if inflation is relatively low.

Empirical Results for Subcategories and Questions of the Transparency Index

As another novel aspect of this paper, we assess the influence of all subcategories and the corresponding questions of Eijffinger and Geraats's (2006) transparency index. For this purpose, we replace the overall transparency index with a particular subcategory (political, economic, procedural, policy, or operational) or question. Table 2 sets out the results for all subcategories and 14 of the 15 questions.[16]

Three of the five subcategories have a theory-consistent declining impact on the bias. Operational transparency has the largest bias-reducing impact (–0.57 pp). All three question items from this subcategory separately and significantly contribute to better management of money market expectations: a regular evaluation of the extent to which a central bank's targets have been achieved (Q5a: –0.35 pp), regular information on (unexpected) macroeconomic disturbances (Q5b: –0.36 pp), and a regular evaluation of policy outcome in light of the central bank's macroeconomic objectives (Q5c: –0.50 pp). These factors help market participants learn about (the central bank's view of) monetary policy mistakes and exogenous shocks and, therefore, agents can alter their expectations as to future interest rates if necessary.

Economic transparency (–0.15 pp) and, in particular, the regular provision of macroeconomic forecasts by the central bank (Q2c: –0.14 pp) also contribute to better management of money market expectations. In contrast to the findings by Neuenkirch (2011) for advanced economies, agents active in emerging markets benefit from macroeconomic data and forecasts by the central banks. Geraats (2002) views policy transparency (–0.14 pp) as a factor that could boost the effectiveness of interest rate setting. Thus, it is not surprising that the prompt disclosure (Q4a: –0.07 pp) and explanation (Q4b: –0.12 pp) of policy decisions significantly reduce the bias in money market expectations. Finally, Q3a (a subcategory of procedural transparency) leads to a decrease in the bias (–0.10 pp). An explicit monetary policy rule or strategy facilitates prediction of interest rate setting (in the near future).

[16] We are not able to employ Q4c as there is no variation in the variable in our sample.

Table 2: Assessing the Subcategories and Questions of the Transparency Index

	Political	Q1a	Q1b	Q1c
Inflation	0.26 **	0.28 **	0.24 **	0.29 **
Transparency	0.26	0.33	0.01	0.90
R^2	0.29	0.29	0.28	0.29
σ	6.93	6.92	6.94	6.91
Observations	3448	3448	3448	3448

	Economic	Q2a	Q2b	Q2c
Inflation	0.23 **	0.23 **	0.23 **	0.22 **
Transparency	–0.15 **	–0.03	–0.02	–0.14 **
R^2	0.29	0.28	0.28	0.29
σ	6.93	6.94	6.94	6.92
Observations	3448	3448	3448	3448

	Procedural	Q3a	Q3b	Q3c
Inflation	0.23 **	0.23 **	0.23 **	0.23 **
Transparency	–0.11	–0.10 **	–0.01	0.01
R^2	0.29	0.29	0.28	0.28
σ	6.94	6.93	6.94	6.94
Observations	3448	3448	3448	3448

	Policy	Q4a	Q4b	Q4c
Inflation	0.22 **	0.22 **	0.23 **	
Transparency	–0.14 **	–0.07 **	–0.12 *	
R^2	0.29	0.29	0.29	
σ	6.94	6.94	6.94	
Observations	3448	3448	3448	

	Operational	Q5a	Q5b	Q5c
Inflation	0.18 **	0.19 **	0.20 **	0.21 **
Transparency	–0.57 **	–0.35 **	–0.36 **	–0.50 **
R^2	0.31	0.30	0.30	0.30
σ	6.84	6.88	6.89	6.85
Observations	3448	3448	3448	3448

Note: Results for the estimation of Equation (4) after replacing the overall transparency index with its subcategories and questions. An excerpt of the Eijffinger and Geraats (2006) questionnaire can be found in the Appendix. **/* indicates significance at the 1%/5% level, respectively. Country fixed effects are included in the models. To assure comparableness with the transparency coefficients in Table 1, we multiply the coefficients for the transparency subcategories by 1/5 and for the question items by 1/15.

Optimal Level of Transparency and Further Results

Van der Cruijsen et al. (2010) show that there might be a limit to the benefits of transparency and that an intermediate degree of transparency might be desirable. The theoretical idea is that agents can become confused by information they receive that is in excess of the optimal level

of transparency (Morris and Shin, 2002).[17] To test for a potential optimum in transparency and to control for financial depth and per capita income, we add further variables to Equation (4): (i) 'transparency^2', (ii) M2/GDP, and (iii) GDP/capita. Table 3 sets out the results.

Table 3: Optimal Level of Transparency and Further Results

	(1)	(2)	(3)	(4)
Inflation	0.21 **	0.20 **	0.21 **	0.21 **
Transparency	–2.25 **	–2.25 **	–2.12 **	–2.13 **
Transparency^2	0.15 **	0.15 **	0.16 **	0.16 **
M2/GDP	—	–2.95 *	—	–0.39
GDP/Capita	—	—	–1.96 **	–1.89 **
R^2	0.30	0.30	0.30	0.30
σ	6.89	6.89	6.87	6.87
Observations	3448	3448	3448	3448

Note: Results for the estimation of Equation (4) with further control variables. **/* indicates significance at the 1%/5% level, respectively. Country fixed effects are included in the models. GDP/Capita is denominated in $10,000.

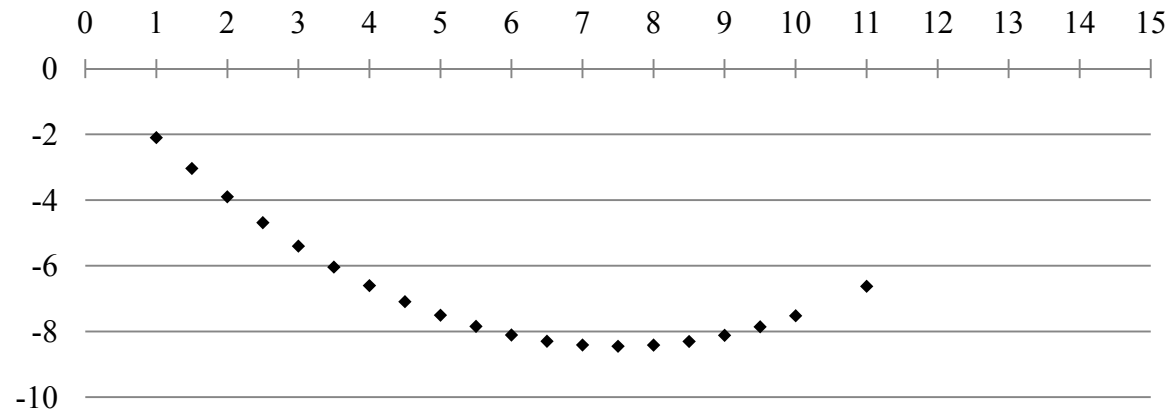
At first glance, Models (1)–(4) of Table 3 show almost unchanged coefficients for inflation and transparency. As in the previous specifications, a one pp rise in inflation is associated with a 0.20–0.21 pp increase in the bias; a one unit increase in the transparency index reduces the bias by 2.12–2.25 pp. However, this helpful effect is partly offset by the coefficient of transparency^2, which ranges from 0.15–0.16 pp. Figure 4 illustrates the joint effect of transparency and transparency^2 (Model (1)) for all levels of transparency observed in our sample while keeping all other variables constant.

In line with the findings of van der Cruijsen et al. (2010), an intermediate level of transparency is found to have the largest influence on money market expectations. Neither complete secrecy nor complete transparency is optimal: increases of transparency over the level of 7.5 might have an unfavourable effect on the bias, whereas central banks with a transparency index below 7.5 might benefit from increasing their transparency.

The results are robust to the inclusion of M2/GDP and GDP/Capita. A higher degree of financial depth improves the formation of money market expectations and decreases the bias by –2.95 pp (Model (2)). A similar result is obtained for higher per capita income (Model (3): –1.96 pp). Including both variables reveals that the real economic indicator dominates financial depth as its coefficient is nearly unchanged (Model (4): –1.89 pp), whereas the coefficient for M2/GDP becomes insignificant.

[17] Gosselin et al. (2007) provide a theoretical framework for this idea.

Figure 4: Optimal Transparency



Note: This figure plots the effect of central bank transparency on the bias in money market expectations (Table 3, Model (1)) for observed transparency levels.

4. Conclusions

In this paper, we study the influence of central bank transparency on the formation of money market expectations. Our survey covers 25 emerging market countries for the period January 1998–December 2009. As the dependent variable, we employ a variant of the bias indicator put forward in Neuenkirch (2011) that captures the deviation of money market rates from the expected target rate. We address the following research questions.

First, does transparency decrease the expectation bias in money markets? If so, is there a difference in this effect between countries with an inflation target and those with an exchange rate peg or, alternatively, is there any difference due to various macroeconomic variables? In general, transparency is beneficial in mitigating the bias in money market expectations. The effect is larger for non-inflation targeters, countries with low income, and countries with low financial depth vis-á-vis their respective counterparts, but does not differ for countries with and without an exchange rate peg. Finally, the bias-reducing effect of transparency prevails only if inflation is relatively low.

Second, are there subcategories of transparency (political, economic, procedural, policy, and operational) that are particularly important for the formation of expectations? A detailed examination of the subcategories of the Eijffinger and Geraats (2006) index reveals that operational transparency has the largest bias-reducing impact. This aspect of transparency helps market participants learn about (the central bank's view of) monetary policy mistakes and exogenous shocks and, therefore, agents can alter their expectations as to future interest rates if necessary. Also noticeable are economic transparency (in particular the regular provision of macroeconomic forecasts by the central bank), policy transparency (in particular

the prompt disclosure and explanation of policy decisions), and a subcategory of procedural transparency (explicit monetary policy rule or strategy).

Third, is more transparency always beneficial or is there an optimal intermediate degree of it? In line with the findings of van der Cruijsen et al. (2010), an intermediate level of transparency is found to have the largest influence on money market expectations. Neither complete secrecy nor complete transparency is optimal: increases of transparency over the level of 7.5 might have an unfavourable effect on the bias, whereas central banks with a transparency index below 7.5 might benefit from increasing their transparency.

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Appendix

Transparency Index Questionnaire (Eijffinger and Geraats, 2006)

1. Political Transparency

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

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

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

2. Economic Transparency

a) Is the basic economic data relevant for the conduct of monetary policy publicly available?

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

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

3. Procedural Transparency

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

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?

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

4. Policy Transparency

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

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

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)?

5. Operational Transparency

a) Does the central bank regularly evaluate to what extent its main policy operating targets (if any) have been achieved?

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

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