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COMMUNICATION FOR MULTI-TASKERS: PERSPECTIVES ON DEALING WITH BOTH MONETARY POLICY AND FINANCIAL STABILITY

Communication for Multi-Taskers:

Perspectives on Dealing with Both Monetary Policy and Financial Stability[*]

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ABSTRACT

This paper examines the communications challenges facing central banks who will be sharing responsibilities with other agencies for macro-prudential objectives, in addition to conventional monetary policy goals. Following a description and analysis of surveys of central banks, and the attributes that make up an index of central bank transparency, some policy proposals are made. It is argued that a hybrid of inflation and price level targeting, combined with a requirement by the macro-prudential regulators to issue press releases much like central banks publish an announcement and rationale for the setting of monetary policy instruments, may improve the central bank communication in a post-crisis world.

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1. Introduction

During the so-called 'Great Moderation' (Bernanke 2004) which began sometime in the 1980s and ostensibly ended around the summer of 2007 central banks around the world grew comfortable with several developments that were eventually reflected in their communications strategy. Enhancements in central bank autonomy led to more transparency. A greater focus on inflation control, a mandate made explicit in the case of inflation targeting central banks or implicit elsewhere, facilitated the monetary authority's ability to anchor inflation expectations, generally through changes in a policy rate released at regularly pre-announced intervals. Equally important was the publication of supporting information by central banks in varying degrees of details to explain and justify the short-term strategy of monetary policy, and the steps to be undertaken to ensure that stated policy objectives would be met. As shown in Figure 1, these developments may well have contributed to enhancing the ability of central banks, especially in the industrial world, to reduce the frequency of changes in their policy rates. With the exception of Switzerland, and Japan, the monetary authorities considered in the figure left their policy rate settings unchanged a majority of the time in the 12 years (19980-2009) covered by the data. Also evident from Figure 1 is the small fraction of time the policy rate changed by more than 25 basis points (bp) while the tendency for the setting of monetary policy to fall over time in most cases, with spells of tightening relatively less frequent, supports the moniker of the Great Moderation which is believed to characterize this period of macroeconomic history. Clearly, the events since the fall of 2007 have led to a rethinking of the role of the interest rate instrument, what has been gained from improvements in central bank transparency, and how the monetary authorities will deal with and communicate these responsibilities to the public. In particular, central banks will be expected to be more vocal about matters beyond their usual remit of maintaining price stability without jeopardizing healthy and sustainable real economic growth.

The present paper is an attempt to provide some perspectives on central bank communication in a world that is expected to require central banks to become multi-taskers when it comes to fulfilling monetary policy and financial stability objectives. Even before the crisis there were

multi-tasking central banks. Hence, a monetary authority that is also responsible for supervision and macro-prudential policies is also, arguably, a multi-tasking central bank. Since the jury remains open about the net benefits of the separation of central banking from supervisory duties the present paper focuses instead of the multi-tasking central bank that emerges from the crisis as being responsible not only for price stability, or a dual objective involving the real side of the economy, but also for financial system stability. As we shall see, the latter task poses some serious challenges not least of which how to communicate central banking policies when monetary authorities are also accountable for this additional burden.

The rest of the paper is organized as follows. I rely on a data base developed as part of the creation of the central bank communications network (see http://www.wlu.ca/viessmann/Bank.htm; and http://www.central-bank-communication.net/about/index.htm), unpublished survey data obtained from the Bank for International Settlements (BIS) [2], as well as portions of an earlier survey conducted by Mahdeva and Sterne (2000), and the Dincer-Eichengreen index of central bank transparency updated by Siklos (2010a). Rather than rely on a single aggregate measure of central bank transparency to assess the effectiveness of central bank communication, as has typically been done so far, I examine whether certain attributes of the index have become more important than others and whether these can assist our understanding of what can help reduce the risks stemming from financial system instability.

Clearly, central bank performance will be partly determined by how well the monetary authority communicates with the public and this must include the impact of central bank communication on the behavior of the core variable central banks are mandated to control, namely inflation. However, as inflation has not proved to be enough to ensure financial system stability I consider some policy proposals and explore whether these can be meaningfully related to forms of central bank transparency. Suggestions for reform, round out the planned

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[2] These include (selected) data from the following surveys: "The provision of monetary policy analysis and advice by central bank staff to central bank policy boards", and "Communication of Monetary Policy by central banks".

study. The results obtained by marrying the data about central banks collected independently together with information gathered via a series of unpublished BIS surveys previously cited will, hopefully, facilitate the introspection needed to enhance the resilience of monetary policy to recurring crises. In addition, the findings of this study may also serve as a reminder to these same institutions against complacency when the good times seem to require less action or foresight than in the harder times that inevitably come following a crisis.

The data reveal that while central banks around the world have largely adopted the necessary arrangements to deal with the goal of maintaining price stability, their decision-making structures are not always adequate to deal with financial stability issues. For example, coordination mechanisms with other governmental institutions, given short shrift to date, are inadequate and must form part of any revamped central bank communication strategy.

Moreover, in spite of the outward appearance that central banks may look alike to outside observers, their communication strategy reveals considerably more heterogeneity in behavior than is commonly believed to exist.

2. The Issues

How much central bank transparency has changed over the past decade, the benefits derived thereof, remains contentious and there continues to be keen interest in evaluating central banks along this dimension. Even if there is some disagreement about the precise metrics one should use to establish a 'league table' for central banks, the only extensive cross-country analysis remains the one developed by Dincer and Eichengreen (2007), updated by Siklos (2010a).[3] Under the Dincer-Eichengreen scheme, central bank transparency is an aggregation of five components. They are: economic, procedural, policy, political, and operational forms of transparency.[4] An important feature of existing exercises aimed at measuring central bank

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[3] Separately, Dincer and Eichengreen (2009) updated their data up to 2006 while Siklos' update is up to 2009, inclusive.

[4] Inspiration for the index constructed by Dincer and Eichengreen (2007) can be traced to earlier work by Eijffinger and Geraats (2004) and Siklos (2002).

transparency is that the methodology is largely driven by the view that central banks have, at most, a dual objective, that is, inflation control with a concern for developments in the real economy.[5] To be sure, the relative weight different central banks place on inflation control varies around the world. Yet, monetary policy and the scope of a central bank's activities are effectively interpreted by such indicators as being limited to the performance of inflation and output (or the output gap). Such a conclusion is also influenced by the view, supported in theory and in practice, that only one instrument is necessary for the central bank to achieve a desirable monetary policy outcome.[6] Not surprisingly then, the associated transparency metrics reflect pre-existing views about the role of central banks and their policy aims.

There is much less emphasis in the literature on measuring transparency on an evaluation of how central banks communicate their actions, the quality of communication, much less on how transparency is managed. Addressing this deficiency means getting a better sense of the variety of 'inputs' used by the decision-making bodies in central banks, how potential conflicts with the fiscal and other governmental authorities (e.g., supervisors of the financial system) are managed, the rationale for certain decisions made by the central bank, and the governance structures they operate under. There is even less research dealing with transparency issues when a central bank must not only manage the conventional requirements of monetary policy but must also evince a concern and develop responses to financial stability issues (see, however, Born, Ehrmann, and Fratzscher 2010). Although a few authors (e.g., Oosterloo, De Haan and Jong-A-Pin 2007) have attempted to analyze and quantify the content of central bank financial stability reports (FSRs), a recent innovation in communication published by a growing number of central banks, it is telling that the contents of such reports did not, until very recently, provide an assessment of the health of the banking system. Moreover, the

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[5] Alternatively, the central bank may have an exchange rate goal or an objective in terms of a monetary aggregate. Nevertheless, the usual aim is to fulfill some primary task for monetary policy without jeopardizing sustainable economic growth.

[6] This need not be only an interest rate or the same instrument at all times. Depending on the circumstances (e.g., near or at the zero lower bound) central banks may turn to other instruments (e.g., quantitative easing or credit easing). At some central banks an exchange rate instrument might be preferred over setting an interest rate.

information used to be somewhat removed from the type of data, for example, that the IMF publishes in its own *Global Financial Stability Report*. Since the publication of Oosterloo, De Haan and Jong-A-Pin (2007) several central banks (e.g., the Reserve Bank of New Zealand) have revamped this kind of publication to provide information not only about the health of the financial system but to analyze the various threats in the form of systemic risks to the financial system.[7] Whether this is sufficient, however, is an entirely different question. Aikman, Haldane, and Nelson (2010) find that financial cycles do not coincide with business cycles, either in amplitude or frequency. Consequently, when it comes to communicating financial stability issues the results suggest "…the need for absolute clarity about the objectives of any macro-prudential policy framework and the policy rule necessary to deliver them. Any lack of transparency or failure of communications is likely to inhibit the effectiveness of macro-prudential policy…" (op.cit., p. 33).

"Talking" about stability issues is, of course, not new. What is different is that such communication will be undertaken in an environment where governments and the public will place greater demands on central banks to achieve multiple outcomes. In turn, this will require a better understanding of how monetary policy and financial stability will work together and the challenges of meeting goals set out for both tasks. Prior to the global financial crisis, price stability was thought to be both necessary and, perhaps, sufficient to ensure financial stability. There is considerable evidence that the fundamental belief that this link underscores how monetary policy used to be conducted since this view is what frequently came from the mouths of central bankers and academics (e.g., Schwartz 1995, Siklos 2009).[8] Indeed, the need to 're-

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[7] With the benefit of hindsight, the failure of FSRs to deliver on their promise is evident in the following quote from Svensson (2003, pg. 26-7) who welcomed their introduction because this type of publication was meant: "…to assure the general public and economic agents that everything is well in the financial sector when this is the case. They also serve as early warnings for the agents concerned and for the financial-regulation authorities when problems show up at the horizon. Early action can then prevent any financial instability to materialize, keeping the probability of future financial instability very low."

[8] Consider again Svensson (2010) who summarizes this view in the context of how monetary policy is conducted under inflation targeting. "The central bank uses all relevant information that has an impact on the forecast of inflation and the real economy. In this framework, the central bank takes financial conditions such as credit growth, asset prices, imbalances, potential asset price bubbles and so on into account only to the extent that they have an impact on the forecast of inflation and resource utilization. Inflation and resource utilization are target

educate' the public to the effect that price stability and small output gaps may no longer be adequate to ensure financial system stability is itself a communications challenge that is only beginning to be tackled by policy makers.

There is an equally important practical implication for what is expected to be a greater demand for simultaneously communicating monetary policy and financial stability issues. One is reminded of the *Tinbergen* principle, seemingly forgotten in a world with a central bank facing a single objective, namely that price stability requires only a single instrument, ordinarily an interest rate, to attain it.[9] In the changed environment policy makers now face the implications of the *Tinbergen* principle are once again germane to policy design. *Tinbergen*'s principle states that, faced with multiple objectives, one must deploy multiple instruments to achieve them. Even if policy makers can agree that an interest rate instrument suffices to deliver price stability, the situation is far more complicated in the case of financial system stability where there is currently no consensus definition of the term, and still less agreement on the constituents of an indicator of the quality of current macro-prudential policies.[10]

A second communications challenge facing the monetary authorities is the need to coordinate their public pronouncements with other authorities and institutions, both of the domestic and international varieties, to ensure that what is communicated to domestic stakeholders is consistent with the policy objectives of the central bank, while permitting the monetary authority to simultaneously retain a reasonable degree of autonomy. After all, it is far from

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variables, that is, variables that the central bank tries to stabilize. Financial conditions are not target variables. Instead, they are only indicators, as they provide information to the central bank about the state of the economy, the transmission mechanism and exogenous shocks. Financial conditions then affect policy rates only to the extent that they have an impact on the forecast of inflation and resource utilization."

[9] Recall the point made above, namely the refrain from central banks that price stability is the best way to deliver other benefits to society in the form of muted business cycle fluctuations and financial stability.

[10] With the possible exception of the fall-back position to do "whatever it takes" as when, for example, the U.S. Fed invoked section 13(3) of the Federal Reserve Act in the midst of the 2007-2009 financial crisis. In the aftermath of the financial crisis of 2007-9 the Act has been amended to place some limits on the loans the Fed can made in "unusual and exigent" circumstances to require approval by the Secretary of the Treasury, while the Congress can also terminate the program.

obvious that the events of 2007-9 represent a failure of monetary policy as opposed to a failure of regulation and supervision. Nevertheless, the presumption is that central banks will have to shoulder a considerable fraction of the burdens of post-crisis policy-making.

The events of April and May 2010 also represent additional evidence of the sheer force of financial globalization and the (in)ability of policy makers to communicate their intentions in a clear and convincing manner. Indeed, a related challenge is for central banks to explain, especially to financial markets, why the concept of central bank independence, and the need for fiscal and monetary policies to be coordinated, needs to be more 'elastic' over time.[11] That is, the monetary authority cannot be above 'politics' in extraordinary times. In ordinary times, when economic shocks are largely benign, the central bank can afford to be more at arm's length than at other times. Elasticity does not mean abandoning the notion of central bank independence. Instead, it requires recognition that the degree to which a central bank operates autonomously from the government can, and must be, state dependent. Communicating subtleties in the government-central bank relationship is essential and contributes to clarity and transparency. Indeed the communications function may have inadvertently been made more complicated since some central banks, such as the Federal Reserve and the Bank of England, have actually gained enhanced authority in the realm of monetary policy. This may be viewed as a surprising outcome in view of worries over loss of autonomy as a consequence of the handling of the crisis in it early stages and in contributing to the conditions that produced the crisis in the first place. One can reasonably ask whether, having won the battle to maintain central bank independence, some central banks may in future lose the war if, and when, the next crisis emerges.

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[11] This may be less difficult than is commonly thought. After all, following a flurry of articles highlighting the connection between central bank independence and inflation, we now know that only a few key elements that define the relationship between the government and the central bank matter. In particular, the clarity of the central bank's mission or, in the case of less developed economies, the turnover rate of central bank governors trumps all other factors. See, for example, Siklos (2002, Chapter 2, and references therein).

Defining when a particular state of the world is, or is not, 'extraordinary', poses a separate difficulty for central banks that wish to communicate clearly without unduly upsetting financial markets. Needless to say, a related hurdle central banks (and governments) must overcome is to explain to the public at large why central bank autonomy is no longer a policy that must be rigidly adhered to at all times. While it is clear that all central banks were aware of the risks posed by changing public perceptions of their autonomy, whether government interference was direct or by stealth, the jury is out on how successful the defense has been. For example, while the Fed and the European Central bank (ECB) are viewed by some to have lost some of their autonomy in the aftermath of the events of 2007-9, the Bank of England does not appear to have suffered the same fate.[12] A root cause then of potential miscarriages of justice when times are difficult, with disastrous consequences for a central bank's standing in the public at large, is the failure to articulate principles for the handling of the inevitable conflicts that arise between a central bank and the government. Time and time again when fiscal and monetary authorities appear to be too close to each other, or on some collision course, this has proved to have permanent and deleterious negative consequences for the important position a central bank holds in society and it is a lesson from history that, sadly, seems to be repeated over and over again (e.g., see Siklos 2002).

All of these developments also mean that, when it comes to communicating policies, central banks will have to guard against the tendency to treat the problem of publicly explaining, say, financial stability issues as being 'complex'. To be sure, the issues are complicated, especially as the economics profession is in the midst of rethinking some of its theories about the relationship between financial and goods markets and revising the models used for policy analysis. However, an unclear or poorly communicated response to the present environment can easily fall prey to a new form of opacity, namely portraying the problem as one that is difficult or impenetrable only because policy makers have yet to come up with a successful mix

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[12] As a result, there may well be lessons learned about the future governance structures of central banks since the Bank of England was indemnified against losses incurred through its asset purchases. The relevant implications for the future shape of central bank legislation are, however, outside the scope of this paper.

of responses to shocks such as the ones that hit the world economy since the summer of 2007.[13]

How information is communicated, the judgments and processes used in arriving at policy decisions are equally important variables economists (and others) need to understand before useful proposals to improve communications strategies are developed to deal with the 'new' realities described above.

Central bankers have often commented on the role of simple policy rules, the best known one of course being the eponymous Taylor rule. Poole (2006), for example, suggests that interpreting Fed behavior as akin to following a policy rule is not inaccurate in the sense that the rule implies that "…the general contours of FOMC policy are broadly predictable" (op.cit., p.6). Many other central banks around the world can make roughly the same claim, at least since the mid-1990s. As a result, it may be fairly claimed that the publicity surrounding policy rules is one of the communications successes of central banks since the mid-1990s. However, neither Poole nor other central bankers would claim that the rule can be safely adhered to at all times. Indeed, at the 2009 Jackson Hole Conference, Mark Carney, Governor of the Bank of Canada, pointedly reminded his audience that "…monetary policy communications could adapt to reflect the behavioural dynamics of financial systems. An effective communications strategy for normal states may prove counterproductive in exuberant states." (Carney 2009). Precisely because asset prices play a role in real outcomes this study argues that central banks should consider adopting hybrid inflation targeting frameworks with a form of price level targeting on grounds that such an approach would improve the clarity of monetary policy communications.

3. Data and Empirical Evidence
a. Data

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[13] A negative externality over concerns about 'complexity' is to propose new forms of regulation that actually end up complicating the task of monetary policy thereby throwing up new challenges for communicating policy decisions.

Mahadeva and Sterne (2000, chapter 4) conducted a large survey of central banks in 1998 and many of the questions are repeated, while not exactly, by the BIS in a separate survey conducted almost a decade later in 2007. Indeed, the BIS has conducted a series of surveys in recent years intended to evaluate how central banks communicate. A broad overview of the results is contained in BIS (2009).[14] While a large number of questions were posed only a relatively small sample of these serve as the starting point for the analysis below or were deemed to be directly germane to the issue of communicating monetary policy when the central bank is expected also to evince a concern for financial stability. Additional information about the surveys is relegated to an appendix. Whereas the survey was conducted across a large number of central banks the empirical analysis that follows relies on a sample of, at most, 30 central banks. Indeed, additional data limitations reduced the effective sample for some of the estimates generated to 8 industrial economies. The latter group consists of industrial economies alone while the broader set of countries also includes 16 emerging market economies. Finally, almost two-thirds of the economies sampled have numerical inflation targets. That I am relying in part on unpublished information limits a detailed identification of some specific information in the data set.

Next, I examine the information content of the index of central bank transparency, due to Dincer and Eichengreen (2007). The index is an aggregation of 15 attributes that describe the type and content of information released by central banks. The 15 attributes are also aggregated into five broad categories. They are: political transparency, which measures how open the central bank is about its policy objectives; economic transparency, an indicator of the type of information used in the conduct of monetary policy; procedural transparency, which provides an indication of how monetary policy decisions are made; policy transparency, a measure of the content and how promptly decisions are made public by the central bank; and, finally, operational transparency, which summarizes how the central bank evaluates its own performance. Details about the construction of the index are also relegated to an appendix

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[14] Also see Filardo and Guinigundo (2008).

(also, see Siklos 2010a). Even if everyone can agree that the individual components of the index are useful metrics for our understanding about how open central banks are, it is striking that certain elements of the index reflect longer term concerns of the central bank while others are more suited to an evaluation of how well the central bank is likely to communicate monetary policy in the short-term. Thus, for example, since political transparency is geared toward the provision of information stemming from the precision of policy objectives and the government's role in setting these objectives, these are likely to change slowly and infrequently. The slow moving nature of changes in the values in this category is likely also enhanced by the principle 'if it ain't broke, don't fix it'. In contrast, attributes included under the headings of policy and operational transparency, are focused on the day to day policy challenges a central bank is likely to face. As a result, an aggregate indicator of central bank transparency is less likely to indicate how well central banks have used their drive to become more transparent to calm markets' fears or in dealing with crisis type situations that directly impinge on the conduct of monetary policy. An additional consideration is likely to stem from the fact that central banks are apt to copy from each other what 'works', prompted also by advice from institutions such as the IMF and the BIS. Presumably, they are likely to promote what they consider as 'best standards of practice' when it comes to monetary policy.

Since the available dataset is relatively small, and the number of central bank transparency attributes that play a role in influencing the goals of financial stability is also likely to be limited, one way of addressing the issue empirically is to consider a factor model and effectively extract the principal components which can then be related to the variable(s) of interest. This can potentially reduce the dimensionality of the problem to a manageable level. Since there are 15 attributes that make up central bank transparency (T_i) we can express the linear combination of factors as follows

$$T_i = \alpha_{i1} f_1 + \ldots + \alpha_{i15} f_{15} + \varepsilon_i \tag{1.1}$$

The f_i (i=1,...15) are the potential common factors while the α_{ij} are the factor loadings. Specification (1.1) is estimated in such a way so that the factors are orthogonal to each other. If

we then specify a proxy for an observable variable that defines financial stability (FS) we can empirically assess whether the most important factors, or principal components, play a role in the outcome. Following the usual practice (e.g., see Joliffe 1986), only eigenvalues that are greater than one are retained.[15] Arguably, it is not levels of transparency achieved by certain central banks that may matter as much as how transparency has changed over time. Hence, central banks that achieved a high level of transparency early on, which then remains unchanged, may have different implications for the balance between price stability and financial system stability than for central banks whose transparency is rising quickly over time. Finally, as there are data from two separate surveys, one is also able to examine the sensitivity of the results to a set of questions more directly related to how central bank communication has evolved over time. Regardless, the preceding calculations lead to the following regression specification

$$FS_{it} = \beta_0 + \beta_1 Z_{it} + \beta_2 f_{it} + u_i \qquad (1.2)$$

In equation (1.2), all the variables were previously defined except for Z which, ideally, is a vector of other determinants of the financial system stability proxy. To keep the specification as parsimonious as possible, Z is defined according to whether country *i* had a numerical inflation target during the 1998-2007 period examined below while we sequentially consider the various available factors extracted on the basis of expression (1.1).[16] Because a time series-cross section version of equation (1.2) is also considered, a time subscript (*t*) is added.

It remains then to develop a proxy for financial stability (FS). It has already been pointed out by several authors (e.g., Goodhart and Tsomocos 2010) that there is no consensus about how to define the term. Even more striking perhaps is that this is an age old problem. For example, Crockett (1997, p. 8), former General Manager of the BIS, in the wake of the financial crisis that was beginning to grip Asia, asked the questions at the Jackson Hole Symposium that continue to

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[15] The eigenvalues can be interpreted as the standardized variance associated with each factor.

[16] Other candidate variables were also considered. See the discussion below.

be posed today: "What do we mean by financial stability? Why should official intervention (as opposed to reliance on market forces) be required to promote stability? And what concrete approach can be employed?" Over the years many central banks have had to at least come up with an explanation of what they believe financial stability represents. A survey of seven central banks of the industrial world included in the empirical work below (not shown; see, however, the appendix) suggests some differences persist in views about the meaning of the term. Obviously, this potentially complicates the communications problem. However, there exists some agreement, more clearly spelled out by some central banks than others, that financial system stability represents an ability to withstand a wide variety of shocks such that economic performance is not adversely affected. In other words, financial system stability contains an element of changes in risks to the central bank being able to fulfill its primary objectives, namely either price stability as defined by each central bank, or a dual objective that includes some form of sustainable employment.

Since the definitions leave wide latitude in developing a proxy the present paper consider several definitions, themselves partly motivated by various data limitations. For 24 countries, including 11 emerging markets, we can evaluate the variance of inflation forecast errors from Consensus economics over the 1997Q1-2007Q4 period. A larger variance is assumed to be more likely to threaten the twin goals of financial and inflation stability. Similarly, to the extent that central banks that have become more transparent are also more likely to set policy according to a policy rule, namely the Taylor rule larger deviations from such rules are also likely to be seen as a threat to both objectives. For 8 industrial countries, 5 of which possess a numerical inflation target, we can also evaluate how much disagreement there is in inflation forecasts, again covering a period that excludes the global financial crisis of 2008-9. As noted earlier (also see the appendix) a loss of financial system stability reflects the outcome of a cumulative process. Hence, if we sum levels of disagreement over time we can gain some idea about the extent to which failure by central banks to properly convey the overall state of the economy, and whether financial imbalances threaten them. Finally, owing to the role of asset price movements in facilitating deleterious outcomes for aggregate economic activity, we also

proxy FS by evaluating the variance of nominal asset price growth or, alternatively, the variance of asset price gaps, based on the aggregate asset price indicator developed by the BIS (e.g., see Borio and Lowe 2004). To proxy the gap a Hodrick-Prescott filter with the standard smoothing parameter (1600 for quarterly data) is applied to the logarithm of the asset price index.[17]

b. Suggestive Evidence

Table 1 provides an overall summary of the finding from the BIS surveys of 2007. Countries that qualify as belonging to the industrial or emerging market (EMEs) groups of economies are defined according to the IMF's International Financial Statistics. By 2007 almost two-thirds of all economies sampled followed monetary policy objectives focused on inflation control with all industrial economies in the same camp. While the fraction of EMEs where inflation was the primary objective of monetary policy is slightly higher than in the industrial world, almost 20% of central banks in this region followed other objectives such as an exchange rate or a monetary target. There is considerably more diversity in who sets the objectives of monetary policy. For example, whereas almost a third of central banks in the industrial world set their objectives jointly with government the same fraction is far smaller among the EMEs where the central bank sets the objective in two-thirds of the sample. These figures are important because the constraints felt by a central bank when communicating not only purely monetary issues but also

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[17] There are many ways, of course, of defining asset price gaps. Goodhart and Hofmann (2008) follow the approach of Borio and Lowe (2002) and Adalid and Detken (2007) to define aggregate asset price booms. A house price-boom is defined as a persistent deviation of real house prices from a smooth trend, calculated via a one-sided HP filter with a (high) smoothing parameter of 100,000. A boom is defined as a positive deviation of house prices from this smooth trend of more than 5 per cent lasting at least 12 quarters. In Adalid and Detken (2007) a boom is defined as a persistent deviation from an HP trend (with smoothing parameter of 100,000) of more than 10 per cent lasting at least 4 quarters. Bordo and Jeanne (2002) focus on the growth rate of asset price series to define booms. Detken and Smets (2004) argue that the use of an asset price gap is preferable to the growth rate for defining a boom because the price gap allows the concept of accumulated financial imbalances to be stressed – reducing the weight of periods of rapid asset price growth directly following an asset price collapse. It also allows sustained periods of only slightly above average growth to cumulate into a boom in levels space. A boom is defined where the 3-year (from t-2 to t) moving average growth rate of the (real) asset price exceeds the series average by a factor of 1.3 times the series standard deviation. When this condition is met, then a boom is declared in periods t-2, t-1 and t.

questions that directly relate to financial stability are likely to be dictated in part not only by the overall objectives for policy but the procedures in place to revisit and renew the existing monetary policy strategy. Next, I consider what the survey says about how monetary policy decisions are announced. The results are summarized in Table 2. There is little to distinguish the industrial from the EMEs with both newswire and the internet overwhelmingly the means used to disseminate such announcements. Far less common are briefings (e.g., press conferences) suggesting that prepared statements are the preferred vehicle to communicate with the public. If one considers the content of central bank communication, as summarized in table 3, the situation is different between the industrial and EMEs. All of the economies in the former group provide a rationale as well as comment on both the short-term outlook and risks to that outlook. In contrast, central banks in EMEs are far less keen to show their hand about how they see the future. One reason, of course, is that EMEs may feel that they are far more susceptible to foreign shocks and the uncertainties contained therein than their counterparts in the industrial world.

It is also interesting to consider the objectives of central banks as they pertain to disclosing more information to the public, as shown in Table 4. In 70% of central banks, the aim is to influence expectations (one would presume, first and foremost, of inflation). Interestingly, a far greater fraction of central banks in EMEs rely on the guidance motive than in the industrial world. There are some hints in the bottom portion of the table suggesting that monetary authorities in the industrial world worry about the loss of flexibility or potential market overreaction to the content of policy announcements. Nevertheless, the fraction of central banks in EMEs that worry about the same issues is considerably higher suggesting that these central banks have reached a slightly different conclusion about the net benefits of greater disclosure. It is also worth noting, though the data are insufficiently informative, that central banks in the industrial world are not only older and more conservative on this score while the EMEs in the sample have only relatively recently enjoyed the freedom to communicate more frequently and directly to the public, encouraged by the autonomy they have won from direct government interference. Given the importance attached to some form of forward guidance it

is perhaps not surprising, as revealed in Table 5, that the vast majority of central banks around the world rely on multiple channels to transmit information to the public. While the press release is the favoured vehicle, monetary policy reports, numerical forecasts, as well as speeches, all figure prominently as devices to communicate their views.

If we are to understand how central banks communicate, and the likely effectiveness of this communication, it is worth considering the nature of the inputs provided by central bank staff and transmitted to senior management who are responsible for making monetary policy decisions and publicly communicating them. It is immediately clear from the summary shown in Table 6 that central bank officials not only receive frequent assessments and updates, on average nine times a year, but also receive projections or forecasts, on average, roughly about once every two months. Also, notice that forecasts and risks to such forecasts play a relatively larger role in policy meetings at inflation targeting central banks. Since almost all central banks make policy announcements at least 8 to 12 times a year this suggests that, at least on average, the incidence of new information from forecasts is less frequent than the potential number of times a year a change in the policy instrument is contemplated. Clearly, central banks can decide to change the policy rate for reasons other than the change in the outlook (e.g., the uncertainty about the outlook) and the survey clearly suggests that other factors are also at play. Unfortunately, the survey is uninformative about the role played, for example, by changes in risks to the future outlook, perceptions of financial imbalances or the threat of a looming financial crisis. However, there is potentially another factor at play that has received far less discussion in the literature. It is worth highlighting, as demonstrated in Table 7, that almost all central banks perceive both the volume and complexity of the information they are required to consider as having risen over time. It is quite likely that these considerations weigh on central bankers and their ability not only to communicate their views but to express such views in a clear and convincing manner. Going forward, central banks and their partners in other agencies, and in government, must tackle the problem not only how to define the scope of central bank communication but whether increasingly vast amount of information can be communicated effectively to markets and the public at large.

The next two tables (Tables 8 and 9) turn to an attempt to compare the various surveys of central bank transparency (e.g., Mahadeva and Sterne 2000, BIS 2009) with the version of the same index based on attributes measured from actual information publicly provided by the central banks. To facilitate comparisons the Tables consider changes in communication activities between 1998 and 2007. The index of central bank transparency begins in 1998 while the survey conducted by Mahadeva and Sterne (2000) begins in 1997 and was completed roughly by the end of the same year. Hence, we take their data as a reflection of the state of play as of the beginning of 1998. In addition, since the two surveys considered here are not entirely identical, the calculations provided in Table 8 are based on a selection of questions from both surveys that were nearly the same. In contrast, the construction of the index of central bank transparency relies on a slightly different format for its contents.[18]

Table 8 confirms the findings based on table 7 since the overall volume of information both used and published by central banks has risen and this is just as true for central banks in the industrial world as it is in the EMEs. Nevertheless, there are four areas that offer interesting contrasts about changes in central bank transparency, at least as measured by survey data. First, the role of economic analysis has grown substantially more in importance among central banks in the industrial world than elsewhere. On the other hand, projections or forecasts of some kind have become a more prominent feature of the work of central banks in EMEs. This is not surprising as one of the challenges faced by central banks in the EMEs since the early to mid 1990s has been to understand and model the transmission mechanisms in their own economies as well as build-up a data base capable of generating useful predictions. Third, Table 8 captures the shift towards a greater focus on inflation control as well as the lead taken by several central banks in the industrial world in this regard, reflected in the finding that almost three quarters of central banks in industrial economies (IE) had unchanged monetary policy objectives while almost half of their counterparts in the EMEs saw changes in central bank objectives. Finally, it is striking that, although 80% of all central banks have increased their emphasis on providing a

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[18] The appendix provides additional details.

public explanation of monetary policy actions, the breakdown by IE and EMEs shows that this is overwhelmingly a phenomenon of the advanced economies. As we shall see, this finding may well have repercussions for how central banks communicate in future and the role played by multilateral agencies such as the G20 in the process.

Table 9 supports the surveys' findings about the relatively faster improvements in aggregate central bank transparency over the decade from 1998 to 2007. In particular, EMEs have adopted a numerical objective for their central banks at a relatively faster pace than their counterparts in the industrial world. Other improvements include faster adoption of measures to enhance procedural and policy transparency. The evolution of central banks policies in the industrial world (Siklos 2002) suggests that this group of economies essentially were 'first movers'. As we shall see, this may also have a role to play in dealing with concerns over communicating financial system stability issues.

I now turn to more formal empirical evidence concerning the role and impact of attempts by central banks to improve their transparency and provide effective communications. Table 10 shows the communality for each of the 15 attributes for the 30 economies that were also surveyed by the BIS. Estimates are shown for both the levels and changes in transparency attributes as well as for a selection of key questions from the BIS survey. When it comes to transparency levels there is considerable common ground across the economies examined regarding procedural transparency. This suggests that central banks communicate information in a similar manner. There is also, unsurprisingly given some of the summary statistics discussed earlier, considerable common ground in the specification of a numerical inflation objective (attribute 1b). Finally, a very strong common factor is the provision of an explanation for policy rate decisions. Turning to changes in the same attributes over the 1998-2007 period the situation is broadly similar with the one reported based on the levels of central bank transparency attributes, except that there is more in common across the central banks surveyed in the area of political transparency as well a relatively stronger links among the economies considered in the area of policy transparency. Since the index of transparency effectively represents what's observed by the public it is useful to contrast this with what

central banks themselves regard as important features of the inputs that go into the monetary policy making process. As shown in the last column of Table 9 there is considerable agreement across the economies examined that economic analysis of various kinds, but especially projections and forecasts, represent central ingredients in the monetary policy decision-making process. There is considerably more diversity about the role of risk factors in influencing the setting of monetary policy and still less common ground when it comes to the volume and complexity of the information that is provided.

The upshot of all this is that while each of the attributes that make up the index of central bank transparency are interesting in their own right, as is the content of the survey-based analysis, the number of 'factors' that help define transparency and central bank communication strategy can be reduced to a more parsimonious level. Accordingly, Table 11 shows the chosen factor loadings themselves estimated by principal components analysis.[19] Although, in principle, the identification of each of the components, defined to be orthogonal to each other, is somewhat arbitrary we do get some information from the factor loadings which, following (1.1), can be viewed as weights in a linear combination of potential common factors. Significant loadings are highlighted in bold characters and these serve as guides in defining the factors defined in the top row. The factors are listed in order of importance. Hence, according to the principal components analysis on the levels of the attributes that make up the central bank transparency index, the economic outlook represents the most important factor followed by explanations of the policy stance. Information that communicates the monetary policy strategy or provides an indication of how central banks reach their decision, that is, their judgment, round out the list of most salient factors. The list looks somewhat different when we turn to changes in central bank transparency attributes. Now, communicating monetary policy strategy, the stance of policy, the nature of shocks hitting the economy, are the most important factors driving changes in the components of the index. Communicating policy disagreements within the policy

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[19] Following standard practice (e.g., see Joliffe 1986) the analysis is restricted to components with eigenvalues greater than 1, also known as the Kaiser-Gutmann criterion. The principal components are rescaled since they are dependent on the scaling of the variables although in the present context this poses little difficulty given how the index of central bank transparency and the survey-based questions are coded.

making committee and evaluations of policy outcomes complete the list of factors that matter for understanding changes in central bank transparency over time. Finally, if we examine the inputs into the policy process, the data uphold the relative importance of projections, economic analysis, and a discussion of risks to the outlook. Taken together it does appear that there is some consistency between the survey and an independent assessment of central bank transparency. What central banks communicate is indeed largely influenced by the importance attached to certain inputs that go into the policy making process.

I now turn to a few regression estimates that may be used to speculate about the contribution of transparency and, therefore, central bank communication, on some proxies for 'financial stability'. Previously noted data limitations imply that only two sets of estimates are possible, namely one set based on a group of 8 industrial economies and a larger group of 24 economies that includes a number of EMEs. There is no consensus on how to define financial system stability. Therefore, in line with what central bankers believe are the links between the real and financial sectors of the economy the first proxy estimates the variance of inflation forecast disagreement (FS1). A convenient way of expressing how much forecasters disagree with each other is to evaluate the degree of dispersion across forecasts of the same variable, in the present case the rate of change in a Consumer Price Index (CPI). As pointed out recently by Leduc, Rudebusch, and Weidner (2009), the concept of forecast disagreement is frequently overlooked by observers who track and report on the evolution of the state of the macro-economy. Unfortunately, there is no universally agreed upon statistic for forecast disagreement. Nevertheless, a measure of the dispersion of forecasts is often used to quantify forecast disagreement (see Siklos 2010b, and sources therein).[20] Data limitations imply that the

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[20] In the present case Let d_{th}^{j} represent forecast disagreement at time t, for a forecast of horizon h, produced for economy j. Then,

$$d_{th}^{j} = \frac{1}{N_j - 1} \sum_{i=1}^{N_j} (F_{ith}^{j} - \bar{F}_{\bullet th}^{j})^2$$

where F is the forecast for inflation, N_j is the number of forecasts, i identifies the forecast, while $\bar{F}^{j}$ represents the mean forecast value across forecasters in economy j. For the purposes of the econometric study to follow, forecast

period over which forecast disagreement is measured is restricted to the 1999-2007 period and only for a group of 8 economies. The original calculations are based on quarterly data and simple arithmetic averaging is used to generate the variance measure over the 1999-2007 period.[21] We exclude the period beginning in 2008 to avoid having the results contaminated by the financial crisis (however, I return to this question below). The next two proxies for financial stability (FS2, FS3) take their cue from the work of the BIS (e.g., Borio and Lowe 2004) who have highlighted the role of asset price imbalances as instigators of the crisis of 2008-9. Hence, the variance of real asset price growth or the variance of deviations in (log) asset prices from an HP filtered trend, originally based on quarterly data provided by the BIS, serve as estimates of the underlying state of financial stability. The last two proxies for financial stability (FS4, FS5) expands the dataset to include a number of EMEs in the sample but at the expense of coarser data. FS4 is defined as the variance of inflation forecast errors where forecasts from *The Economist* are used (Siklos 2010c). Next, given the debate over whether departures from the Taylor rule are necessary and sufficient to explain the build-up of financial imbalances (e.g., Clarida 2010, Taylor 2010, Bernanke 2010), I aggregate the variance of inflation forecast errors for the same group of 24 economies and add the variance of deviations from a 'classic' Taylor rule.[22]   Table 12 presents selected results. Owing to the shortage of observations, and making use of the orthogonality principle used in constructing the principal components, only principal components that were found to be statistically significant are shown. An additional vexing issue is whether other 'controls' are necessary and which ones to include. Given the construction of the dataset it was felt that a dummy variable for whether the economy in question targets inflation seemed like a sensible choice. Other controls were also considered but these did not

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disagreement is first evaluated for each source (i.e., each *i* in the above equation). The mean value of *d* is then calculated for each economy *j* in the dataset.

[21] An appendix plots the original data at the quarterly sampling frequency.

[22] In the present case the Taylor rule is defined as $3.5 + 1.5\tilde{\pi} + 0.5\tilde{y}$, where $\tilde{\pi}$ is the inflation gap, and $\tilde{y}$ is the output gap. For additional details about sensitivity analysis and the implications of this particular construction, see Siklos (2010b).

change the conclusions at all.[23] Of the various principal components considered (see Table 11)[24] only the outcome of policy factor proved to be statistically significant, except when the financial stability proxy, defined according to inflation forecast disagreement, is used. In the latter case none of the principal components was found to be statistically significant. In addition, greater transparency in communicating the outcome of monetary policy measures and decisions is found to raise each one of the proxies for financial stability.[25] To the extent that more information implies that agents can make more informed judgments this represents a little bit of evidence that central bank communication does influence expectations and the outlook. However, if the objective of the exercise is to foster greater agreement, then the outcome may just as easily be interpreted as signaling a failure in the communication strategy.[26] Indeed, if we examine forecasts of the dependent variable for all 30 economies in the full dataset, as shown in Figure 2,[27] it is found that there are two possible sources for the overall positive impact of the outlook reported in Table 12. First, there is a statistically significant and positive impact for 10 EMEs whereas only 5 industrial countries have the same impact. For one of the EMEs communicating of the outlook actually reduces the variance of

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[23] For example, the indicator of regulatory quality from the Polity IV dataset (http://www.systemicpeace.org/polity/polity4.htm), as well as the financial regulation quality indicator developed by Masciandaro et. al. (2010) were also used and left the conclusions unchanged.

[24] A variety of other principal components were also estimated, for example, based on measures of changes in transparency relying on survey-based measures. Space limitations and their lack of significance prevent further discussion here.

[25] Further, it did not make a difference whether the economy in question was industrial or an EME.

[26] There are at least two other technical issues that can only be addressed in a very limited fashion. First, it is possible that since inflation targeting is a choice variable, there is excessive correlation with the residual term. In other words, this variable is endogenous. Limited experimentation reveals, for example, that when FS3 is the dependent variable the sign and the significance of the principal component is unchanged. However, owing to the paucity of instruments, these are to be considered weak by the standards of the Stock-Yogo test (see Stock, Wright and Yogo 2002). Another possibility is that, due to the restricted number of countries in the sample, there is the possibility of sample selection bias. Once again, experimentation when FS3 to FS5 are the dependent variables suggests no sample selection bias though one should be cautious in drawing the conclusion that there is no sample selection bias.

[27] The forecasts for the countries outside the 8 economies are based on incomplete data.

inflation forecast disagreement. Finally, since we have data for the variance of inflation forecast errors for 2008-9 I next consider the following counterfactual. Suppose that the relationship between transparency and financial stability is described by the FS3 proxy. To what extent can this model explain the variance of inflation forecast disagreement during the 2008-9 period of the so-called global financial crisis? As shown in Figure 3 the results suggest, at least for 6 of the 8 economies in the group of 8 industrial economies considered, that communicating the outlook still served a useful function. However, in the case of the UK and US, there is clearly a missing element or elements that require an explanation. Of course, the UK and the US, as of 2009, were at the epicenter of the financial crisis and it is conceivable that no amount of clear or frequent central bank communication would have made a difference. In the concluding section I reflect on the possibility that central bank transparency and communication, in spite of having reached high levels, could stand some improvements that are not immediately obvious from either survey results or existing indices of central bank transparency.

Although the results can only be viewed as speculative, in part due to the severe data limitations, one other factor may have played a role in the outcome, namely that most of the economies in the group of 8 examined in the first four columns of the table had already attained a considerable amount of transparency.[28] Consequently, I consider another counterfactual, namely assume that central bank transparency in the 8 economies considered in Table 12 changed over the 1998-2007 period at the same rate as in a select group of 8 EMEs in the sample. As shown in Table 13, the results change markedly. First, various forms of central bank communication unambiguously reduce the financial stability proxy which is taken here as implying a rise in financial stability. Second, the timeliness of monetary policy communication, as well as information about disagreements within the policy making body, are proximate explanations for improvements in financial stability in the hypothetical case considered.

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[28] Indeed, Dincer and Eichengreen (2007, Table 2) report that 14 countries have aggregate transparency index values that are described as 'extreme'. Seven of the 14 economies in question (not all of them industrial countries) are in the dataset examined in this study. Moreover, based on the extension of the dataset from 2007-9, there are no further changes in any of the transparency measures for the 8 economies considered in the regressions in Table 12 (results not shown; also see Siklos 2010b).

Conceivably then, prompt reporting and an open acknowledgement of differences in views can potentially enhance the role of central bank communication.

4. Conclusions and Policy Implications

At the outset, it might be noted that the data so far collected from central banks, as well as some of the data contained in various surveys of central banks, ought to lead to other studies related to the general issue of how central banks communicate. For example, forecasting lies at the core of central bank activities. Yet, there is considerable divergence of opinions around the world not only about what information should be released, how it ought to be communicated, but the limits of providing forward-looking type information. Indeed, nowhere is the issue more heated than when the question is raised of releasing a forward interest rate track. Understanding how different central banks reach different conclusions is also of considerable importance and interest. Taking a step back from the specific example of forecasts, an additional avenue of future research should investigate why central banks place greater or lesser emphasis on certain forms of transparency. Whether this emerges through the kinds of publications released, their frequency, the areas of research a central bank promotes, how it portrays and communicates the modeling process in public, are just some of the avenues that could also be investigated and from which policy implications may be drawn.

If we are prepared to accept the notion that changing an interest rate instrument is a "heavy-handed means of dealing with financial sector vulnerabilities, especially if the potential source of instability is limited to a particular sector or area of activity" (Murray 2010), and if the available macro-prudential instruments remain in short supply, or we cannot agree on them at the present time, then improved communication may well assist in mitigating to some extent these financial imbalances.[29]

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[29] "Rather than trying to reduce imbalances using interest rate policy, it may therefore be preferable in many cases for central banks to step up communication and issue risk warnings, that need to be backed up by the 'threat' of macropudential action." (IMF 2010, p. 24)

Would a change to a version of a price level target that combines flexible inflation targeting with price level targeting solve the communication problem? Consider Figures 4 and 5. Figure 4 displays the evolution of the price level in 9 industrial countries since 1996.[30] Super-imposed on each one of the graphs are straight lines representing constant drifts in the price level ranging from 0% to 2.5% depending on the economy in question. In a couple of cases, such as Canada and the euro area, the 2% drift alone appears to capture quite well the evolution of the price level in both economies, a point that has also been made by others (also see Kamenik et.al. 2008, Ruge-Murcia 2009, Melino 2010; Gaspar, Smets, and Vestin 2010). In other cases, such as Sweden which also has a numerical objective of 2% inflation, the 2% drift does a far poorer job of tracking prices than, say, a 1% drift whereas for Japan the no drift case appears to outperform other drift patterns considered. Finally, for the UK and the US, a 2.5% drift appears to do relatively well. While the US does not have a stated numerical objective there is evidence that such an implicit target is not too far away from FOMC members' views about the appropriate US inflation rate whereas for the UK it should be noted that, until 2004, the stated target range was 1-4% which makes 2.5% the effective inflation target. Given the persistence of inflation it may take some time for prices to reach the present goal, exacerbated by the events that have taken place since late 2007. Nevertheless, whereas existing research has tended to focus on whether central banks effectively targeted a price level with some drift, or indeed whether such a policy is optimal, the point here is to suggest that presenting such data provides a simple but powerful communication tool for central banks that ultimately aim to offer some form of price stability.[31] Carney (2009), Governor of the Bank of Canada, suggests that such a hybrid could be used to lean against financial imbalances during extraordinary times, while preserving a drift away from an inflation target (say 2%) for as long as necessary until the

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[30] Two issues are worthy of mention here but beyond the scope of this paper. First, the date of origin for the data plotted in Figures 3 and 4 may alter the conclusions below in a very few cases but not for most. Second, there is the issue of the appropriate price level for policy. Although the CPI, or a domestic version of it, is employed below there is much to be said in favour of communicating policy by relying on a consumption price deflator.

[31] This also raises the question whether there is consensus about what constitutes price stability, especially as the quality of price data varies across countries. This issue is also sidestepped here.

imbalance is corrected and the economy can return to its price stability objective.

The proposal is not a new one. White (2006, p. 16), former at the Bank for International Settlements writing about the need for a new monetary policy framework, argued that central banks "…should express publicly their intention to respond to emerging financial imbalances even if, occasionally, this leads to an undershooting of near-term inflation targets." In other words, price stability is not enough. Nevertheless, such a policy might also contribute to 'solving' the vexing problem of the suitable horizon for monetary policy. Consequently, the time horizon to achieve the inflation target would become flexible, in recognition of the primacy of the inflation objective but not to the exclusion of the imperative of maintaining some form of financial stability. Far from complicating the communication task of the central bank, as Kohn (2010) claims, it would actually simplify it unless it is far from clear when financial imbalances have become large. Indeed, such a policy might also ease the shifting responsibilities over time from the central bank to the regulators who could independently concur with the monetary authority concerning the state of financial imbalances. Central banks learned in the early 1990s that an unchanged policy rate does not imply an unchanged policy stance, resulting in the publication of a press release after each decision is made, regardless of the outcome of the policy committee meeting. A future role for central banks in a world where macro-prudential concerns predominate, and communication by several regulators and supervisors risks confusing rather than clarifying the state, say, of financial imbalances, could involve a joint press release, at pre-announced intervals, explaining the existing state of affairs and policy decisions that are required to prevent the onset of exuberance in the financial sector from taking hold. In conclusion it is worth asking whether there are any implications for financial imbalances from advocating a hybrid type of inflation targeting regime of the kind mentioned earlier. Figure 5 shows for the US, the UK, and Japan, the evolution of a proxy for financial imbalances, defined as the cumulative deviations in a trend of aggregate asset prices (right hand scale) against deviations in a drifting price level (left hand scale). In both cases the

correlation is positive and statistically significant.[32] Moreover, if we were to begin the sample in 1990 the results would remain unchanged. The Japanese case, shown for a longer sample in view of the widely studied Japanese macroeconomic experience since the early 1990s, also points to another concern for policy makers. Not only do imbalances in asset prices remain negative but, if one assumes even a 1% drift in the price level, deviations from the 1% drift become more negative over time. Since the UK and the US were earlier seen as two of the 'outliers' in the sample there is a little bit of evidence supporting some connection between these imbalances and developments in consumer prices. Japan, as many others have previously noted, is not an example to emulate and Figure 5 supports this view. Clearly, other factors are also at play and this also provides additional incentive for the publication of a joint press release by regulators and central banks.

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[32] The correlation is 0.31 for the UK (0.40 if the data are extended to 1990), and 0.26 for the US (0.31 if the sample starts in 1990). The correlation is statistically insignificant for all the other economies considered in the 1996-2009 period. However, if we were to extend the data back to 1990 there is a positive correlation found for Australia (0.32), while a negative correlation (-0.32) is found for Switzerland. Note that Switzerland's experience comes closest to that of Japan where the correlation is also negative (-0.31) but not statistically significant.

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Table 1 Overview: the Objectives of Monetary Policy and Monetary Policy Decisions, 2007

Objectives of Monetary Policy	All economies	Industrial	Emerging markets
		%	
Inflation	61	54	67
Exchange rate	6	0	11
Monetary aggregate	3	0	6
Who defines the target?			
Government	16	8	22
Central Bank	35	15	50
Joint	23	31	17
Who Announces changes to MP Objectives?			
Government	13	8	17
Central Bank	45	15	67
Joint	19	31	11

Table 2 Communication of Policy Announcements, 2007

Outlet	All economies	Industrial	Emerging markets
		%	
Newswire	81	92	72
Internet	84	85	83
Briefing	13	15	11

Table 3 The Content of Communication of Policy Setting Changes, 2007

Type of Content	All economies	Industrial	Emerging markets
	% of respondents who answer 'always'		
Rationale	94	100	89
Future direction of policy	16	31	6
Short-term outlook	68	92	50
Risks to the outlook	65	85	50

Notes to Tables 1 to 3: Based on the BIS's survey (see BIS 2009). % of all economies surveyed shown. Definition for industrial and emerging markets follows IMF definition.

Table 4 The Objectives of Greater Disclosure, 2007

Objectives	All economies	Industrial	Emerging markets
	% of respondents who answer 'very important'		
Expectations guidance	70	50	83
	% of respondents who answer 'very important' [% who answer 'somewhat to important']		
Limit loss of discretion	13 [53]	0 [33]	22 [67]
Limit market overreaction	17 [50]	0 [34]	28 [61]
Limit potential loss of credibility	20 [44]	8 [25]	28 [56]

**Table 5 The Channels of Central Bank Communication
and their Role in Influencing Expectations, 2007**

Channels	All economies	Industrial	Emerging markets
	% of respondents who answer 'very important'		
Press release	87	83	89
Forecasts	73	83	67
Monetary policy reports	80	92	72
speeches	70	75	67

Notes to Tables 4 and 5: See notes to Table 1 to 3.

Table 6 Staff Input Into the Monetary Policy Process, 2007

	All economies	Industrial	Emerging markets
	Mean (S.D.) of annual frequency		
Current economic situation	Unadjusted: 11.5 (9.7) Adjusted: 9.5 (2.8)	13.18 (13.05) 9.30 (2.26)	9.65 (3.35) NA
Current financial situation	Unadjusted: 13.08 (12.97) Adjusted: 11.24 (10.31)	12.82 (13.27) 8.90 (2.81)	13.39 (13.39) 9.06 (3.53)
Projection/Forecast	5.50 (2.86)	4.90 (1.97)	6.05 (3.50)
	% of respondents who answered 'significant focus of MPC meeting'		
Discussion of risks to forecast	94.4	58.8	41.2
Of which: Inflation targeters	-	80	57

Table 7 Volume and Complexity of Monetary Policy Process, 2007

	All economies *% of respondents who answered 'increasing'*
Volume of background material	94.1
Technical content of discussion	85.7

Notes to Tables 6 and 7: See notes to Tables 1 to 3.

Table 8 Changes in Central Bank Transparency, Survey-Based: 1998-2007

All economies							
	Analysis	Projections	Objective	Assignment	Rationale	Outlook	Risks
Reduced	5.26	5.26	7.14	14.29	4.00	12.50	13.04
Increased	78.95	31.58	57.14	14.29	80.00	54.17	21.74
Unchanged	15.79	63.16	25	71.43	16.00	33.33	65.21
No. CB	19	19	28	28	25	24	23
Industrial							
	Analysis	Projections	Objective	Assignment	Rationale	Outlook	Risks
Reduced	0	9.09	0	14.29	0	16.66	16.67
Increased	100	72.73	28.57	14.29	15.38	58.33	56.67
Unchanged	0	18.18	71.43	71.43	84.62	25	16.67
No. CB	11	11	14	14	13	12	12
Emerging Market Economies							
	Analysis	Projections	Objective	Assignment	Rationale	Outlook	Risks
Reduced	12.50	0	14.29	14.29	8.33	8.33	9.09
Increased	50.00	50	42.86	71.42	16.67	41.66	63.63
Unchanged	37.50	50	42.86	14.29	75	50	27.27
No. CB	8	8	14	14	12	12	11

Notes: See the appendix for details about the structure and content of the survey. Based on the differences in the scores obtained from the BIS (2009) survey for 2007, and the survey conducted by Mahadeva and Sterne (2000). Shows the percent of central banks surveyed which saw a rise, fall, or no change in the attributes listed in the first row. The sum of 'reduced', 'increased', and 'unchanged' in each portion of the table should add to 100% though there may be a small rounding error.

Table 9 Changes in Central Bank Transparency, Index-Based 1998-2007

Attributes	All	Industrial	Emerging Markets
Political transparency			
Formal objective?	.01	.01	.01
Quantification of objective?	.03	.01	.04
Instrument independence?	.01	.01	.01
Economic transparency			
Data availability?	.01	.01	.02
Model disclosure?	.04	.05	.03
Forecasts published?	.05	.03	.07
Procedural transparency			
Strategy outlined?	.01	.01	.02
Account of deliberations?	.02	.01	.03
Disclosure of monetary policy decision process?	.01	.01	.01
Policy transparency			
Prompt announcement of policy rate decision?	.04	.02	.06
Explanation of decision?	.03	.04	.03
Disclosure of policy inclination?	.01	.02	0
Operational transparency			
Evaluation of policy target?	.02	.01	.03
Disclosure of shocks/disturbances?	.02	.01	.03
Evaluation of policy outcomes?	.02	.01	.03
Overall transparency index	**.33**	**.25**	**.40**

Notes: Details about the attributes can be found in the appendix. The values represent the average annual change in the attributes listed in the first column. Each attribute receives a score of between 0 and 1. The aggregate transparency index reaches a maximum at 15.

Table 10 Factor Loadings and Communality

Level Attribute	Communality	Change Attribute	Communality	Survey-based	Communality
1a	0.08	1a	0.71	C11	0.46
1b	0.79	1b	0.83	C110	0.92
1c	0.40	1c	0.93	C111	1.00
2a	0.42	2a	0.65	C12	0.90
2b	0.48	2b	0.16	C13	1.00
2c	1.00	2c	0.51	C14	0.70
3a	0.86	3a	0.09	C15	0.56
3b	0.70	3b	0.56	C16	0.44
3c	0.98	3c	0.86	C17	0.58
4a	0.63	4a	0.90	C31	0.64
4b	0.98	4b	1.00	C32	0.28
4c	0.69	4c	0.72	E1	0.22
5a	0.31	5a	0.48	E15	0.14
5b	0.37	5b	1.00	E19	0.43
5c	0.25	5c	0.54	NA	NA

Note: Attributes consist of the 15 components of the index of central bank transparency (columns (1) and (3)) or selected questions from the BIS survey. See the text and the appendix for details.

Table 11 Factor Loadings

Level Attribute	Outlook	Stance	Strategy	Judgment	Change Attribute	Strategy	Stance	Shocks	Timely	Dis.	Outcome	Survey-based	Forecast	Analysis	Risks
1a	0.20	-0.04	0.18	-0.06	1a	**0.77**	0.11	0.21	0.03	-0.16	-0.16	C11	0.32	-0.07	0.59
1b	0.42	-0.03	**0.73**	-0.28	1b	0.60	0.52	0.07	0.07	-0.09	**0.43**	C110	**0.84**	-0.27	0.38
1c	0.44	0.04	0.43	-0.15	1c	**0.94**	-0.11	0.00	0.00	-0.15	-0.08	C111	**0.94**	0.33	0.00
2a	0.19	0.56	0.17	-0.18	2a	0.04	-0.02	0.40	0.47	0.43	0.29	C12	0.55	**0.77**	-0.07
2b	0.15	0.51	0.44	0.03	2b	-0.13	-0.05	0.04	0.09	0.35	-0.09	C13	0.57	**0.83**	0.00
2c	**1.00**	0.00	0.00	0.00	2c	0.06	0.46	0.53	-0.09	-0.04	-0.01	C14	0.47	**0.69**	-0.04
3a	0.38	-0.03	**0.75**	-0.38	3a	0.11	0.16	-0.09	-0.05	0.16	0.13	C15	0.58	0.22	0.42
3b	0.26	0.39	0.38	0.58	3b	0.17	0.50	-0.05	0.06	**0.50**	0.15	C16	0.62	0.02	0.23
3c	0.51	0.54	0.05	**0.65**	3c	0.58	-0.29	0.21	0.06	**0.62**	-0.03	C17	0.50	0.24	0.52
4a	0.45	0.55	0.19	-0.30	4a	0.09	0.69	0.24	0.52	0.19	-0.21	C31	0.31	0.33	**0.66**
4b	0.36	**0.83**	-0.06	-0.40	4b	0.00	0.00	0.06	**1.00**	0.00	0.00	C32	0.34	-0.08	0.39
4c	0.29	**0.64**	-0.11	0.42	4c	0.13	**-0.71**	0.03	0.39	0.16	0.12	E1	0.21	0.22	0.36
5a	0.18	0.41	0.32	-0.05	5a	0.21	-0.01	-0.05	0.20	-0.36	**0.52**	E15	0.31	0.17	0.10
5b	0.52	0.10	0.31	0.07	5b	0.00	0.00	**0.98**	-0.18	0.00	0.00	E19	-0.24	-0.06	0.61
5c	0.30	0.02	0.27	0.30	5c	-0.04	0.08	0.50	-0.09	0.22	0.48	NA	NA	NA	NA

Note: See the appendix for an explanation of the attributes, Table 10 and the text for estimation details.

Table 12 Regression Results

Ind. Variable	Dependent variables				
	FS1	FS2	FS3	FS4	FS5
Constant	0.92 (0.97)	31.93 (8.63)*	20.87 (4.19)*	16.92 (7.17)**	50.23 (22.01)**
IT	0.22 (1.12)	-11.53 (9.94)	-8.74 (4.83)*	-14.38 (9.74)	-42.01 (29.90)
Outcome of Policy	0.90 (1.05)	26.54 (9.36)*	17.36 (4.54)*	11.66 (3.90)*	36.03 (11.97)*
Diagnostics					
Obs.	8	8	8	24	24
$\overline{R}^2$	0.26	0.50	0.66	0.28	0.28
F (p)	0.86 (.48)	4.45 (.08)	7.72 (.03)	5.50 (.01)	5.50 (.01)

Note: IT is an inflation targeting dummy (see the appendix for the details). Standard errors in parenthesis. *, ** mean statistically significant at the 1 and 5% levels, respectively. The other independent variable is based on the principal components reported in Table 11. FS1 to FS5 are the various proxies for financial stability described in the text. All equations estimated via OLS. Table A5 (appendix) and Siklos (2010c) provide the dates for IT. FS1= variance of forecast disagreement. The latter is defined in n. 20. Also, see Siklos (2010b). FS2= variance of the growth rate of aggregate asset prices (BIS index), FS3= variance of asset price gaps, as defined in the text. FS4= variance of inflation forecast errors, 1999-2007, inclusive. See Siklos (2010c). FS5= FS4 + variance of deviations from a classic Taylor rule, as defined in n. 22. The 8 countries in the first three columns are: Australia, Canada, the euro area, New Zealand, Sweden, Switzerland, U.K., and USA. The remaining 16 economies added in columns 4 and 5 of the results are: Argentina, Chile, Czech R., Hong Kong, Hungary, Israel, Korea (South), Malaysia, Mexico, Norway, Philippines, Poland, Singapore, Slovakia, South Africa, and Thailand.

Table 13 Counterfactuals

Ind. Variable	FS1	Ind. Variable	FS2	FS3
		Dependent variables		
Constant	0.95 (0.61)	Constant	16.88 (6.20)	10.87 (3.70)**
IT	0.41 (0.70)	IT	7.05 (7.74)	3.41 (4.62)
Timeliness	-0.63 (0.31)+	Policy Disagreement	-14.40 (5.34)**	-8.55 (3.19)**
Diagnostics				
Obs.	8	Obs.	8	8
$\overline{R}^2$	0.34	$\overline{R}^2$	0.46	0.45
F (p)	2.85 (0.15)	F (p)	4.03 (0.09)	3.86 (0.10)

Note: See notes to Table 12. The counterfactuals are described in the text and involve replacing actual changes in transparency in the 8 industrial countries considered with the values obtained for 8 EMEs in the sample.

Figure 1 Frequency of Policy Rate Changes, Nine Industrial Countries, 1998-2009
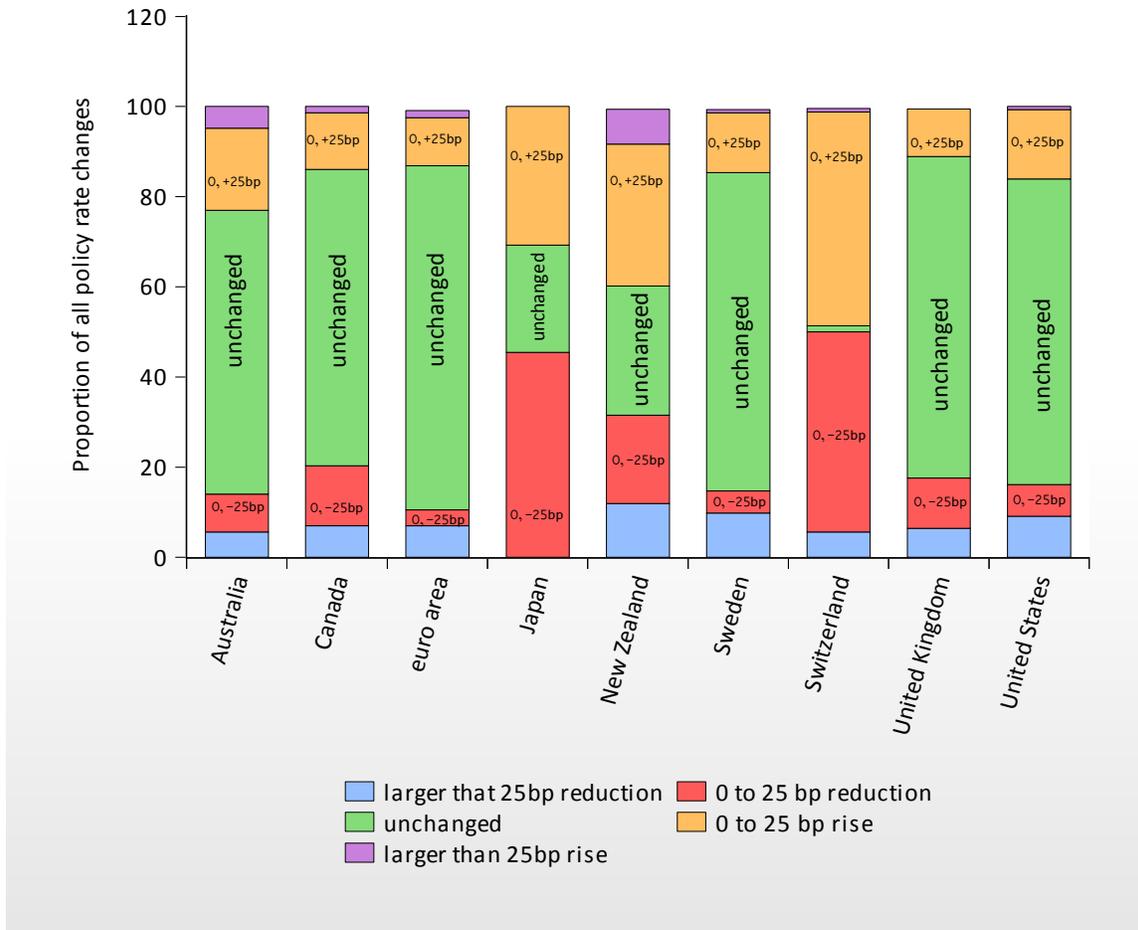
Note: The vertical axis is the fraction of policy rate changes, in percent, in the ranges shown. The top and bottom bars represent changes that exceed 25 basis points. See individual central bank websites for details of each economy's official policy rate (e.g., fed funds rate for the U.S.). central bank websites can be accessed from the central bank hub at http://www.bis.org.

Figure 2 – Projected Financial Stability Proxy
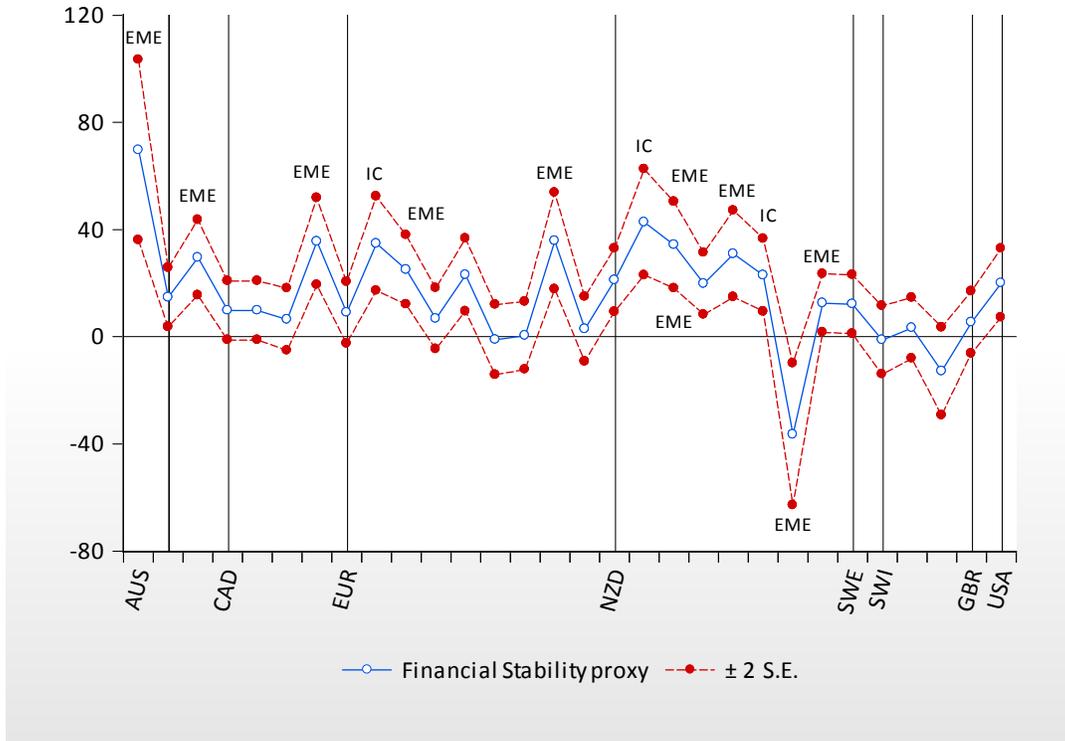
Note: The left hand side is the financial stability proxy described in the text. EME stands for emerging market economy, IC stands for industrial economy. See the appendix for the country/economy codes. S.E.= standard error. The FS3 proxy (see Table 12) is used as he dependent variable.

Figure 3 – Forecast and Standard Error for Financial Stability Proxy
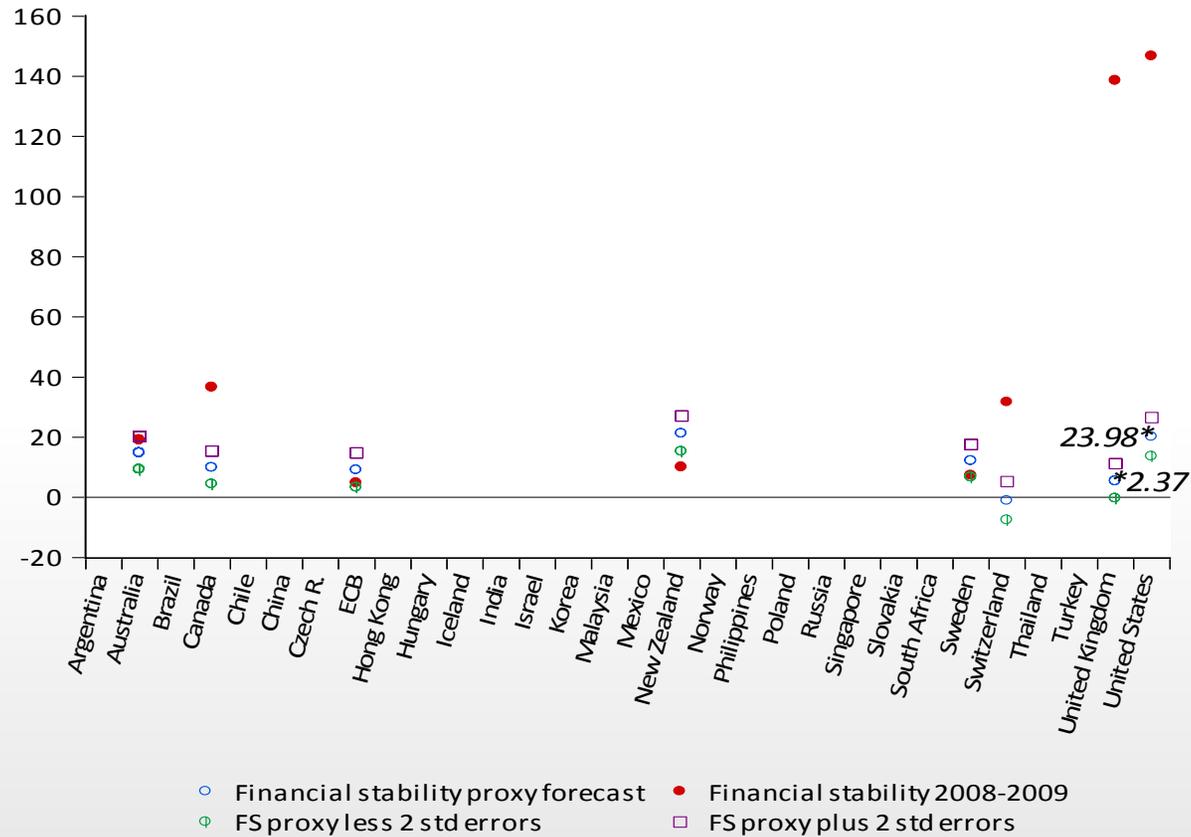
Note: See note to Figure 2. Financial stability 2008-2009 is the value obtained via a counterfactual experiment explained in the text.

Figure 4 Drifts in the Price Level in Nine Industrial Countries, 1996-2009
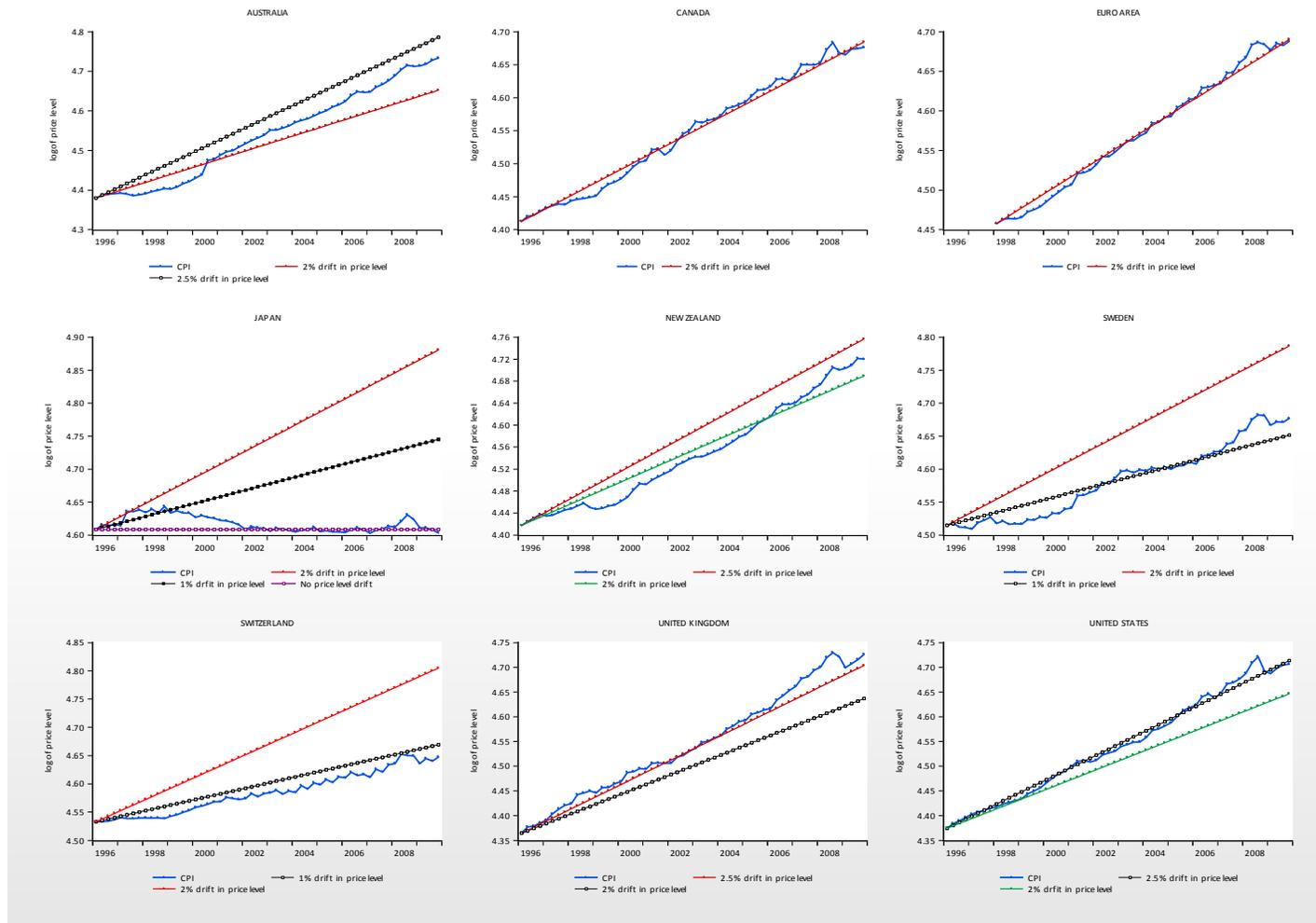
Note: The vertical axis is the logarithm of the price level proxied via the CPI. Data are from the International Financial Statistics CD-ROM (October 2010). The straight lines represent constant 0% to 2.5% increases in the price level.

Figure 5 Price Level Drift and Financial Imbalances
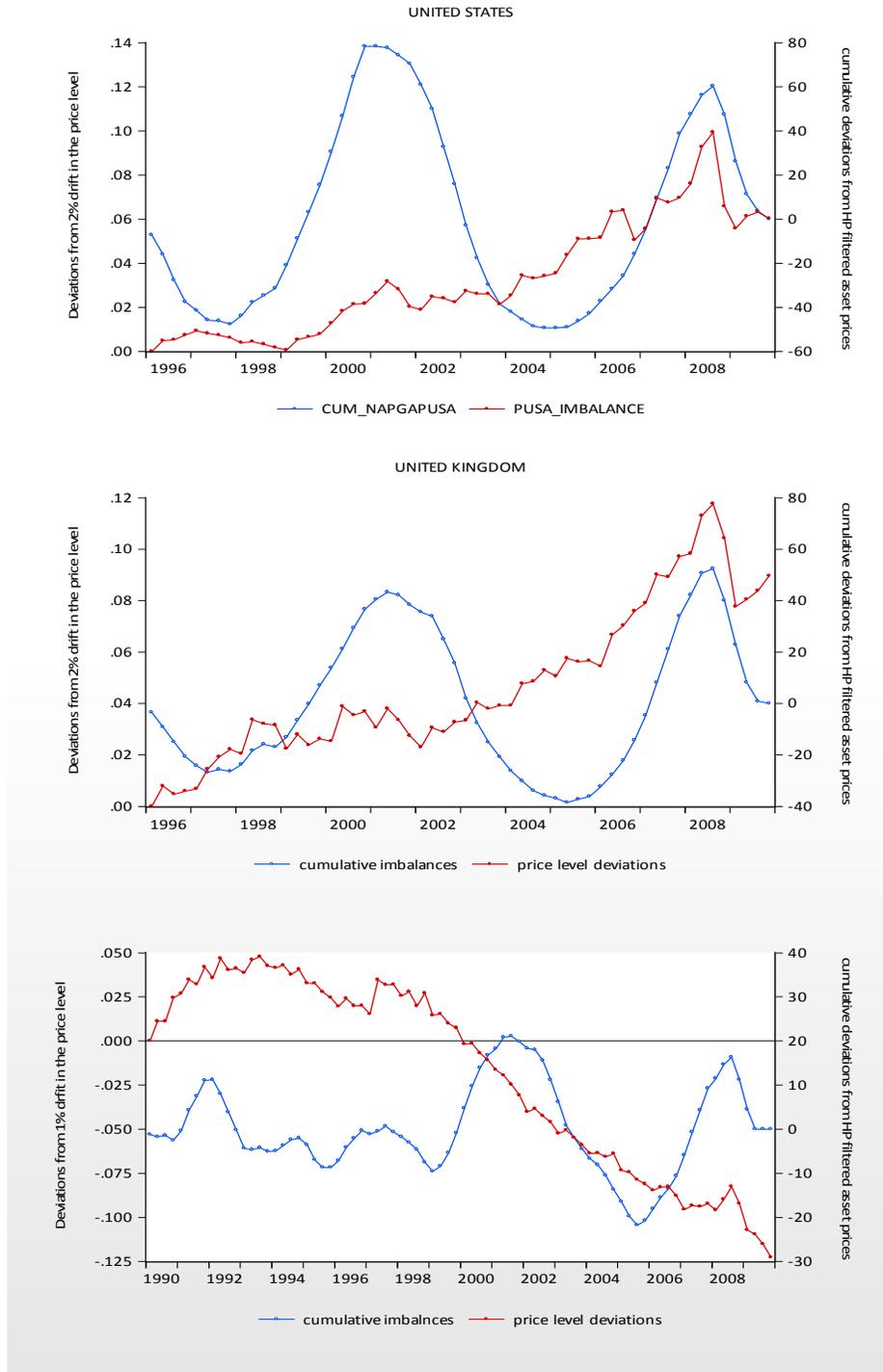
Note: Cumulative imbalances represent the sum of deviations of the log of the BIS's aggregate asset price index from an H-P filtered log index value. Price level deviations represent the difference between the (log) of the price level and a drift in the price level indicated on the vertical axis.

Appendix I : Survey Questions Used

A. Communication of Monetary Policy Results (BIS 2009)[1]

2a: What is the objective in Q1: the intermediate objective or target of monetary policy

2b: Who defines this objective or target?

2c: Who announces changes to this objective or target?

5b: Where are decisions about changes to policy settings first publicly announced

6: Please indicate what other information the central bank discloses at or around the same time that decisions about changes to policy settings are announced and whether this information accompanies every policy decision or only some decisions.
  6a 1. Reason for decision
  6a 3. Likely direction of future changes in policy settings
  6a 5. Short-term outlook for the economy
  6a 6. Possible risks to the outlook for the economy

25a: Reasons for increasing disclosure
  25a 7.Guide market particpants' expectations
  25b 1. Minimise constraints on future policy decisions
  25b 5. Minimise the risk of over-reaction by market participants, eg due to misinterpretation
  25b 8. Avoid damage to credibility that could result from disclosing views about future developments that might be proven wrong

27: How important are each of the following communication channels for guiding <u>market participants'</u> expectations?
  27 1. Press release announcing the policy decision
  27 4 Central bank forecasts of key economic variables
  27 5.Regular reports, eg monetary policy report
  27 6. Speeches by central bank officials

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[1] Access to survey data was provided under an arrangement that prevents attribution or identification of individual country information, in view of the unpublished nature of the surveys.

B. Provision of Monetary Policy Advice to Boards (BIS 2009)[2]

C1 Staff information and analysis provided as input into the policy decision-making process
        C1.1 Historical data set of economic and financial indicators
        C1.2 Chart pack of economic and financial indicators
        C1.3 Analysis of recent data/current economic situation
        C1.4 Analysis of recent financial market developments
        C1.5 A central staff projection or forecast
        C1.6 Alternative projection(s) or forecast(s)
        C1.7 Assessment and analysis of risks
        C1.10 Private sector macro forecasts (e.g. individual, summarised, consensus)
        C1.11 Market expectations for policy adjustment (e.g. surveys, implied from market prices), and/or analysis of likely reactions
C3 Assessment of analysis and risks to the forecast:
        C3.1 Often a significant focus of discussion at MPC meeting?
        C3.2 Generalised standard distributions of shocks, model calibrations:Provided as background material for the decision-making meeting on a reasonably regular basis?
        E1 Impact of changes in the process of providing policy analysis and advice in the last few years
        E1.1 The volume of background material
E1.5 the number of alternative scenarios considered

E1.9 The technical content of the discussion

Summary
- Conducted In 2007
- 16 industrial, 20 emerging market economies participating.

C. Mahadeva and Sterne (2000, Chapter 7, Appendix I)
        Question equivalent to 2a (section A above), Table A1, rows 1 to 4;
        Question equivalent to 2b (section A above), "Government role in setting any target?", Table A6, row 2;
        Question equivalent to 6a1 (section A above), "Explanation on day policy changed?", Table A7;

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[2] Access to survey data was provided under an arrangement that prevents attribution or identification of individual country information, in view of the unpublished nature of the surveys.

Question equivalent to 6a5 (section A above), "Forward looking analysis on bulletins?", Table A7;

Question equivalent to 6a6 (section A above), "Risks to forecasts published", Table A7;

Question equivalent to C1.10 and C1.11 (section B above), "Analysis of expectations", Table A9;

Question equivalent to C1.4 (section B above), "Weighted score for explanation of policy", Table A8;

Question equivalent to C1.5 (section B above), "Forecasting and simulation methods", Table A10.

D. Index of Central Bank Transparency (Dincer and Eichengreen 2007, Siklos 2010a)

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 contacts or other similar institutional arrangements 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 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.

(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, together with 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 announced promptly?

No or only after the day of implementation = 0.
Yes, 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.

Source: Dincer and Eichengreen (2007), Appendix.

APPENDIX I

The Financial Stability Objective

European Central Bank

"…a condition whereby the financial system is able to withstand shocks without giving way to cumulative processes, which impair the allocation of savings to investment opportunities and the processing of payments in the economy."

Padoa-Schioppa, T. (2003), "Central Banks and Financial Stability", remarks delivered in Jakarta, 7 July.

Federal Reserve

"It is worth emphasizing that the Federal Reserve's concern with financial stability stems largely from the adverse implications of financial instability for overall economic performance. The Fed's interest in promoting financial stability is thus intimately connected with its macroeconomic objectives: maximum sustainable employment and price stability."

Warsh, K. (2007), "Financial Stability and the Federal Reserve", remarks delivered the New York State Economic Association Annual Conference, October 5.

Bank of England

"The Bank has a statutory objective to 'contribute to protecting and enhancing the stability of the financial systems of the United Kingdom.' The Bank does this through its risk assessment and risk reduction work, market intelligence functions, payment systems oversight, banking and market operations, including, in exceptional circumstances, by acting as a lender of last resort, and resolution work to deal with distressed banks."

From http://www.bankofengland.co.uk/financialstability/index.htm

"… to avoid the type of boom and bust cycle in the supply of credit and liquidity that has marked the recent financial crisis."

From "The Role of Macroprudential Policy", Bank of England discussion paper, November 2009.

Riksbank

"…to promote a safe and efficient payment system. …detect changes and vulnerabilities that could lead to a serious crisis. the major Swedish banks have particular significance in the analysis."

From http://www.riskbank.se/templates/SectionStart.aspx?id=10889

Bank of Canada

"In Canada, the Bank shares the responsibility for financial stability at the federal level with three other entities—the Office of the Superintendent of Financial Institutions, the Canada Deposit Insurance Corporation, and the Department of Finance. Various provincial bodies also play an important role.

The Bank focuses its attention mainly on macro financial stability issues, leaving the principal responsibility for micro issues to the other entities. The Bank's overriding concern is to ensure that the financial system is sound and that it works efficiently. In this context, we provide liquidity to the system, in both ordinary and extraordinary situations. We give policy advice to the federal government on the design and development of the financial system. Through our oversight of major clearing and settlement systems, we act to make sure that the failure of a participant does not lead to domino effects and to generalized instability. And we provide banking services to these systems and to their participants. Finally, we collaborate with other domestic and international bodies that work on financial-stability issues."

From Dodge, D. (2001), "The Bank of Canada and Financial Stability", remarks to the Montreal Society of Financial Analysts, March 20.

"Financial system stability is the capacity of the financial system of the financial system to do its job under a wider range of circumstances. … because the financial system provides channels through which savings become investments, money and financial claims are transferred and settled, and risk is allocated to those most willing and able to bear it."

From Duguay, P. (2009), "Financial Stability Through Sound Risk Management", remarks to the Risk Management Association, Toronto chapter, 8 January.

Swiss National Bank

"A stable financial system can be defined as a system whose individual components – financial intermediaries and the financial market infrastructure – fulfill the responsibilities functions and prove resistant to potential shocks."

From http://www.snb.ch/en/about/finstab

Bank of Japan (http://www.boj.or.jp/en/type/release/zuiji/kako02/fss9905a.htm)

One of the objectives of the Bank of Japan, as stipulated in Article 1 of the Bank of Japan Law, is "to ensure the smooth settlement of funds among banks and other financial institutions, thereby contributing to the maintenance of an orderly financial system."

The Bank of Japan has made decisions in view of the following four principles:

1) there must be a strong likelihood that systemic risk may materialize;

2) there must be no alternative to the provision of central bank funds;

3) all responsible parties are required to take clear responsibility to avoid moral hazard; and

4) the financial soundness of the Bank of Japan should not be impaired.

The Bank has taken efforts to disseminate information on these principles so that the public understands the rationale behind its operations in dealing with failed financial institutions.

APPENDIX II

1. Time series of forecast disagreement
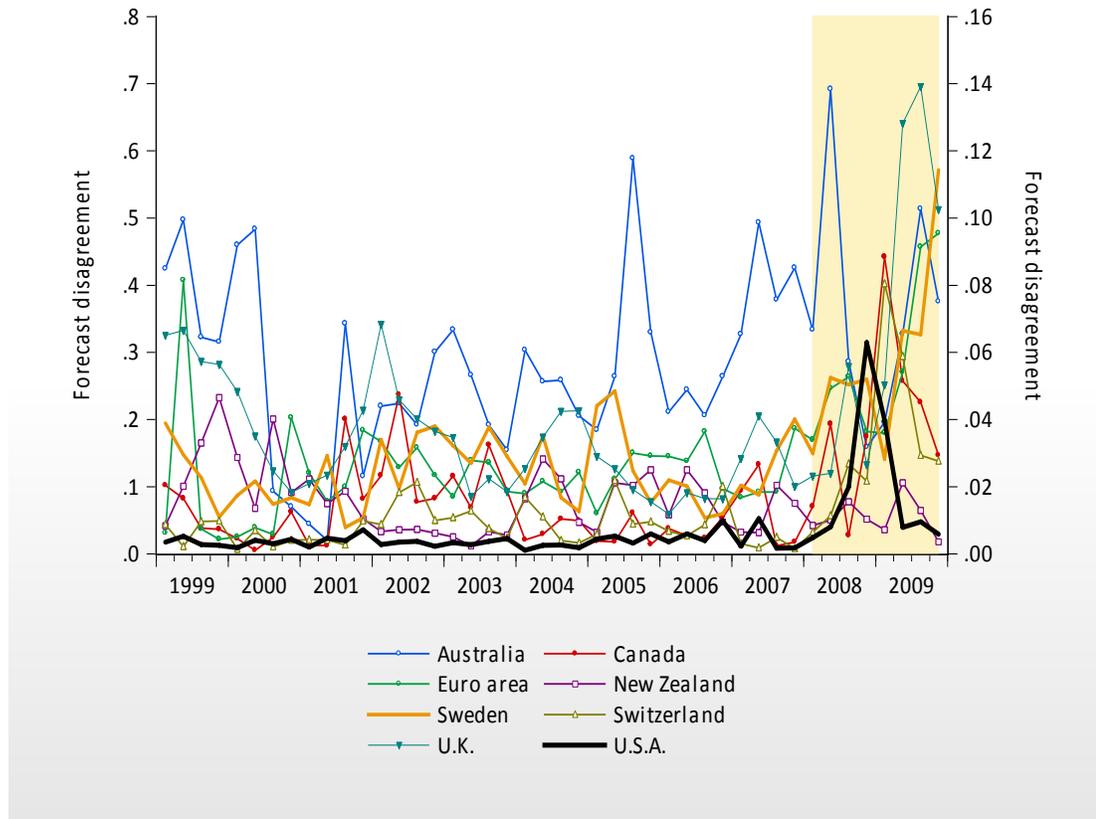
Source: Siklos (2010b)

2. Time Series of (real) asset prices
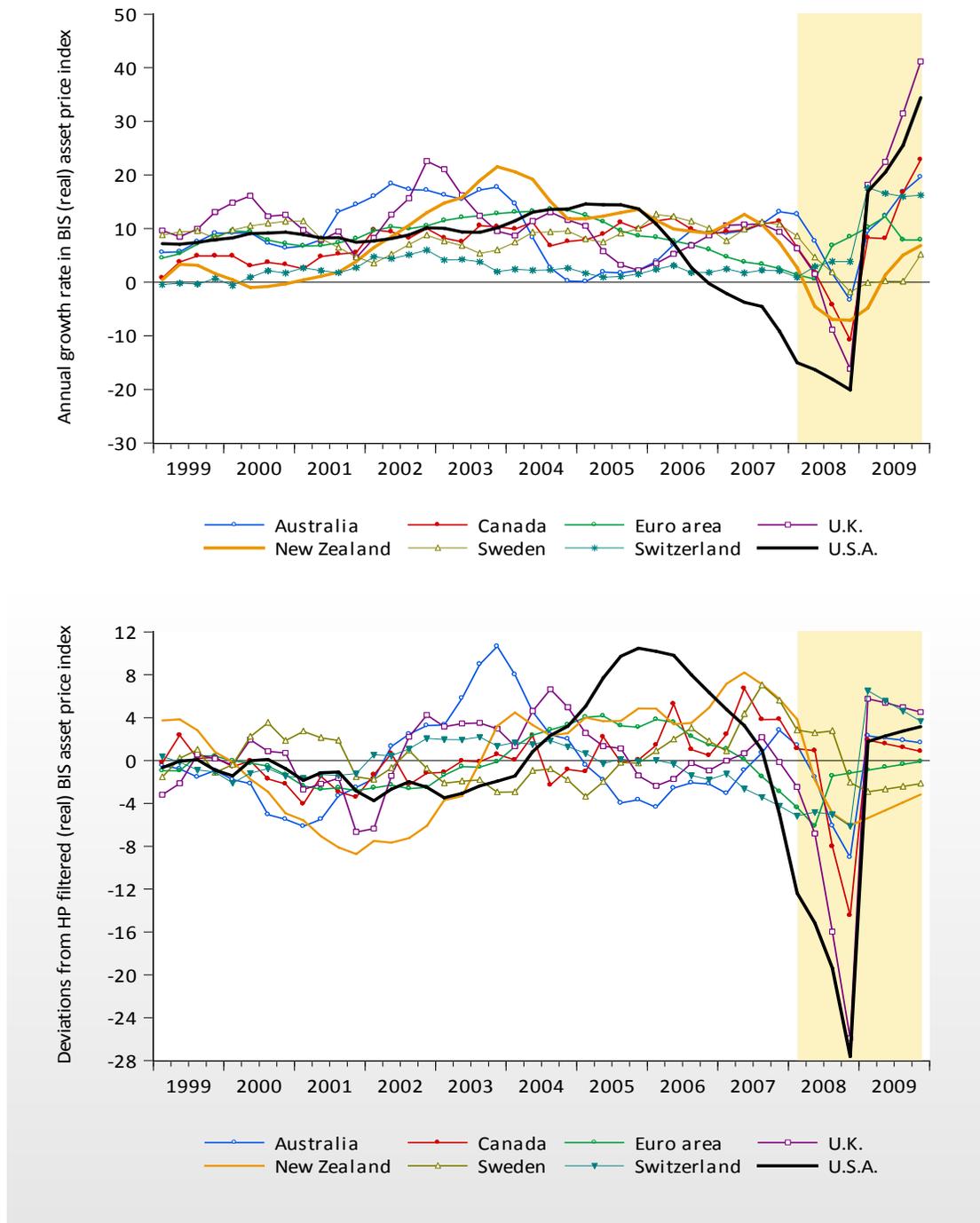
Source: Siklos (2010b)

3. Additional Tables

Table A1 Components of Uncertainty, 1997.1-2007.4

Economy	Mean # breaches (months)	Variance – forecast errors	Mean – deviations from TR	Variance – TR deviations
ARG	7.34	126.95	1.39	261.36
AUS	2.64	1.62	1.76	4.22
CAD	0.23	0.67	0.13	2.84
CHI	0.41	3.80	1.46	6.48
CZE	1.78	7.10	1.78	9.46
EUR	0.07	0.61	-0.17	1.32
HKG	10.18	6.46	3.47	24.57
HUN	1.65	4.97	2.28	8.13
ISR	4.73	6.12	5.44	17.74
KOR	1.53	3.82	2.08	12.51
MAL	0.80	3.33	-0.22	2.43
MEX	1.48	5.35	3.73	7.86
NZD	0.64	1.19	2.28	1.97
NOR	0.23	2.49	2.21	4.75
PHI	3.44	8.71	3.86	8.03
POL	3.19	4.99	9.87	35.11
SIN	2.30	4.30	0.66	4.09
SLK	17.89	3.81	-3.28	5.23
SAF	1.29	12.04	5.51	15.14
SWE	2.02	1.25	0.98	2.37
SWI	3.18	0.70	-0.41	0.92
THA	0.68	8.71	-2.23	3.56
GBR	0.93	0.94	0.98	2.78
USA	0.86	1.09	-0.42	3.36

Sources: Author's calculations based on data in Siklos (2010b), and Siklos (2010c).

Table A2 Components of Uncertainty, Select Economies, 1999-2009

Economy	Cum. 1999-07	Cum. 2008-09	Mean DIS 1999-07	Variance	Mean DIS 2008-09	Variance
AUS	3.47	1.48	0.10	0.01	0.19	0.02
CAD	0.32	0.21	0.01	0.0001	0.03	0.0002
EUR	0.39	0.10	0.01	0.0003	0.01	0.0002
NZD	1.44	0.27	0.04	0.001	0.03	0.0004
SWE	0.34	0.15	0.01	0.0001	0.02	0.0003
SWI	0.18	0.14	0.01	0.00002	0.02	0.0004
GBR	0.27	0.21	0.01	0.00004	0.03	0.0006
USA	0.40	0.61	0.01	0.00012	0.08	0.0006

Source: Siklos (2010b)

Table A3 Variance of (real) BIS Asset Price index

Economy	1999-2007		2008-2009	
	GROWTH	HP GAP	GROWTH	HP GAP
AUS	29.16	16.91	577	18.98
CAD	9.23	5.45	116.04	36.56
EUR	9.41	5.27	16.50	4.71
NZD	42.67	26.13	30.98	9.97
SWE	4.79	6.01	12.19	7.24
SWI	2.34	2.56	54.86	31.58
GBR	19.81	8.54	392.42	138.53
USA	30.81	19.97	523.91	146.65

Source: Siklos (2010b)

Table A4 Changes in Regulatory Quality, 2008-1998

	All	Industrial	Emerging Markets
	2007-1998		
Reduced	36.67	35.71	37.50
Increased	3.33	0	0
Unchanged	60.00	64.29	62.50
No. CB	30	14	16
	2008-2007		
Reduced	6.67	35.71	18.75
Increased	0	0	0
Unchanged	63.33	64.29	81.25
No. CB	30	14	16

Source: Calculations based on World Bank Governance Indicator data. See
http://info.worldbank.org/governance/wgi/index.asp.

Table A5 Inflation Targeting Countries in the Sample

Country	Start Date[@]
Industrial World	
Australia	93.2
Canada	91.1
Korea	98.2
New Zealand	90.1
Norway+	01.1
Sweden	93.1
United Kingdom	92.4
Emerging Markets	
Brazil	99.2
Chile	90.3
Mexico	99.1
South Africa	00.1
Czech R.	98.1
Hungary	01.1
Poland	98.4
Israel	92.1
Philippines	02.1
Thailand	00.2
Turkey	02.1

Table A6 Correlation of Central Bank Transparency Attributes, Mean 1998-2007

Correlation
t-Statistic

Prob.	Q1A	Q1B	Q1C	Q2A	Q2B	Q2C	Q3A	Q3B	Q3C	Q4A	Q4B	Q4C	Q5A	Q5B	Q5C
Q1A	1.00														

Q1B	0.25	1.00													
	1.35	-----													
	0.19	-----													
Q1C	0.41	0.53	1.00												
	2.38	3.32	-----												
	0.02	0.00	-----												
Q2A	-0.16	0.27	0.17	1.00											
	-0.86	1.46	0.92	-----											
	0.40	0.16	0.37	-----											
Q2B	0.06	0.42	0.20	0.29	1.00										
	0.34	2.43	1.09	1.58	-----										
	0.74	0.02	0.28	0.12	-----										
Q2C	0.20	0.42	0.44	0.19	0.15	1.00									
	1.07	2.45	2.61	1.03	0.78	-----									
	0.29	0.02	0.01	0.31	0.44	-----									
Q3A	0.16	0.82	0.52	0.24	0.36	0.38	1.00								
	0.86	7.58	3.26	1.31	2.07	2.17	-----								
	0.39	0.00	0.00	0.20	0.05	0.04	-----								
Q3B	0.09	0.24	0.26	0.21	0.40	0.26	0.13	1.00							
	0.48	1.31	1.44	1.12	2.31	1.45	0.72	-----							
	0.64	0.20	0.16	0.27	0.03	0.16	0.48	-----							

Q3C	0.05	0.05	0.17	0.29	0.39	0.51	-0.04	0.74	1.00					
	0.24	0.26	0.90	1.61	2.24	3.14	-0.19	5.85	-----					
	0.81	0.80	0.37	0.12	0.03	0.00	0.85	0.00	-----					
Q4A	0.15	0.34	0.43	0.61	0.35	0.45	0.43	0.25	0.34	1.00				
	0.81	1.92	2.54	4.12	2.00	2.67	2.51	1.34	1.93	-----				
	0.42	0.06	0.02	0.00	0.06	0.01	0.02	0.19	0.06	-----				
Q4B	0.05	0.20	0.23	0.60	0.44	0.36	0.22	0.17	0.36	0.72	1.00			
	0.27	1.08	1.23	3.93	2.63	2.01	1.19	0.91	2.05	5.55	-----			
	0.79	0.29	0.23	0.00	0.01	0.05	0.24	0.37	0.05	0.00	-----			
Q4C	-0.07	-0.10	0.00	0.34	0.37	0.29	-0.15	0.52	0.76	0.25	0.48	1.00		
	-0.37	-0.51	0.02	1.92	2.14	1.62	-0.78	3.18	6.24	1.36	2.87	-----		
	0.71	0.62	0.99	0.07	0.04	0.12	0.44	0.00	0.00	0.18	0.01	-----		
Q5A	0.25	0.32	0.19	0.36	0.28	0.18	0.36	0.23	0.30	0.26	0.41	0.37	1.00	
	1.35	1.78	1.04	2.07	1.56	0.97	2.04	1.23	1.66	1.41	2.35	2.11	-----	
	0.19	0.09	0.31	0.05	0.13	0.34	0.05	0.23	0.11	0.17	0.03	0.04	-----	
Q5B	0.34	0.32	0.35	0.33	0.24	0.52	0.42	0.34	0.38	0.42	0.22	0.10	0.27	1.00
	1.91	1.77	2.00	1.84	1.31	3.18	2.46	1.90	2.17	2.43	1.19	0.51	1.48	-----
	0.07	0.09	0.06	0.08	0.20	0.00	0.02	0.07	0.04	0.02	0.24	0.61	0.15	-----
Q5C	0.18	0.16	0.32	-0.03	0.26	0.30	0.21	0.43	0.36	0.10	-0.01	0.26	0.14	0.34
	0.97	0.83	1.81	-0.14	1.41	1.66	1.12	2.53	2.07	0.53	-0.08	1.40	0.75	1.91
	0.34	0.41	0.08	0.89	0.17	0.11	0.27	0.02	0.05	0.60	0.94	0.17	0.46	0.07

Q5C last column: 1.00 / ----- / -----