Preliminary and incomplete

Do Markets Care Who Chairs the Central Bank?

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Abstract

This paper examines financial markets' reactions to the appointment of new central bank governors. News of a new central bank governor might affect financial markets for two reasons: First, a change in governor could signal a change in the *credibility* of the central bank's commitment to price stability or a particular monetary regime. Second, the new governor's *preferences* with regard to the relative weight on inflation versus output stabilization, may differ from her predecessor's. Creating a new and unique dataset on central bank leadership transitions, we analyze the responses of bond yields and exchange rates in the days following the announcements of 48 governor appointments from 14 countries. These announcements frequently generated significant market reactions, many of them favorable; no systematic relationship between type of central bank regime and market response is evident, however. Interestingly, announcements of new Federal Reserve chairmen generate some of the most pronounced reactions. The results suggest that, while the announcement of a new governor affects perceptions of the likely preferences guiding monetary policy, concern over the successor's "credibility" is not the norm.

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1. Introduction

The revolution in analyzing central bank behavior that began with Kydland and Prescott's (1977) time-inconsistency insight allowed for the possibility that not all central banks would behave alike—nor would they produce identical outcomes. Whether due to their institutional framework, their independence or lack thereof, or due to their perceived differences in "type" ("wet" vs. "dry", "hawk" vs. "dove"), markets would form different expectations about their commitment to price stability and their relative weights on inflation versus output stabilization. Such differences were then invoked to explain the large variations in the average inflation rates and the disinflation processes across the major central banks in the 1970s and 1980s, and then the convergence of central bank beliefs and institutions was used to explain the worldwide decrease in average inflation levels in the 1990s. To our knowledge, however, the influence of individual central bankers (or at least those chairing the governing boards of central banks) has never been the subject of systematic empirical research.[2]

This gap in research is a bit odd considering the tendency of knowledgeable monetary economists, let alone the more extreme examples done by market participants and the financial press, to put a great deal of stock into who chairs the central bank. In the United States the "death of Benjamin Strong" has remained a popular theory of the Great Depression. (Had the farsighted Federal Reserve Bank of New York President been alive in 1929 to participate in the FOMC's discussion of how to respond to the crash, presumably he would have prevented the ill-advised monetary tightening that followed.) More recently, there was the unforgettable quip by Senator John McCain (R-AZ), made during a G.O.P. presidential debate in 1999: "if Mr. Greenspan should happen to die, God forbid, I would do like they did in the movie 'Weekend at Bernie's', I would prop him up and put a pair of dark glasses on him and keep him as long as we could."

But just how much and how does the identity of the central bank governor matter?[3] Does she deserve this much attention? Or, to put it another way: controlling for the institutional framework within which the central bank operates, and the domestic monetary anchor (if any) in use, will the choice of central bank governor really have any effect on monetary policies and market participants' inflation expectations? Posed in this way, the question is unanswerable: we will never be able to know the counterfactual whether Strong's death really did cause the Great Depression; nor will be ever be able to know whether it was Arthur Burns' relationship with the Nixon White House, or merely

[2] Of course, there have been studies of the decisions made by individual central bankers as part of central bank histories, such as Meltzer (2004); and even a few biographies of central bankers, such as Woodward (2000).

[3] We use the term "governor" generically to refer to the head of the central bank, even when the actual job title is "chairman" or "president."

an inaccurate estimate of potential output, that was to blame for the Great Inflation of the 1970s in the US.

But what we can discern more easily is whether the markets perceive the central bank governor appointments as "newsworthy," in the sense of affecting policy expectations. While there is unquestionably ample market chatter regarding central bank appointments (not just of governors), like most researchers we safely assume that market participants will only move money in response to news with (perceived) real implications—to do otherwise would generate losses. We do not, however, require that the market's initial judgment be correct; indeed many central bank governors' policies turned out to differ considerably from what was expected at the time. What is important is that financial market participants *have reason to believe* that the policy of the incoming governor might differ from that of her predecessor—and that the market reactions reflect this perception. Thus, once their type has been discerned by the market, analyzing the initial reaction of foreign exchange and bond markets is a sufficient measure of their appointment's overall impact. There is, of course, bound to be a certain amount of uncertainty regarding the "type" of the new central bank governor; but the effects of this uncertainty would presumably be strongest at time of the announcement, when there is the least information available (and no track record) to indicate the new governor's likely behavior, once in office.[4]

With that in mind, in this paper we perform an event study-style analysis of how financial markets in the major economies have reacted to announcements of a new central bank governor's appointment. This paper is closely related to Goodfriend's (1993) innovative study of "inflation scares," in that it looks for the forward-looking response of financial markets particularly with regard to doubts about the future of central bank policy regarding price stability. Our analysis focuses on the foreign exchange and bond markets, which are likely to be most heavily affected by inflation and interest rate expectations. Further, we argue, the foreign exchange and bond markets are respectively good proxies for market beliefs about each of the two major dimensions of central bank governors' perceived policymaking behavior: their *conservatism*, that is their relative preferences for inflation versus output stabilization; and their *credibility*, the degree of their ability to pre-commit to price stability.

We have created a new and unique dataset on central bank leadership transitions, consisting of 48 announcements of appointments of new governors from 14 countries in the post Bretton Woods period. Appendix A gives the complete list of these events, and their dates. For obvious reasons, as discussed in section 4 below, we limit the analysis to industrialized countries for which announcement dates are (relatively) easily obtained, and turnover of central bank governors is not (directly) driven by specific macroeconomic events.[5] We include as well (in Appendix B) some examples of cases

[4] The literature following Cukierman and Meltzer (1986) allows for the possibility of a 'wet' (non-conservative) central banker to mimic a 'dry' (conservative) central banker until response to an economic shock allows the market to discern the true type. Even in this set-up, however, the central banker never changes her fixed type, there is simply a period of discovery by markets – one whose existence we investigate empirically below.

[5] Cukierman, Webb and Neyapti (1992) argued that central bank turnover in developing countries (or in countries without 'respect for rule of law') is a proxy for central bank independence, with greater turnover

where the popular and market discussion surrounding a governor's appointment would seem to indicate that there might be particularly high interest in and uncertainty about the implications of that appointment.

To preview our results: (1) Most appointments are not all that newsworthy, in the sense of not generating an unusual market response. (2) Seven of the 48 turnover "events" in the sample do generate a one-day change in the exchange rate that falls in the upper or lower 5 percent of the distribution, compared with the 4.8 out of 48 expected. (The results are similar for three-day changes.) (3) All but one of these "large" exchange rate movements, however, are appreciations, in which the domestic currency *strengthened* following the announcement. (4) Only three of the 28 turnover events in the sample for which we have bond market data generate a "large" three-day change in the long-bond interest rate. And (4) having a solid domestic policy target, such as money or an inflation target, has no apparent connection with the likelihood (or not) of having a market response.

In the end, we conclude that relatively few central bank appointments contain information that moves inflation and/or policy expectations—and there is no evidence of heightened market uncertainty about the governors (or more specifically about her conservatism or credibility) at the start of their terms. This is inconsistent with the oft-expressed but to our knowledge never directly tested view that central bankers have to establish credibility at the start of their terms or that soft-on-inflation central bankers can play off of uncertainty about a governor's type. Differences in central bank regimes (e.g., independence and/or an inflation target) seem to have little impact on market reactions, suggesting that such institutions do little to "de-personalize" policy, which may come as something of a disappointment to proponents of such regimes; but there is little to indicate that this is a serious issue in the industrialized countries in our sample, with the notable exception of the U.S.

Perhaps surprisingly, to the extent that these appointments do contain information, more often that not they are greeted as "good news" in the sense of raising the market's confidence in the central bank's conservatism and/or credibility. This may indeed reflect the trend towards appointing counter-inflationary conservatives to central banks that dominates the second half of our sample and the reality of central banking over the last 15 years. That said, the ability of such a trend to be immediately apprehended and believed indicates that there is no evidence for turnover generically to lead investors to doubt the central bank's credibility.

2. Why central bankers are not all alike

The Chairman or CEO of any large organization has many attributes relevant to her performance in the role. For economic modeling of monetary policymaking, however, it is appropriate to focus on two key attributes: conservatism and credibility.[6]

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indicative of lesser independence. In parallel work underway, we are reexamining this measure for reverse causality. In any event, for purposes of the present paper focused on developed economies since 1970, there is no issue of central bank governors being dismissed at will and rarely for cause in our sample.

[6] A third "C" would be competence, or lack thereof. The definition of that in the central banking context is not self-evident. Would it include communications ability, forecasting ability, or management ability

These correspond to critical aspects of what is usually modeled as the loss function central bankers minimize when setting monetary policy—they also are the attributes arguably most closely related respectively to the short-run conduct of monetary policy and long-run anchoring of inflation expectations. As conventionally defined, conservatism is the relative weight on inflation versus output goals—that is to say the preferences—of the central banker in question in the spirit of Rogoff (1985). Credibility, in the context of the Barro-Gordon (1983) and Kydland-Prescott (1977) literature, refers to the ability of the central bank to follow through on its commitments even when there are short-term gains from not doing so. Finally, another aspect to consider is the room for discretion or the pre-commitment imposed upon any central banker by the institutional framework of the central bank to which she is appointed. An individual governor may be more or less constrained by the policy regime already in place or by the degree of insulation from political pressure, at least in theory.

Conservatism

Conservatism maps directly into the standard objective function attributed to central banks (or more precisely here to central bank governors),

$$(1) \qquad E_t \sum_{i=0}^{\infty} \beta^i \left[(\pi_{t+i} - \pi^T)^2 + \lambda (y_{t+i} - y^*)^2 \right]$$

in which π represents the inflation rate, and y is the output gap, suitably defined. In this context, "conservatism" can be said to be the relative weight, λ, associated with the deviation of output from potential or full-employment output. A more conservative central banker will have a smaller value of λ, indicating a greater willingness to forego output stabilization for the sake of inflation stabilization. This conforms with the normal sense of the term in popular discussion of central banks, subject to the understanding that monetary policy is about minimizing deviations from target inflation and that natural rate of unemployment as in (1), and not about levels of inflation and growth per se. As pointed out by Svensson (1997) (and numerous others), it is λ that determines the gradualism with which the central bank responds to output shocks, and thus the balance of output and inflation goals in the short-run. Reduced to essentials, this is about how many people the central banker is willing to put out of work to reduce inflation by a given amount in a year, if necessary.[7]

The target level of inflation, π^T, is not a particularly informative measure of a central banker's conservatism. Although it putatively represents a preference chosen or set by the individual governor, in any model with a vertical long-run Philips curve the long-run average inflation rate has no exploitable relationship or tradeoff with other variables in the welfare function, including employment and/or growth. As a result, there is no reason to set an above zero π^T except for reasons of technical assessment, not

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(which might enable a governor to utilize central bank staff so as to provide good forecasts and communications)? Would it entail understanding of monetary issues or of how best to get productive discussion out of a committee, where such exist? Given the list of central bank governors and their tenures generated in this paper, future researchers can consider such assessments.

[7] The "if necessary" refers of course to the possibility that a more credible central bank would not always have to reduce employment or slow growth to achieve disinflation.

personal preference.[8] This can be seen in the fact in practice that almost all inflation targeting central banks have set largely similar public target levels (around 2% on the CPI), other central banks have spoken informally about definitions of price stability near the same levels, and that revealed preference in average inflation levels delivered has approached that level as well (as shown in Figure 3).

Presumably a newly-appointed central banker may be either more or less conservative than her predecessor. Thus, if central bankers were believed to differ *only* with respect to their λ parameters, markets may react either positively or negatively to a new appointment, depending on the participants' perceptions of the newcomer. A less conservative central banker would be expected to deliver higher inflation volatility relative to output volatility, and slower disinflations for a given unit inflationary shock. To the degree that the governor's preferences are seen as representing or at least reflecting those of the appointing political authority, a central banker seen as an appointee of a left (right) -leaning government with a short-time horizon, as in the political-business cycle models of Alesina and Roubini (1994), would lead the market to assume a short-term rise (decline) in inflation and employment.

Credibility

Central bank governors, however, may also differ from one another with respect to their credibility—defined loosely as the degree to which they are trusted to do what they say they will do, even when there may be a short-term incentive to re-optimize. Similarly conservative central bank governors may differ in their perceived credibility, while governors with differing λ parameters may well have comparable ability to command belief in their commitments to their differing goals. In the Barro-Gordon (1983) context, this boils down to the ability to "pre-commit" to a policy rule, or to the "optimal state-contingent rule" of King (1997) [or alternatively Woodford's (2003) "timeless perspective"]. Thus, credibility is not a matter solely of the governor's loss function, but of what expectations the markets form of the behavior that results from that loss function.

A well-known result is that the absence of this sort of credibility results in an inflation or stabilization bias.[9] If the market participants are uncertain about the policymaker "type" of the incoming governor, as in Cukierman and Meltzer (1986), the degree of credibility is uncertain as well. The more the policymaker is perceived as wet in their model (soft on inflation), or rather the greater the chance that between wet and dry 'types' the governor is wet, the greater the inflation bias that emerges. In Cukierman and Meltzer (1986), the more wet governor not only can, but has an incentive to, initially mimic the behavior of the dry policymaker until a sufficiently large shock forces her to

[8] Such reasons would include measurement bias in the price index, creation of a buffer zone to reduce the risk of deflation, taking into account wage setting rigidities, and so on.

[9] Strictly speaking, in the Barro-Gordon type of models, it is a setting of the target rate of employment or growth above the natural or potential rate that generates the governor's futile desire for springing an ultimately expected inflation surprise, which in turn creates the inflation bias. This should be seen not as a literal mistake or willful ignorance by governors, but as a proxy for political and other pressures to expand output in an unsustainable way (or for an inability to carry through a disinflation as desired).

reveal her true colors.[10] As a result, uncertainty about the governor's type is likely to be highest at the start of a governor's tenure and to diminish over time, again assuming that her type is time invariant (as Cukierman and Meltzer and others in this literature do).

Thus, to the extent that incoming central bank governors have not yet had an opportunity to demonstrate credibility, market participants would tend to react adversely to news of *any* new central bank appointment, and inflation expectations would rise, at least temporarily.[11] Even if the mean market participant's subjective estimates of an incoming governor's credibility only extend over a limited range, it is likely to encompass values which lead to a proabability weighted mean estimate below that of the outgoing governor's ability to commit. In this case, unexpected turnover of governors should tend to be associated with "inflation scares" à la Goodfriend (1993), upward shifts in inflation expectations absent new economic data or changes in monetary policy. The informal popular discourse that governors have to "earn" credibility by demonstrating toughness is intuitively equivalent. In any event, whatever the transition and learning dynamics surrounding appointment of a new governor, according to these models, a less credible governor should be more highly suspected of trying to spring inflationary surprises, caving to political pressure, going back on commitments to price stability, and so on. The result should be a higher inflation bias, which translates into a higher long-term inflation expectation.

Do institutions determine how much governors matter?

While the impact of individual central bank governors and gubernatorial appointments has been largely overlooked by economic research, central bank institutions have been the primary focus of most research on monetary policy in recent years. The fundamental premise of most of the literature on monetary institutions—and, in many countries, of intended reform of actual central bank structures—has been that such institutions serve to "bind the hands" of policymakers, making commitments to price stability credible. By limiting the discretion to pursue politically motivated or short-sighted monetary policies, such institutions should reduce or remove the inflation bias. They can also be associated with promoting conservative central bank policies (as defined here), and thus limiting the ability of any governor to sacrifice inflation for output stabilization, though the institutions are themselves more limited in their ability to impose such strictures.

Potentially, therefore, monetary institutions, by constraining policy and tightening commitments no matter who is the governor, should have some effect on the ability of any specific central bank governor to pursue her desired policies. Leaving aside the vast literature on exchange rate regimes, there are three types of institutions that we consider as potential checks on the importance of any governor's appointment.

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[10] The incentive comes from an adjustment in the actual slope of the short-term tradeoff between output and inflation (Philips curve slope), which confers upon dry policymakers more favorable stabilization possibilities, not in the governor's preferred λ. This assumption connecting credibility to the output-inflation tradeoff has been rejected empirically; see Debelle and Fisher (1994) and Posen (1998).

[11] This would also be true in the models of Kara (2004), and Schaumburg and Tambalotti (2003). In those models, the incumbent central bank governor is credible in the sense of following a "timeless" policy, but his commitment is not binding on his successor.

- **Central Bank Independence** – The greater a central bank's independence from political oversight and from fiscal capture, the more discretion available to the monetary policymaker. Since Rogoff's (1985) ingenious paper, independence is often assumed to be positively correlated with conservatism, but as argued in Posen (1995) that need not be the case (as exemplified by independent central banks in Russia and Brazil pursuing highly inflationary if not hyperinflationary policies at times). The recent example of the succession of governors at the Bank of Japan from Matsushita to Hayami to Fukui illustrates how, under independence, a change in governor can make a radical difference to the conservatism of monetary policy pursued as well as to inflation expectations.[12] One would therefore expect that an increase in central bank independence, all else equal, should increase the impact upon markets of individual variations in governors' conservatism. To the extent that independence is a barrier to political interference for more expansionary policies, consistent with the wide usage of restrictions on firing the governor as a measure of independence [see Eijffinger, de Haan (1996) and Kuttner and Posen (2001)], more independence should result in greater credibility cross-sectionally irrespective of the governor appointed. The global trend towards granting greater central bank independence, reflected in our sample, should show itself overall in a rising impact from individual governors' appointments over time.
- **Inflation Targeting –** Inflation targeting has been referred to as a form of "constrained discretion" [Bernanke et al., (1999)], meaning it is intended to support the credibility of commitments to price stability by making deviations from pursuit of such as more visible. That said, as discussed by Svensson, even under inflation targeting, a central bank can pursue differing degrees of gradualism over a reasonable range in responding to shocks (representing different λ's or degrees of conservatism in our framework)—unless the central bank treats inflation targeting as a strict rule, like King's (1997) "inflation nutter." The potential significance of an inflation target as a constraint on individual governors was argued for in Bernanke, Mishkin, and Posen (2000), where it was claimed on the occasion of Greenspan's fourth reappointment as Federal Reserve Chairman that adoption of an inflation target would constrain Greenspan's successors to follow a policy similar to the one Greenspan voluntarily adopted and developed. The empirical implication of such an argument is that the appointment of new governors should have less impact on policies at inflation targeting central banks, and therefore on inflation expectations in markets of those banks' economies, because inflation targeting "depersonalizes" policymaking. Arguably, monetary targeting in Germany and Switzerland served much the same function [Laubach and Posen (1997)], and thus should have the same dampening impact on market response to appointments of new governors.

[12] See Kuttner and Posen (2004) and Bernanke, Reinhart, and Sack (2004) for discussions of the impact of BOJ policy shifts on bond prices in this period. It must be noted that both Hayami and Fukui set their policies with the active support and efforts of their respective Deputy Governors and senior staff as well, and cannot be attributed sole responsibility for the policies pursued. This issue is raised more generally in the third institutional point on committees.

- **Committee Structures –** Decision-making at most central banks is done by committee. Even central bankers with the seemingly executive title of "governor" usually have to get their way by persuading their peers on a monetary policy board or in a pinch winning votes. There is good reason and evidence to think that a committee deliberating will come to better forecasts and policy decisions than one individual will alone [Blinder (2004)].[13] Even in the more cynical view, however, that committee members simply reflect the happenstance accumulation resulting from the prevailing political winds at the time of appointments, the sheer existence of a committee will act as a check on the impact of any one member's convictions. A governor may be first among equals, with various tools such as agenda setting, control of the staff forecast, and means of discouraging public dissent, but she will not get her way with a committee in the same fashion she would if she were a sole decision-maker. At a minimum, a committee represents a transaction cost for the governor to overcome when implementing policies. Accordingly, the impact on markets of appointing individual governors should be less in economies where the central bank is led by a committee.

3. A look at the variation in inflation outcomes across governors

It almost goes without saying that economic outcomes—especially inflation rates—vary widely across tenures of central bankers. A quick glance at the average CPI inflation rates by governors' tenures in Figure 1 (sorted high to low) confirms this: average inflation rates for the governors in our sample range from a high of 17.2% for Italy's Baffi to -0.6% for Japan's Hayami. This by itself suggests striking disparities between these governors' policies.

It would be a mistake, of course, to attribute these differences *solely* to governor-specific differences in conservatism and credibility, and therefore to blame the central banker for poor inflation outcomes. Bad luck, in the form of adverse inflation shocks, is a possibility, of course, although these would presumably average out over a tenure spanning several years. Also, an incoming governor may have inherited a high inflation rate from her predecessor, and given any degree of gradualism in disinflation, that would raise the inflation seen over her term; also, a preceding governor with low credibility could have built in high-inflation expectations (the usual explanation for the costly disinflations of the 1980s following the 1970s inflation shocks). A fairer gauge of inflation performance and preferences for a given governor's tenure then might be the inflation rate prevailing at the *end* of the governor's term. If the term were sufficiently long to allow for disinflation as needed and establishment of the central banker's type (in practice, at least two or three years), then, absent inflation shocks, the end-of-term inflation rate should more or less reflect that governor's preferences.

Here too there is a great deal of variation. Figure 2 shows the beginning- and end-of-term 12-month CPI inflation rates for the same set of central bankers, sorted by the beginning-of-term inflation rates. While the end-of-term rates tend to be lower and

[13] Of course, no central banker is ever alone. Professional staff also exert a strong and usually salutary influence as well, even when there is no committee structure at the top or when the staff is answerable to the governor rather than the committee as a whole.

more tightly clustered than beginning-of-term inflation, they still vary considerably with Italy's Baffi at the top end with 14.4%, and Japan's Hayami at the bottom with -0.4%. The first four lines of Table 1 present summary statistics on the mean and variation of tenure, inflation, and disinflation among the 47 governors in our sample.

What is also clear from the figure is that in our sample, there has been a strong trend towards lower inflation—reflecting the global disinflation of the 1980s and 1990s, all but a handful of the central bankers ended their terms with lower inflation than at the beginning. Figure 3, which plots the end-to-beginning change in the inflation rate as a function of the initial inflation rate, bears this out: with only a few exceptions, there has been a tendency for inflation to converge to a level close to 2%. Thus, as noted above, central bank governors appear not to differ significantly *ex post* in terms of their inflation objective π^T—at least not in recent years.

There are, however, important observed differences in the *speed* with which central bankers reached their inflation objectives—which as noted above, should be depend on their degree of "conservatism" (i.e., inversely with respect to the λ in the loss function). To see this, we calculated rates of convergence to price stability (somewhat arbitrarily defined as a 12-month inflation rate of 2.5%) for each central bank governor. For those that reached this level, we subtracted 2.5% from the initial inflation rate, and divided by the number of years it took to get there; for those who never made it to 2.5%, we divided the change over the term by the number of years in the term. (Rates of disinflation were not calculated for those who started with inflation below 2.5%, or for those who served as governor for less than two years.) This governor-specific "disinflation rate", expressed as "percent per year", is plotted in Figure 4 along with the raw change in the inflation rate.

While rather rough-and-ready, this simple gauge clearly reveals the identity of the "toughest," low-λ central bankers—or at least those that had the opportunity to prove their toughness through rapid disinflation: France's Camdessus and Switzerland's Leutwiler, to cite two examples.[14] With a disinflation rate of -2.2%/year, by this metric Volcker is conservative—but not exceptionally so compared to his peers. Greenspan's disinflation rate, by contrast, is a very mild -0.2%/year—having taken nearly seven years to reduce 12-month inflation to 2.5% from the 3.7% rate prevailing at the beginning of his term. (It is worth recalling that the term "opportunistic" was often used to describe the disinflation process during this period.) Thus, there is reason to believe that "conservatism" varies considerably across governors, even if target inflation rates do not.

Descriptive statistics such as these clearly show that governors differ *ex post* in terms of how they have pursued disinflations, and what inflation outcomes were achieved over their tenure. The dispersion may sound unsurprising given the legends surrounding various governors; but this fact was previously undocumented, given the tendency of recent monetary economics research to attribute cross-national and time-series

[14] The gauge is a little misleading in those instances characterized by a large (dis)inflation shock occurring at roughly the same time as the appointment. This explains the spectacular disinflation rate of Finland's Hamalainen and Sweden's Baeckstrom. In the latter case, the twelve-month CPI inflation plummeted by over two percentage points within two months of the appointment, driven by Sweden's banking crisis which began before he was appointed governor.

differences in inflation outcomes to differences in central bank *institutions*, ignoring changes in the governorship [e.g., Persson and Tabellini (1999) and Cukierman(1992)].[15] Given the scale of variation here between governors, it is worth noting that the variation in institutions in our sample of 14 developed economies along the dimensions of committees and central bank independence is limited, and they converged further as the 1990s progressed; our sample does include central banks both having domestic inflation or monetary targets, and having none, and we explore the empirical significance of this distinction below.

4. Discerning whether markets react to appointments, and why

Given that governors, when in office, do appear to have an independent effect on inflation outcomes ex post , it is worth exploring whether newly-appointed central bankers are *expected* by market participants to behave differently from their predecessors—and if so, why? Are new governors inherently of suspect credibility, as implied by Cukierman and Meltzer (1986) and seemingly widely believed according to press chatter (see Appendix B for examples)? Are new appointees constrained by extant inflation (or monetary) targets believed to make less of a difference than those without such constraints? Do the market participants trade on the basis of subjective assessments of nominated governors' conservatism? Does the importance of those governors' preferences matter more to the market participants when they are trading securities denominated in the currency of an independent central bank or a central bank having a public inflation target?

To address these issues, our basic approach is to look at the impact of the governors' appointments on expectations of future monetary policy, as embodied in exchange rates and bond yields. In order to isolate the impact of the announcement itself, and distinguish it from the effects of other economic news affecting expectations, we will use relatively narrow event windows of 1–3 days following the announcement of the new governor's appointment (not her taking office nor the rumors who she might be).

On the interpretation of exchange rate and bond yield responses

In a perfect world, one would want to use "pure" high-frequency measures of inflation expectations to examine the way in which those expectations changed in response to central bank appointments. The ideal dataset would be one containing daily yield curves for nominal and indexed bonds, from which long-dated inflation premia could be calculated, as in Gürkaynak et al. (2005). Such data exist only for a very few countries, however, and only for the past few years; insisting on "pure" data would therefore severely limit the scope of our analysis to only a few central bank appointments.

Instead, we are forced to rely on cruder measures of inflation and policy expectations: bond yields and nominal exchange rates. What can make these measures difficult to interpret is that they embody not only inflation expectations, but also

[15] Exceptional central bank governorships, for good or ill, are occasionally noted and discussed—Blinder and Reis (2005) is an example of a generally favorable case study. Focusing exclusively on these exceptional cases raises obvious issues of sample selection, however.

expectations of real interest rates—which are, in turn affected by changing inflation expectations. Consequently, an increase in the bond yield, for example, could be associated either with more contractionary monetary policy in the near term, or an increase in long-term inflation expectations.

In spite of these limitations, we would argue that it is possible to use basic economic principles—interest rate parity and the expectations hypothesis—to map the exchange rate and bond yield responses into inferences about movements in inflation expectations (short- and long-term) due to expected changes in the central bank's underlying preferences and credibility. Specifically, the exchange rate response is likely to be informative about the central bank's perceived "weight-conservatism"—the λ in equation (1)—while the bond yield response should be more informative about the central bank's credibility as embodied in the existence and size of an inflation bias (a premium on long-term inflation expectations).

Exchange rates. A reasonable starting point for interpreting exchange rate changes is the principle of uncovered interest rate parity (IRP),

$$E_t \Delta e_{t+1} = i_t^* - i_t \tag{2}$$

where *e* is the (log) exchange rate (defined as foreign currency/domestic currency, so that an increase in *e* implies an appreciation of the domestic currency), *i* is the domestic interest rate, and *i** is the foreign interest rate. Thus, if the domestic interest rate is below the foreign rate, then an expected appreciation is required to equate expected returns denominated in the domestic currency.

The IRP condition can be solved forward to give

$$e_t = E_t \left[\sum_{s=0}^{T} (i_{t+s} - i_{t+s}^*) + e_T \right] \tag{3}$$

or, decomposing the nominal rate *i* into the real rate *r* and the inflation rate π,

$$e_t = E_t \left[\sum_{s=0}^{T} (r_{t+s} - r_{t+s}^*) + (\pi_{t+s} - \pi_{t+s}^*) + e_T \right]. \tag{4}$$

But if we assume that the nominal exchange rate is determined in the "long run" (i.e., for some "large" value of *T*) by purchasing power parity, then e_T should be equal to $p_T^* - p_T$; this in turn can be written as the time-*t* difference in (log) prices, plus the sum of the expected inflation differentials. Inserting this in equation (4), the terms involving the expected sum of inflation differentials cancel—leaving the exchange rate determined by the initial foreign and domestic price levels, plus the expected *real* interest rate differentials,

$$e_t = p_t^* - p_t + E_t \left[\sum_{s=0}^{T} (r_{t+s} - r_{t+s}^*) \right]. \tag{5}$$

The *change* in the exchange rate Δe_{t+1}, therefore, can be expressed as the revision in expectations about future real interest real interest rates. To understand why this is, suppose there were an increase in inflation expectations in the domestic country, matched one-for-one by an increase in the nominal interest rate. In this case, the reduction in the expected future nominal value of the domestic currency (a long-run depreciation) would

be just offset by the higher nominal interest rate, leaving investors indifferent between foreign and domestic currency at an unchanged current interest rate.

What this means is that shifts in the central bank's leadership that involve *only* changes in the market perceived desired inflation rate π^T (which will include the net effect of any inflation or stabilization bias, and thus credibility) will have little or no impact on the exchange rate: changes in the expected long-run value of the currency will tend to be offset by one-for-one changes in the nominal interest rate, leaving the current exchange unaffected. If, on the other hand, the central bank chose to respond more aggressively to an inflation rate in excess of its (unchanged) desired inflation rate, this would cause the domestic real interest rate to rise—and lead in turn to an appreciation of the currency. Thus, it is reasonable to interpret changes in the exchange rate as a relatively clean indicator of changing perceptions about the central bank's "conservatism" in its response to inflation deviations.

As discussed in section 2 above, the greater (lesser) the weight conservatism of the central bank appointee perceived by foreign exchange market participants relative to the outgoing governor, the more the currency will appreciate (depreciate), all else equal, if inflation is currently above target. If she is seen as politically beholden to a right (left) leaning government, for a given amount of susceptibility to political influence, the currency will appreciate (depreciate) upon announcement. More generally, the greater the central bank's independence, the more the individual governor's preferences should matter, and therefore the size of the announcement effect on foreign exchange markets should be larger in absolute value (sign indeterminate). By the same token, the impact of an individual governor's preference should be lower in central banks where monetary policy is made by committee, with the governor as chair, than in those central banks where the decision is made solely by the governor, so the absolute value of the foreign exchange announcement effect should be lower under those circumstances. Inflation targeting should have no impact one way or the other on the foreign exchange market response, given that it relates to longer-term credibility rather than conservatism and has no direct implications for the value of the currency.

Bond yields. The natural starting point for thinking about bond yields is, of course, the expectations hypothesis; and perhaps the simplest way to frame it is in terms of a one-period bond with nominal return i^S (S for "short") and a long bond with yield i^L (L for "long"). The expectations hypothesis implies that this long rate i^L is (approximately) the arithmetic average of expected future short rates over the life of the bond, plus a constant term premium ϕ,

$$i_t^L = E_t \sum_{s=0}^{T} i_{t+s}^S + \phi . \tag{6}$$

This can be written as the sum of expected future *real* short-term rates and inflation,

$$i_t^L = E_t \sum_{s=0}^{T} (r_{t+s}^S + \pi_{t+s}) + \phi . \tag{7}$$

so that the *change* in the nominal long rate can be expressed as the revision in expectations of future short-term real rates and inflation (assuming the term premium remains constant).

It is readily apparent from equation (7) why changes in "conservatism" would have an ambiguous effect on long-term interest rates: on one hand, a more aggressive response to above-target inflation would tend to raise expected future real interest rates over some horizon; but at the same time, it would *reduce* expected future inflation over a comparable horizon, even if the central bank's ultimate desired inflation rate remained unchanged.

By contrast, an increase in the central bank's desired π^T, or its "inflation bias", would raise the expected long-term inflation component, tending to increase the long bond yield.[16] Consequently, changes in the long-term interest rate can be viewed as a relatively clean indicator of changes in expected inflation, and thus of credibility, while giving more ambiguous signals about the central bank's degree of conservatism.

As discussed in section 2 above, in the usual time-inconsistency framework, the greater (lesser) the credibility of the central bank appointee perceived by bond market participants relative to the outgoing governor, the more the bond yield will decrease (increase), all else equal. The governor's individual preferences (that is, her degree of conservatism) will not affect the bond market given that it only affects the balance of short-run stabilization policy, not the ultimate inflation rate delivered or commitment to maintaining that rate. More generally, the greater the central bank's independence, the smaller in sign should be the announcement effect on bond market interest rates because, according to the standard literature, independence should reduce or remove the inflation bias.[17] Committee decision-making on monetary policy should have no effect on the bond market response to announcing a new governor since it has no set impact on credibility. Inflation targeting, however, is supposed to have a significant positive effect on credibility by constraining the discretion of new central bankers to deviate from an already announced target. This should lead to a smaller response by bond market participants to announcement of a new governor since policy is being depersonalized, if the theory is correct.

To summarize: while neither the exchange rate nor the long-term bond yield is a "pure" measure of inflation expectations, under certain assumptions they can be interpreted in terms of the central bank's desired inflation rate (or its perceived inflation bias) and degree of conservatism. While these two dimensions of the central bank's objective function will often be related (e.g., a new appointee may have greater credibility *and* react more strongly to inflation deviations), the need not be; thus it is no surprise that, as an empirical matter, the two indicators may sometimes behave differently (e.g., the exchange rate displays a reaction to a new governor while bond yields do not).

[16] Strictly speaking, an increase in the central bank's desired inflation rate might be expected also to cause the real interest rate to decline in the short run as it ran a more expansionary monetary policy. But the longer-run (or even permanent) effect on expected inflation would be likely to dominate the purely short-run real interest rate effects.

[17] Note, however, that Blinder (1998), McCallum (1997) and Posen (1995) give reasons to doubt a strong association between central bank independence and the existence of an inflation bias.

Determining announcement dates

A crucial step in assessing empirically the impact of central bank governor turnover is simply to determine the relevant dates. And since our focus is on the financial market impact, our task is to track down the dates on which the new governors' appointments were announced, rather than the dates on which they took office. Unfortunately, these announcement dates are not well documented in official sources, requiring us to turn to published news sources, such as major newspapers and wire services.[18] Our full list for the fourteen countries considered is given in Appendix A.

The nature of the analysis therefore limits the scope to a study of industrialized countries with freely-floating exchange rates and/or well-developed bond markets. In addition, news coverage of central bank appointments is anything but uniform: sources available through Nexis-Lexis provide good coverage of appointments for the G7 central banks beginning in the 1970s, but only spotty reporting of those for non-G7 institutions. Some of these cases (e.g., Austria, Denmark, Belgium) are not particularly interesting from our standpoint, as these countries maintained *de facto* pegs, and thus had no distinct monetary policy.[19] For the same reason, post-1999 turnover for Euro area countries is excluded from the analysis.

The inability to pin down precise announcement dates also precludes an analysis of emerging market economies.[20] By contrast, turnover among governors in industrialized countries tends to be exogenous, at least with respect to daily or weekly changes in exchange rates and interest rates. The widespread independence of central banks in our sample, including restrictions on firing of the governor, supports this exogeneity. Several governors in our sample have fallen victim to broader *political* crises in their countries, however; but it is precisely this sort of politically-generated turnover whose effects we seek to estimate as part of the credibility impact of governors turning over.

5. Results: new governors are typically good news

In the end, we were able to reliably establish the announcement dates for the 48 appointments listed in Appendix A, covering the central banks of 14 countries. Also noted in the table are any unusual circumstances surrounding the change in leadership. The majority of the changes are routine: retirement, ill health, or the completion of a fixed term. Four of the 48—Finland's Kullberg, France's De la Geniere, Italy's Carli,

[18] Sources include: *The New York Times*, *The Wall Street Journal*, *Financial Times*, *The Times of London*, *The Guardian*, *The Washington Post*, and *The Associated Press*. Names and approximate appointment dates were obtained from Pringle (2005).

[19] When Klaus Liebscher left the presidency of the Austrian National Bank (OeNB) in 1998 to join the General Council of the ECB, the Financial Times quipped that he would have a "proper" job for the first time since he took over as head of the OeNB in 1995, noting that "some unkind critics have joked that his job could easily have been done by an incoming fax machine linked to the Bundesbank's Frankfurt headquarters."

[20] Related work in progress shows that a great deal of turnover among emerging market central bank governors appears to be precipitated by macroeconomic crises, which would make it difficult to disentangle effect from cause in an exercise like that in this paper.

and Portugal's Beleza—were resignations in which overt conflicts with the government over matters of economic policy were cited as a precipitating factor.[21] Another four resignations were brought on by personal or financial scandals—although in the case of Italy's Baffi, the corruption charges alleged seem to have been politically motivated. Three central bank governors departed to enter politics, perhaps reflecting economically driven political problems in their countries; Finland's Koivisto and Italy's Ciampi were subsequently elected president and prime minister, respectively.

Detecting "unusual" market reactions

Having determined the dates of the new governors' announcement, the next step is to measure the reaction of the foreign exchange and bond markets. Specifically, we calculate the percentage change (log difference) in the nominal exchange rate, and the change, in basis points, in the 10-year government bond yield in the days following the announcement. For the baseline results, below, a relatively narrow three-day window is chosen, on the grounds that it is of sufficient length for the markets to have "digested" the news, yet not so long that the impact of the appointment will have been overwhelmed by other news. The remainder of Table 1 reports the sample means and variations in announcement effects for both foreign exchange and bond markets.

This leaves the question of determining whether the observed change in the exchange rate or bond yield represents an "unusual" market reaction, rather than a normal fluctuation attributable to other news, or simply "noise". Our approach is simply to determine how far out on the "tails" of distribution the observed changes fall, and to flag as "newsworthy" any change in the upper or lower five percent of the distribution. Unlike a regression, this more descriptive approach allows for the possibility that some announcements might be interpreted favorably, while others might generate an adverse market reaction.

Three different methods were used to characterize the distributions. The first was simply to estimate the variance of the three-day exchange rate change as three times the variance of the one-day change calculated over the 90 days prior to the announcement, and to use this estimate to calculate a *t*-statistic and *p*-value. This method requires that the changes be normally and independently distributed, however. An alternative, "robust" measure of the standard deviation was therefore calculated allowing for fourth-order serial correlation. (In the data, exchange rate changes appear to exhibit some negative serial correlation at high frequencies.)

Finally, a bootstrap procedure was used to estimate the empirical distribution of three-day exchange rate changes, sampling (with replacement) 1000 draws from the observed exchange rate change over the previous 90 days. All three methods yield generally similar results. The **boldface** numbers in Table 2 are those for which at least two of the procedures indicated a change that was statistically significant at the 10% level; *italics* are those which are statistically significant using only one of the three methods. Listed are one- and three-day changes post-announcement, and three-day

[21] Policy disagreements were surely in the background in the reshuffle that sent Miller to Treasury to replace Blumenthal and created the opening that eventually led to Volcker's appointment in 1979, but a direct causal link is not clear.

changes pre-announcement of the market variable in question. For exchange rates, positive numbers mean an appreciation, in percent. Table 3 does the same thing for the 28 appointments for which we also have bond yield data. The table reports the change in the 10-year bond yield, in basis points.

Highlights of results (more complete discussion to follow):

1. The sample contains seven unusually large (i.e., in the upper or lower 5% tails of the distribution) one-day movements in the exchange rate—only slightly more than the five or so that would be expected in a sample of 48. The sample also contains seven unusually large three-day movements—although not all of these correspond to the same appointments.[22]
2. The majority (six of the three-day, four of the one-day) of the unusually large exchange rate changes are *appreciations*.
3. A similarly small proportion of the (smaller) sample of bond rate changes is significant: four of the one-day changes, and two of the three-day changes. This is roughly in line with what one would expect to see in a sample of 28.
4. At the one-day horizon, half of the appointments associated with significant bond rate changes resulted in *falling* yields.
5. The four Federal Reserve appointments in the sample are noteworthy, in that all were associated with an unusually large movement in either the exchange rate or the bond yield. Except for Volcker's case, these tended to be depreciations and/or increases in the bond yield.
6. Even those central banks with strong institutions and/or nominal anchors (Switzerland, Germany, the UK, Canada) occasionally exhibit strong financial market responses to appointments.

Taken together, results 1 and 3 suggest that the emphasis on credibility issues in the academic literature may be misplaced, at least for the central banks of industrialized countries. The generally mild financial market responses offer little support for the view that doubts about the "conservatism" or credibility of incoming governors is pervasive.

Results 2 and 4 show that there is no systematic tendency for governments to appoint identifiable "doves" to central bank governorships. In fact, the fact that the majority of the significant exchange rate movements were positive is consistent with an increasing tendency to appoint more "conservative" central bankers in recent years.

The propensity for strong financial market reactions in the U.S. (result 5) is something of a puzzle, in light of the high degree of independence usually attributed to the Federal Reserve. One hypothesis is that, for whatever reason, there is a greater tendency to "personalize" monetary policy here than elsewhere—consistent with the Blinder and Reis (2005) critique of Greenspan. Of course, it is impossible to rule out the alternative

[22] The three-day change in the exchange rate for the UK's Richardson is not reported, because of the collapse of Bretton Woods two days following the announcement. Our assumption is that this does not reflect a causal relationship.

hypothesis that that bond (and foreign exchange) market vigilantes in the U.S. are simply more "vigilant" than they are elsewhere.

Finally, it is important to recognize that even very strong monetary institutions are not *always* sufficient to prevent financial market jitters: apparently even inflation targeting is perceived to leave a certain amount of room for discretion on the part of the part of the new governor.

6. Conclusions

Stay tuned for the final word.

References

Alesina, A. and N. Roubini (1994). "Political Cycles in OECD Economies." *Monetary and Fiscal Policy*. T. Persson and G. Tabellini. Cambridge, MIT Press. **2:** 99-134.

Barro, R. J. and D. B. Gordon (1983). "A Positive Theory of Monetary Policy in a Natural-Rate Model." *Journal of Political Economy* **91**: 589--610.

Bernanke, B. S., T. Laubach, F. S. Mishkin and A. S. Posen (1999). *Inflation Targeting*. Princeton, NJ, Princeton University Press.

Bernanke, B. S., F. S. Mishkin and A. S. Posen (2000). What Happens When Greenspan Is Gone? The Wall Street Journal**:** A22.

Bernanke, B. S., V. R. Reinhart and B. P. Sack (2004). "Monetary Policy Alternatives at the Zero Bound: An Empirical Assessment." *Brookings Papers on Economic Activity* **2004**(2): 1-78.

Blinder, A. S. (1998). *Central Banking in Theory and Practice*. Cambridge, MA, MIT Press.

Blinder, A. S. (2004). *The Quiet Revolution*. New Haven, Yale University Press.

Blinder, A. S. and R. Reis (2005). *Understanding the Greenspan Standard*. The Greenspan Era: Lessons for the Future, Jackson Hole, Wyoming, Federal Reserve Bank of Kansas City.

Cukierman, A. (1992). *Central Bank Strategy, Credibility and Independence -- Theory and Evidence*. Cambridge, MA, MIT Press.

Cukierman, A. and A. Meltzer (1986). "A Theory of Ambiguity, Credibility and Inflation Under Discretion and Asymmetric Information." *Econometrica* **54**: 1099-1128.

Cukierman, A., S. B. Webb and B. Neyapti (1992). "Measuring the Independence of Central Banks and Its Effect on Policy Outcomes." *World Bank Economic Review* **6**(3): 353-298.

Debelle, G. and S. Fischer (1994). "How Independent Should a Central Bank Be?" *Goals, guidelines, and constraints facing monetary policymakers*. J. C. Fuhrer, Conference Series No. 38, Federal Reserve Bank of Boston. **38:** 195-221.

Eijffinger, S. C. W. and J. de Haan (1996). "The Political Economy of Central Bank Independence." Princeton University, Special Papers in International Economics #19.

Goodfriend, M. (1993). "Interest Rate Policy and the Inflation Scare Problem: 1979-1992." *Federal Reserve Bank of Richmond Economic Quarterly* **79**: 1-23.

Gürkaynak, R. S., B. Sack and E. T. Swanson (2005). "The Excess Sensitivity of Long-Term Interest Rates to Economic News: Evidence and Implications for Macroeconomic Models." *American Economic Review* **95**(1): 425-436.

Kara, H. (2004). "Monetary Policy under Imperfect Commitment: Reconciling Theory with Evidence." Central Bank of the Republic of Turkey, Research Department Working Paper #04/15.

King, M. (1997). “Changes in UK Monetary Policy: Rules and Discretion in Practice.” *Journal of Monetary Economics* **39**: 81-97.

Kuttner, K. N. and A. S. Posen (2001). “Beyond Bipolar: A Three-Dimensional Assessment of Monetary Frameworks.” *International Journal of Finance and Economics* **6**: 369-387.

Kuttner, K. N. and A. S. Posen (2004). “The difficulty of discerning what's too tight: Taylor rules and Japanese monetary policy.” *North American Journal of Economics and Finance* **15**: 53-74.

Kydland, F. E. and E. C. Prescott (1977). “Rules Rather Than Discretion: The Inconsistency of Optimal Plans.” *Journal of Political Economy* **85**: 473-490.

Laubach, T. and A. S. Posen (1997). "Disciplined Discretion: Monetary Targeting in Germany and Switzerland." Princeton Essays in International Finance, #206.

McCallum, B. T. (1997). “Crucial Issues Concerning Central Bank Independence.” *Journal of Monetary Economics* **39**(1): 99-112.

Meltzer, A. (2004). *A History of the Federal Reserve, Vol. 1: 1913-1951*. Chicago, University of Chicago Press.

Persson, T. and G. Tabellini (1999). “Political Economics and Macroeconomic Policy.” *Handbook of Macroeconomics, Vol. 1C*. J. B. Taylor and M. Woodford, North-Holland**:** 1397-1482.

Posen, A. S. (1995). “Declarations are not enough: Financial sector sources of Central Bank independence.” *NBER Macroeconomics Annual 1995*. B. S. Bernanke and J. J. Rotemberg. Cambridge, MA, MIT Press**:** 253-274.

Posen, A. S. (1998). “Central Bank Independence and Disinflationary Credibility: A Missing Link?” *Oxford Economic Papers* **50**: 335-359.

Pringle, R. (2005). *Morgan Stanley Central Bank Directory*. London, Central Banking Publications Ltd.

Rogoff, K. (1985). “The Optimal Degree of Commitment to an Intermediate Monetary Target.” *Quarterly Journal of Economics* **100**: 1169-89.

Schaumburg, E. and A. Tambalotti (2003). "An Investigation of the Gains from Commitment in Monetary Policy." Federal Reserve Bank of New York, Staff Report #171.

Svensson, L. (1997). “Inflation forecast targeting: Implementing and monitoring inflation targets.” *European Economic Review* **41**: 1111-1146.

Woodford, M. (2003). *Interest and Prices*, Princeton University Press.

Woodward, B. (2000). *Maestro: Greenspan's Fed and the American Boom*, Simon & Schuster.

Figure 1: Average CPI inflation rate

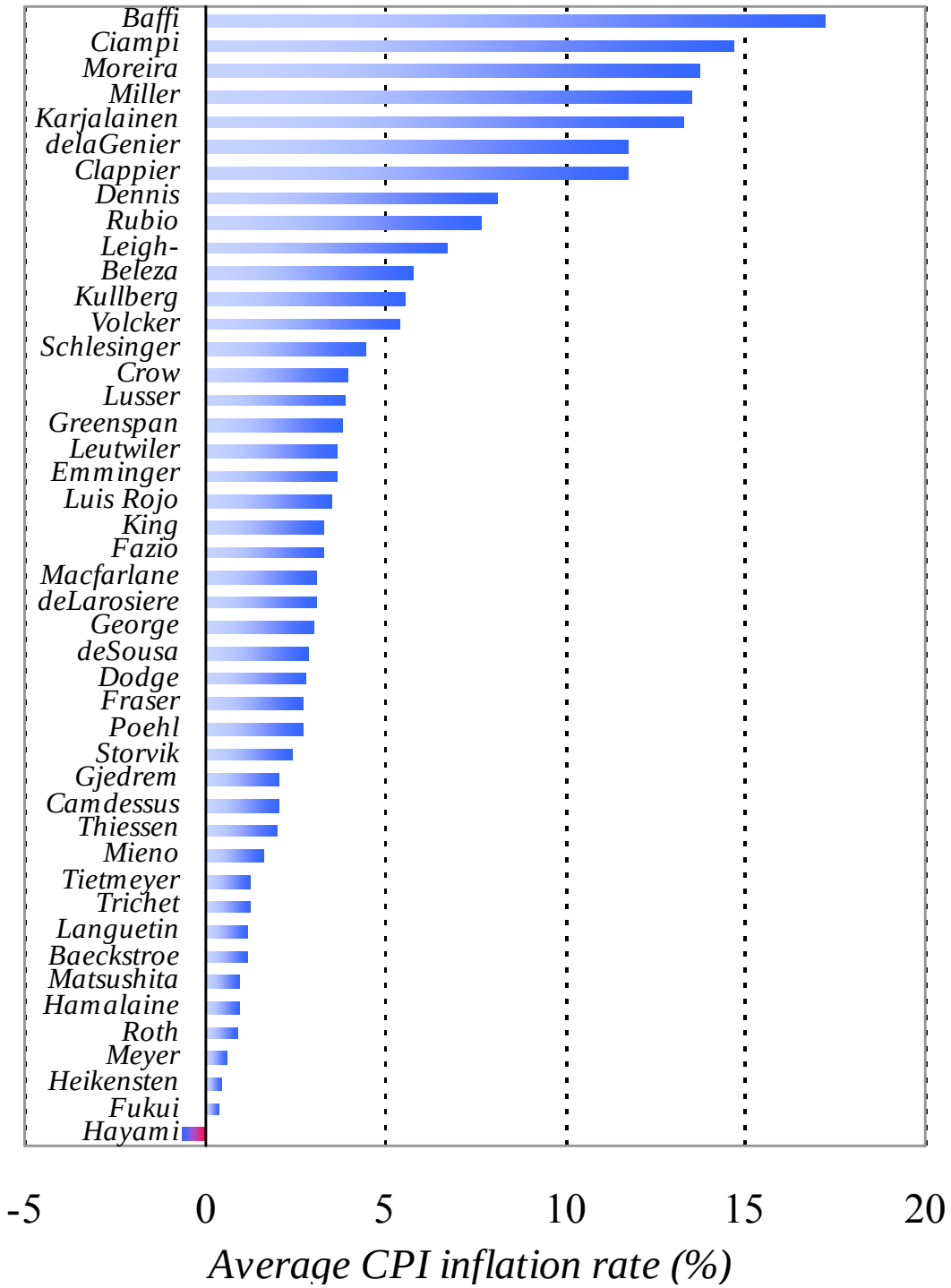

Figure 2: Beginning- and end-of-term inflation rates

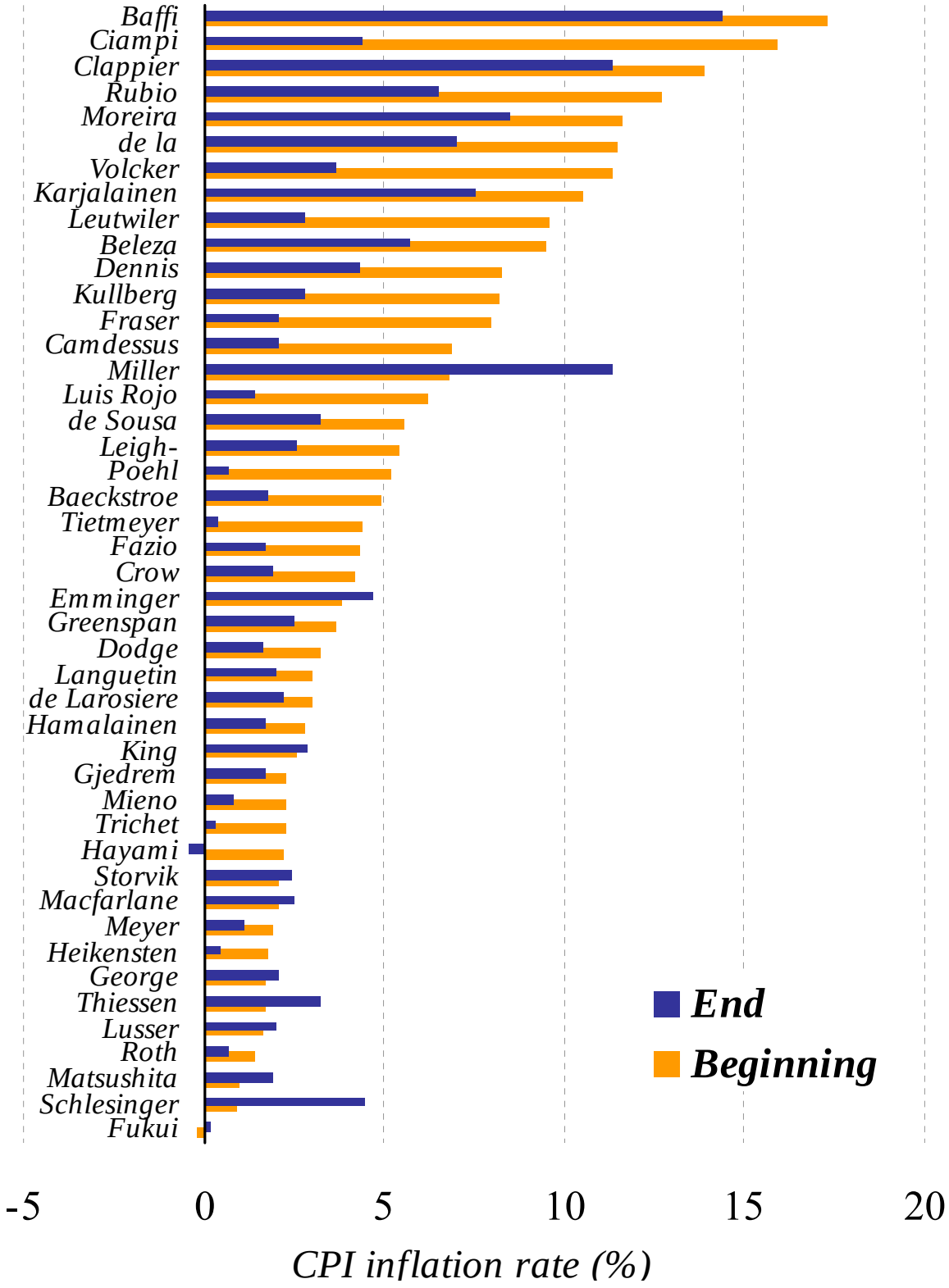

Figure 3: Beginning-of-term and change in inflation

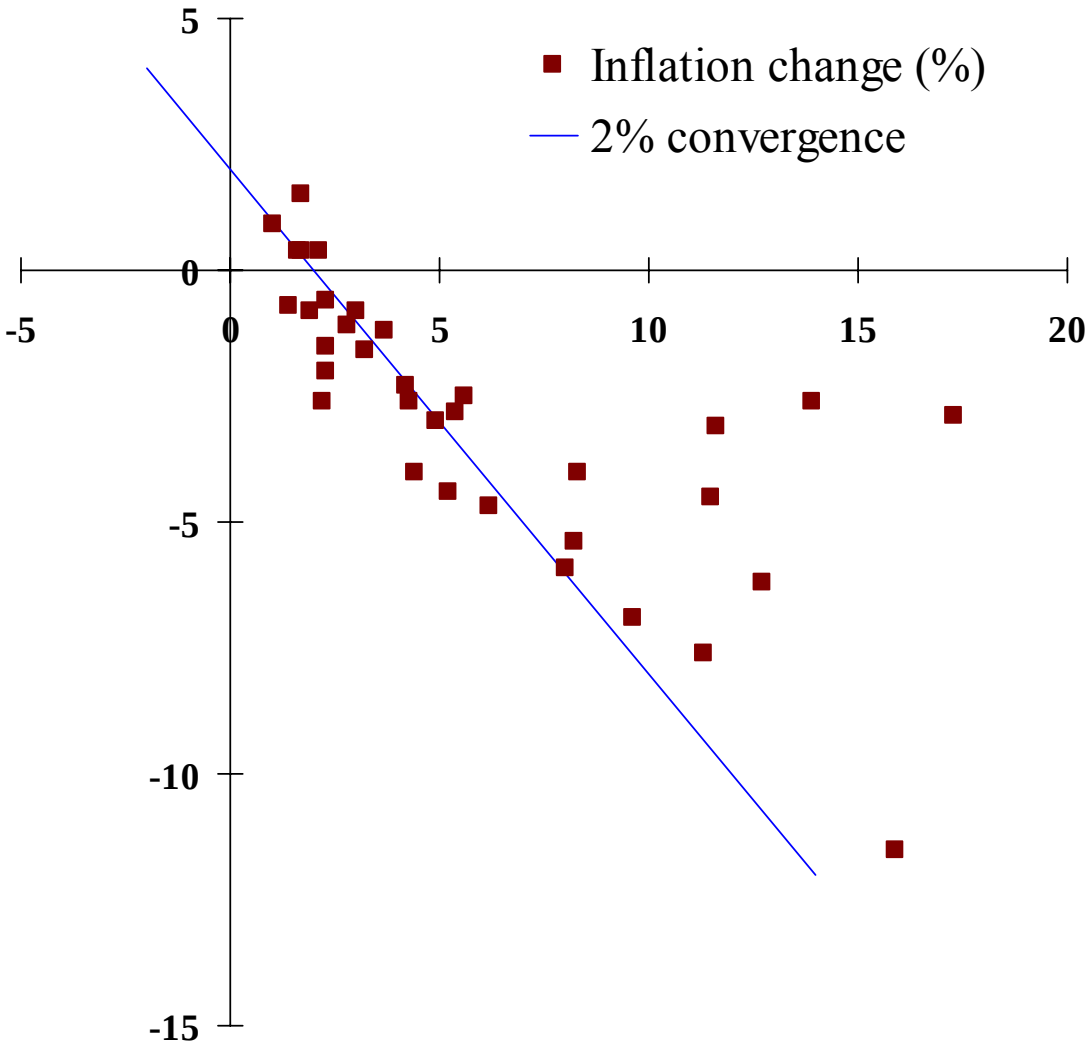

Figure 4: Inflation change and rate of disinflation

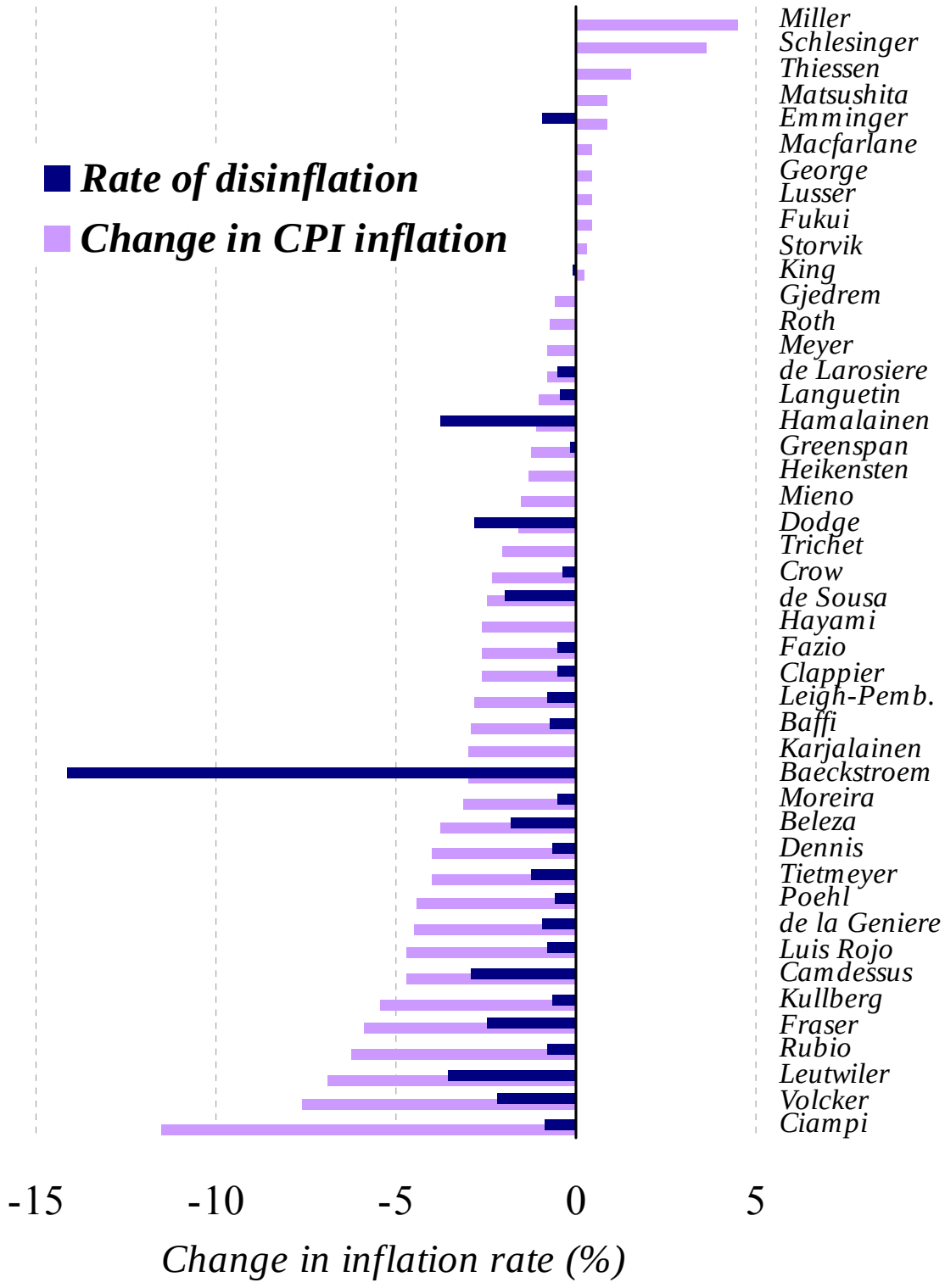

Table 1: Sample Statistics on Governorship Tenure and Outcomes

	Mean	Standard deviation	Minimum	Maximum
Average tenure of governor (years)	6.08	3.45	1.25	18.00
Average inflation over tem (percent)	4.63	4.41	-0.60	17.20
Inflation change over term (percentage points)	-2.22	2.93	-11.50	4.50
Rate of disinflation (percentage points/year)	-1.69	2.65	-14.12	-0.07
Change in exchange rate, 3 days post announcement (percent)	0.18	1.25	-2.46	2.61
Proportion of moves significant at 10% level	0.15			
Proportion of positive moves	0.47			
Proportion of positive moves that are significant	0.27			
Change in bond yield, 3 days post announcement (bp)	0.38	11	-16	27
Proportion of moves significant at 10% level	0.07			
Proportion of positive moves	0.43			
Proportion of positive moves that are significant	0.17			

Table 2: Exchange Rate Changes Around Central Bank Appointments

Country	New governor	Announce-ment date	3 days pre-announcement	Post announcement	
				1 day	3 days
Canada	Crow	12/17/1986	0.12	0.02	-0.01
	Thiessen	12/22/1993	-0.93	**0.72**	**1.33**
	Dodge	12/20/2000	-0.36	0.03	0.34
Finland	Karjalainen	2/5/1982	-0.30	0.41	-0.56
	Kullberg	6/1/1983	-0.62	-0.56	-0.51
	Hamalainen	4/3/1992	-1.61	**2.71**	**2.37**
	Vanhala	5/20/1998	-0.14	*0.83*	*1.39*
France	Clappier	6/12/1974	-0.49	-0.15	-0.05
	de la Geniere	11/14/1979	-0.03	0.55	0.90
	Camdessus	11/14/1984	-0.11	-1.01	-1.05
	de Larosiere	1/16/1987	**2.21**	-0.35	0.19
	Trichet	9/13/1993	1.19	-0.16	0.83
Germany	Emminger	3/9/1977	-0.26	-0.17	-0.10
	Poehl	9/19/1979	0.21	0.33	**2.61**
	Schlesinger	5/29/1991	0.97	-0.91	*-2.46*
	Tietmeyer	6/23/1993	**-2.45**	0.21	-0.35
Italy	Baffi	7/31/1975	-0.79	-0.40	-0.47
	Ciampi	9/21/1979	**1.03**	-0.17	-0.37
	Fazio	5/4/1993	-0.42	0.88	1.31
Japan	Mieno	11/22/1989	0.04	-0.07	0.17
	Matsushita	11/10/1994	-0.13	-0.14	-0.30
	Hayami	3/16/1998	-0.47	*-0.91*	-1.50
	Fukui	2/24/2003	0.13	0.85	1.35
Portugal	Moreira	5/16/1986	-0.85	-0.91	-1.89
	Beleza	4/10/1992	0.07	-0.68	-1.18
	de Sousa	6/23/1994	0.62	0.47	**2.42**
Sweden	Dennis	10/1/1982	0.24	0.04	-0.43
	Baeckstroem	11/3/1993	-0.10	0.09	0.90
	Heikensten	6/13/2002	0.73	-0.16	0.97
Spain	Rubio	7/20/1984	-1.02	0.06	-0.09
	Luis Rojo	6/29/1992	**1.67**	**0.95**	1.06
CH	Leutwiler	3/15/1974	-1.18	0.25	1.12
	Languetin	10/31/1984	-1.27	0.50	**3.26**
	Lusser	9/10/1987	0.00	-0.60	-1.40
	Meyer	10/26/1995	0.57	-0.35	0.09
	Roth	9/18/2000	-0.54	-0.36	-0.22
UK	Richardson	2/8/1973	0.80	-0.01	
	Leigh-Pemberton	12/23/1982	0.44	-0.75	-0.13
	George	1/22/1993	-0.82	0.95	1.37
	King	11/27/2002	**-2.17**	0.73	0.74
Australia	Fraser	7/5/1989	1.08	0.53	-0.07
	Macfarlane	8/14/1996	0.13	-0.03	0.58
Norway	Storvik	11/20/1995	0.71	-0.45	-0.19
	Gjedrem	10/2/1998	0.73	**-1.28**	-0.80
US	Miller	12/28/1977	-0.02	**-1.18**	**-2.44**
	Volcker	7/25/1979	-0.71	**0.80**	**1.56**
	Greenspan	6/2/1987	0.77	**-1.65**	-0.85
	Bernanke	10/24/2005	-0.16	-0.33	-1.03

Table 3: Bond Yield Changes Around Central Bank Appointments

		Announce-ment	EX response		3 days pre-	Post announcement	
Country	New governor	date	pre	post	announce	1 day	3 days
Canada	Crow	12/17/1986			9	-4	-7
	Thiessen	12/22/1993		+	-3	**-10**	-12
	Dodge	12/20/2000			1	-5	-8
Finland	Hamalainen	4/3/1992		+	46	*-19*	*27*
	Vanhala	5/20/1998			0	-3	-6
France	de Larosiere	1/16/1987	+		8	1	-6
	Trichet	9/13/1993			2	-3	5
Germany	Schlesinger	5/29/1991			-4	-3	-5
	Tietmeyer	6/23/1993			-7	2	-2
Italy	Fazio	5/4/1993			20	-3	-13
Japan	Mieno	11/22/1989			4	-1	-6
	Matsushita	11/10/1994			2	-7	-3
	Hayami	3/16/1998			-2	-4	-3
	Fukui	2/24/2003			-5	-2	-3
Portugal	de Sousa	6/23/1994		+	29	**-14**	-16
Sweden	Baeckstroem	11/3/1993			1	-10	3
	Heikensten	6/13/2002			-6	-4	*-9*
Spain	Luis Rojo	6/29/1992	+	+	-4	8	**26**
UK	Leigh-Pemberton	12/23/1982			-24	-1	0
	George	1/22/1993			-9	3	-7
	King	11/27/2002	–		4	-1	3
Australia	Fraser	7/5/1989			-15	**15**	10
	Macfarlane	8/14/1996			-2	5	1
Norway	Gjedrem	10/2/1998		–	**-21**	-1	3
US	Miller	12/28/1977		–	2	1	1
	Volcker	7/25/1979		+	1	-2	4
	Greenspan	6/2/1987		–	**-15**	**27**	13
	Bernanke	10/24/2005			-10	6	**21**

Appendix A: Central Bank Governor Appointment Dates and Circumstances

Country	Incoming governor	Announce-ment date	Unusual circumstances
Australia (7-year terms)	Fraser	7/5/1989	Predecessor Johnston retires. Fraser close to Treasury's Keating; independence questioned.
	MacFarlane	8/14/1996	Internal successor; Fraser leaves after 1 term.
Canada (7-year terms)	Crow	12/17/1986	Considered a "mystery man" with unknown views.
	Thiessen	12/22/1993	Crow eligible for reappointment, but declined for "personal" reasons; had been criticized for tough anti-inflation policies.
	Dodge	12/20/2000	Served as deputy finance minister under Paul Martin; independence questioned.
Finland (7-year terms)	Karjalainen	2/5/1982	Predecessor Koivisto elected president.
	Kullberg	6/1/1983	Karjalainen relieved of post amidst charges of alcoholism, party power struggle.
	Hamalainen	4/3/1992	Kullberg resigns in public dispute with prime minister.
	Vanhala	5/20/1998	Hamalainen appointed to ECB board. Political squabble ensues over Vanhala's replacement on Bank's board.
France (indefinite)	Clappier	6/12/1974	
	De la Geniere	11/14/1979	Clappier retires.
	Camdessus	11/14/1984	De la Geniere resigns over dispute with government on fiscal issues.
	De Larosiere	1/16/1987	Camdessus moves to IMF.
	Trichet	9/13/1993	De Larosiere moves to EBRD
Germany (8-year terms)	Emminger	3/9/1977	Predecessor Klassen retires due to ill health.
	Poehl	9/19/1979	
	Schlesinger	5/29/1991	Poehl moves to private sector; Schlesinger interim appointment.
	Tietmeyer	6/23/1993	
Italy (indefinite)	Baffi	7/31/1975	Predecessor Carli resigns in dispute over fiscal policy.
	Ciampi	9/21/1979	Baffi forced out amidst politically-motivated charges of corruption.

	Fazio	5/4/1993	Ciampi elected prime minister.
Japan (5-year terms)	Mieno	11/22/1989	
	Matsushita	11/10/1994	
	Hayami	3/16/1998	Matsushita resigns after scandal.
	Fukui	2/24/2003	Hayami's term ends
Norway (6-year terms)	Storvik	11/19/1995	Moland resigns facing allegations of tax cheating; Storvik appointed acting governor.
	Gjedrem	10/2/1998	Storvik retires.
Portugal (5-year terms)	Moreira	5/16/1986	Predecessor Constancia resigns to enter politics.
	Beleza	4/10/1992	
	De Sousa	6/23/1994	Beleza resigns in disagreement with government over monetary policy.
Spain (8-year terms)	Rubio	7/20/1984	
	Luis Rojo	6/29/1992	
Sweden (6-year terms)	Dennis	10/1/1982	
	Baeckstroem	11/3/1993	Appointed shortly after bank crisis
	Heikensten	6/13/2002	
Switzerland (6-year terms)	Leutwiler	3/15/1974	Predecessor Stopper resigns for health reasons.
	Languetin	10/31/1984	Leutwiler retires.
	Lusser	9/10/1987	Languetin retires.
	Meyer	10/26/1995	Lusser retires.
	Roth	9/18/2000	
United Kingdom (7-year terms)	Leigh-Pemberton	12/23/1982	
	George	1/22/1993	Leigh-Pemberton retires after 2 terms
	King	11/27/2002	George retires after 2 terms
United States (4-year terms)	Miller	12/28/1977	Predecessor Burns completes term; reportedly distrusted by Carter, not reappointed.
	Volcker	7/25/1979	Miller moves to Treasury amidst deepening economic crisis.
	Greenspan	6/2/1987	Volcker completes term, unexpectedly does not seek reappointment.
	Bernanke	10/24/2005	Greenspan completes term.

Appendix B: Market Commentary Examples

Fraser, 1989 (Australia).

> From *The Advertiser*: "The recent appointment of Bernie Fraser to head the Reserve Bank is extremely disturbing. It's disturbing because the Reserve and a relatively firm monetary policy are about the only things standing between us and both cyclical and longer-term structural disaster. … Most simply, it is worrying that he would actually believe in facilitating an easing of monetary conditions, for a whole series of reasons. And that, at the very time when we would need the Reserve Bank to be standing against both market and political forces, it would likely bow to them. [McCrann, Terry (1989). "The jury is out on Fraser as Reserve Bank chief," The Advertiser, July 28.]
>
> From the *Courier Mail*: "…Opposition Treasury spokesman, Dr Hewson, said it was not appropriate for an outsider to take the top banking job and Mr Fraser would not be able to offer independent advice to the Government. The Treasurer, Mr Keating, did not understand the concept of an independent central bank, he said. 'I have known Bernie for quite some time. I have a high regard for him as an economist, but I just think, quite frankly, he is not the right man for the job.'" [Courier-Mail (1989). "Bank Governor 'Not Right Man'," Courier Mail, July 6.]

Thiessen, 1993 (Canada).

> "Thiessen, 55, would be appointed for a renewable seven-year term. Crow December 22 said that he was refusing to seek a second term for personal reasons. However, it was reported December 23 that Crow's insistence on low-inflation policies at the expense of other economic goals had alienated ministers arguing for a balance between low inflation and lower unemployment." (Facts on File, should find primary source.)

Dodge, 2000 (Canada).

> "…the appointment of Toronto-born Dodge may concern investors that under his watch, the central bank might tend to keep interest rates lower than in past due to pressure from a government that prefers faster economic growth, analysts said. ''His former role as deputy finance minister raises questions about the independence of the Bank of Canada,' said Rob Palombi, senior analyst with Standard and Poor's MMS in Toronto. … Markets will likely have many questions about why Dodge was chosen over (Senior Deputy Governor Malcolm) Knight, said Angelo Melino, an economics professor at the University of Toronto. 'Is this just a reward for a civil servant who has done well and has Paul Martin's confidence? Or is it a statement that the direction at the bank should be changing?" said Melino. [Cordon, Sandra (2000). "Dodge named new Bank of Canada governor; concerns of political influence," Canadian Press Newswire.]

Hamalainen, 1992 (Finland).

From the *Financial Times*: "The Bank of Finland yesterday named Ms Sirkka Hamalainen as the new governor of the central bank, in an attempt to calm the country's turbulent financial markets. News that Mr Rolf Kullberg, the governor of the bank for the past nine years, had tendered his resignation because of a public dispute with Prime Minister Esko Aho over economic policy sent a shock wave through the Finnish money markets in yesterday's half-day trading." [Webb, Sara (1992a). "Finland names Bank governor," Financial Times, April 4, page 2.]

From the *Financial Times*: "The government confirmed its commitment to low inflation, a stable exchange rate, and defending the external value of the currency in order to prevent further loss of confidence when the financial markets opened today. … The bank also announced that Ms Sirkka Hamalainen would take over from Mr Kullbert as central bank governor immediately, not from July 1, as had been originally proposed. The immediate appointment of Ms Hamalainen was seen as a further step aimed at calming the markets." [Webb, Sara (1992b). "Finland cuts spending to avoid devaluation," Financial Times, April 6, page 16.]

De Sousa, 1994 (Portugal).

From the *Financial Times*: "Over the past three months, the apparent contradiction between the government's commitment to both a firm currency and lower interest rates has led to a wave of attacks against the escudo by speculators expecting a realignment of the currency. Contrary to the prime minister's forecast in April that Portugal's main money market rates would fall two points this year, Mr Beleza's defence of the currency has forced rates up several points and banks have raised their lending rates. … Mr Antonio Borges, a former vice-governor of the Bank of Portugal, who resigned last year because of disagreements with the government, said yesterday that the appointment of the new governor would clearly strengthen government influence over the central bank. Mr Borges joined opposition parties in saying the government was reversing a long process of increasing the bank's independence and was at odds with European Union efforts to diminish government influence over central banks." [Wise, Peter (1994). "Portugal replaces bank chief: Appointment of minister as new governor raises suspicion," Financial Times, June 24, page 2.]

From the Banco de Portugal: "In late June, the Governor and 2 Deputy-Governors of the Banco de Portugal were replaced. At the same time, the Finance minister recognised that a decline of domestic interest rates could only be achieved in the context of a sustained reduction of the inflation rate and sustained exchange rate stability. This position marked a welcome departure from previous government calls for lower interest rates." [Abreu, Marta (2003). "The Portuguese Escudo in the ERM," Banco Central de Portugal Economic Bulletin, December, pp. 1-15.]

Miller, 1977 (US).

From the *New York Times*: "Another reason (for the dollar's decline) is that foreign traders reported are wary about what policies the chairman-designate of

the Federal Reserve Board, G. William Miller, will follow." [Hammer, Alexander R. (1978). "Dow Average Falls by 13.43 as Dollar Continues to Drop," New York Times, January 4, page D1.]

Volcker, 1979 (US).

From the *New York Times*: "The dollar rose sharply on foreign exchange markets at home and abroad yesterday following President Carter's nomination of Paul A. Volcker as chairman of the Federal Reserve Board. … 'I believe this is a constructive development for the dollar internationally and also for the fight against inflation and will be viewed as such by domestic bankers and foreign financial institutions,' said Henry Kaufman, chief economist and general partner of Salomon Brothers…" [Associated Press (1979). "Dollar Surges and Gold Dips on Volcker Naming," *New York Times*, July 26, page D9.]

Greenspan, 1987 (US).

From the *Wall Street Journal*: "Mr. Greenspan faces a daunting challenge in proving to the financial markets that he is a worthy replacement for the outgoing Fed chief. The bond market, reacting to the news that Mr. Volcker won't stay on, took its worst pounding in years. The dollar also plunged yesterday against all major currencies. The stock market, however, ended only modestly lower, apparently banking on the notion that the Fed's policies won't change significantly. The commodity markets, sensing a possible resurgence of inflation, rose sharply. … The new Fed chief also will face political pressures. Some Republicans think that Mr. Greenspan may be more accommodating politically during next year's presidential campaign. A former top Reagan administration official says Mr. Greenspan will probably be 'a shade' less likely than the 59-year-old Mr. Volcker to tighten credit and drive up interest rates while the Republicans are trying to retain the White House." [Blustein, Paul (1987). "Fed Jolt: Nominee Greenspan Shares Volcker's Goals But Not Yet His Clout," *Wall Street Journal*, June 3, page 1.]

Bernanke, 2005 (US).

From *Bloomberg*: "Bond traders speculated that Bernanke may be more concerned about the pace of economic growth and so would be willing to permit faster inflation. 'Bernanke is pro-growth, relative to inflation,' said Dominic Konstam, head of interest-rate strategy at Credit Suisse First Boston in New York."

From *Associated Press*: "I think Bernanke may be more predisposed to set more accommodative interest rate policies to keep the economy out of the ditch," said Hans Olsen, managing director and chief investment officer at Bingham Legg Advisers. "And I think what the market is saying today with this jump is that if something bad were to happen in the world, we think this guy would be willing to turn on a dime and lower rates. (Martinez, 2005.)

Appendix C: Data sources

Daily exchange rates are all taken from the Federal Reserve's H.10 release, which reflects the market exchange rate prevailing at noon, New York time.

Daily bond yields were obtained from a variety of sources:

- UK: Bank of England, http://213.225.136.206/statistics/yieldcurve/index.htm (local dating), 1/2/1979 to 12/31/2004 (rl).
- Canada (6/25/1985 to 8/30/2005), France (1/4/1987 to 8/30/2005), Germany (1/16/1983 to 8/30/2005), Italy (1/2/1989 to 8/30/2005), Japan (2/9/1982 to 8/30/2005), Sweden (1/2/1987 to 8/30/2005), Spain (4/3/1991 to 8/30/2005), UK (rl2) (1/4/1987 to 8/30/2005): Federal Reserve Bank of New York (NY dating).
- Portugal: Banco de Portugal (local dating), 7/18/1993 to 8/5/2005.
- Australia: Reserve Bank of Australia Occasional Paper No. 10: online data file for original paper, through 9/1993; and update, from 10/1993 (local dating), 1/3/1989 to 8/30/2005.
- Norway: Norges Bank, http://www.norgesbank.no/english/statistics/interest_rates/interest_rates.html (local dating), 1/2/1996 to 12/11/2003.
- Finland: Central Bank of Finland (local dating), 8/1/1991 to 9/19/2005.
- US: Board of Governors of the Federal Reserve, H.15 release, 10-year constant-maturity yield, 1/2/1962 – present.