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Do Markets Care Who Chairs the Central Bank?

This paper assesses the impact of central bank governor appointments on exchange rates and bond yields using a new dataset of announcements spanning 15 countries and 30 years. The results show that exchange rates exhibit a statistically significant response to the announcement of a new governor, especially when the appointee's identity was not anticipated. The reactions are especially pronounced for banks lacking either independence or a nominal anchor. New governors are not generally thought to lack credibility, however, as announcements generally do not cause exchange rate or bond yield movements signaling expectations of higher inflation or looser monetary policy.

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THE APPOINTMENT OF a new central bank governor usually makes headlines in the financial press, and those reports often attribute to the appointment subsequent movements in asset prices.[1] Ben S. Bernanke's October 24, 2005 appointment to chair the U.S. Federal Reserve, for example, generated hundreds of press reports and nearly as many analyses and commentaries speculating on his policy leanings.[2] Stocks climbed sharply immediately following the announcement, while bond prices fell.

1. This paper uses the term "governor" generically to refer to the head of the central bank, even when the actual job title is "president" or "chair."

2. Factiva alone reports 1322 such articles on the day of, and the day following, his appointment.

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That financial markets should react to the appointment of a new governor is hardly surprising. After all, central banks' policies can have significant macroeconomic effects, and it is taken as given that the governor exerts a disproportionate influence over those policies. This may have been especially true in the case of Alan Greenspan, to whom extraordinary powers of foresight were sometimes attributed and who was increasingly personally identified with U.S. monetary policy over the course of his long tenure.[3] And decades earlier, a similar degree of prescience and personal influence was attributed to Benjamin Strong, the governor of the Federal Reserve Bank of New York (then the locus of U.S. monetary policy decision making), whose death in 1928 is thought by some to have contributed to the onset of the Great Depression.[4]

Governor-specific attributes also play a central role in much of the theoretical literature on monetary policy. The currently standard framework for modeling policymakers' incentives, which began with Kydland and Prescott (1977) and Barro and Gordon (1983), opened the door to characterizing differences in central bank behavior in terms of the objective function attributed to the central banker, as well as the institutional setting within which he or she served. This was made explicit in the influential Rogoff (1985) model of the "conservative" central banker. In a similar vein, the model of Cukierman and Meltzer (1986) distinguished between different central banker types—"hawks" versus "doves". Financial market commentary often makes much of this distinction in central bankers' preferences when forecasting appointees' likely influence on monetary policy.[5]

The point of this paper is *not* to determine whether, and to what extent, central bank governors influence monetary policy and the economy—we assume that they do. Rather, it is to determine whether financial markets *perceive* that the central bank appointments contain new information relevant to policy expectations.[6] If so, then these appointments (or, more precisely, the announcements) should move markets through their effects on expected inflation and interest rates.

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3. This is nicely illustrated by Senator John McCain's unforgettable quip from a 1999 GOP presidential debate: "...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."

4. Friedman and Schwartz (1963, p. 412–13) conjectured that "if [Benjamin] Strong had still been alive and head of the New York [Federal Reserve] Bank in the fall of 1930, he would very likely have recognized the oncoming liquidity crisis..." and taken "appropriate measures to head it off."

5. Bernasek (2005), for example, wrote following Bernanke's appointment: "Greenspan did, however, make one thing clear [at the time of his appointment]: the need to combat inflation. He realized that he needed to establish his credibility on this front. Soon after his appointment, the Fed raised interest rates by half a percentage point and sent a message about his determination to tame price increases. He understood that an unhappy bond market could undo a Fed chairman and that the economy would suffer the consequences.... The first test will be [Bernanke's] credibility on inflation... the vote that ultimately matters more will be the one cast by the bond markets. Inflation will be their litmus test. Bond traders are already scouring Bernanke's record for evidence one way or the other.... The bond market reacted by inching rates higher."

6. Note that the shifts in expectations created by these announcements need not be correct *ex post*. The bond market's adverse reactions to the appointments of Bernie Fraser in Australia and Alan Greenspan in the United States. In both cases, the markets' apparent inflation concerns turned out to be unfounded—and Fraser went on to establish inflation targeting at the Reserve Bank of Australia.

Our objective is therefore to assess empirically the perceived information content, if any, of governor appointments in the eyes of financial market participants. The paper's specific goals are threefold. The first is to document the reaction of exchange rates and bond yields, and to assess those reactions' statistical and economic significance. The second goal is to determine the extent to which the monetary policy framework in place at the time of the appointment affects the magnitude of the market response. Third, we are interested in whether the reactions indicate a generic concern about incoming governors' anti-inflation credibility: if this were the case, we would expect to see a tendency for announcements to be associated with rising bond yields and depreciating exchange rates.

So far as we know, this is the first effort to analyze the impact of new governor appointments on financial markets and monetary policy expectations. There is, of course, a large literature on how monetary policy affects financial markets, and a number of recent papers have examined the effects of specific monetary policy actions (changes in the target federal funds rate for the United States) on financial markets. Examples include Kuttner (2001) and Gürkaynak et al. (2005a), for the bond market, Rigobon and Sack (2004) and Bernanke and Kuttner (2005) for the stock market, and Faust et al. (2003) for the foreign exchange market. Others, such as Lucca and Trebbi (2009), Bokus and Rosenberg (2006), and Reinhart and Sack (2005) focused on the information content of Federal Open Market Committee minutes and other forms of communication. Our study is similar in spirit to that of Gürkaynak et al. (2005c), who entertained the possibility that certain kinds of macroeconomic news can affect market participants' inferences about the central bank's policy objectives, and to the Meyer and Sack (2005) case study of the 1987 Volcker-to-Greenspan transition.

This paper conducts a systematic event-study analysis of 61 announcements of new governor appointments and departures of incumbent governors. Our results are based on a new dataset of central bank governor appointments spanning 15 countries and over three decades. Precise announcement dates, and the circumstances surrounding the appointments, were gleaned from contemporary press reports.

Our results reveal a pronounced and statistically significant response of exchange rates, but a less distinct response of bond yields. Just as importantly, the responses do not consistently point to an increase in inflation expectations. Some announcements appear to create expectations of tighter monetary policy (i.e., higher real interest rates or a lower inflation objective), while others are consistent with more expansionary policy. Overall, the results suggest that appointments are thought to contain new information about future monetary policy. We observe a significant reaction only in the case of unanticipated new governor appointments, however. The lack of a reaction to departures or anticipated appointments suggests it is the perceived characteristics of the new governor that account for the markets' response, not turnover *per se*. In addition, we find that the market responses tend to be more pronounced for central banks lacking independence or an explicit domestic nominal anchor than they are for banks possessing those two features.

The paper is organized as follows. Section 2 discusses the nature of the information that might be contained in the announcement of a new governor. Section 3 describes

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the construction of the announcement dataset and the selection of the sample. Section 4 lays out the statistical framework and presents the main results. Section 5 concludes.

1. ON THE INFORMATION CONTENT OF APPOINTMENTS

Our premise is that central bank governors' preferences can influence the conduct of monetary policy. To make that maintained assumption more concrete, it is worth taking a moment to review the ways in which the governor's preferences could affect the conduct of monetary policy, and how changes in those preferences would affect financial markets.

1.1 Characterizing Central Bankers' Preferences

The standard way to characterize the central bank's preferences is in terms of a quadratic objective function involving the squared deviations of output and inflation from their targets,

$$L = \sum_{t=0}^{\infty} \delta^t \left[\left(\pi_t - \pi^T \right)^2 + \lambda \left(x_t - x_t^* \right)^2 \right], \tag{1}$$

where π is the inflation rate, π^T is the central bank's desired or "target" inflation rate, x is real output, and x^* is equilibrium or potential output. Future outcomes are discounted by the factor δ, and λ parameterizes the relative weight assigned to output fluctuations in assessing welfare costs, vis-à-vis deviations of π from π^T.

In the context of such an objective function, there are two dimensions along which central bankers might differ from one another. One is in the weight they attach to output relative to inflation stabilization—that is, they may have different values for λ. Much of the literature on central bankers' preferences has focused on this parameter, which is typically interpreted as summarizing the monetary authority's "conservatism," as defined in Rogoff (1985). A more conservative central banker will have a smaller value of λ, indicating a greater willingness to forgo output stabilization for the sake of inflation stabilization. This means that, faced with a higher-than-desired inflation rate, a "low-λ" central banker will pursue a relatively restrictive policy (i.e., high real interest rates) in order to achieve a rapid disinflation. Differences in λ seem to be implicit in business press reporting, which often speaks of an appointee as being "pro-growth, relative to inflation" (Stanton 2005), or "favoring faster interest rate reductions" as a means to restore full employment (Harverson and Corrigan 1993). Quantitative estimates of the Federal Reserve's λ have even been presented in several empirical studies, such as Özlale (2003) and Favero and Rovelli (2003).

Central bank governors may also differ in terms of their desired inflation rate, π^T. This possibility has not received much attention in the theoretical literature, for the simple reason that, under the standard assumption of a vertical long-run Phillips

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curve, there are no gains to choosing a higher π^T.[7] Consistent with this assumption, most central banks have converged in recent years toward average inflation rates of roughly 2%. This has not always been the case, however: Favero and Rovelli (2003) estimated that the Federal Reserve's post-Volcker implicit inflation objective is three percentage points lower than it was in the 1960s and 1970s. In addition, Gürkaynak et al. (2005c) found long-run inflation expectations (measured by the spread between nominal and inflation-indexed bonds) are not well anchored in the United States, implying some uncertainty about the Fed's ultimate inflation objective.

More subtly, central bank governors may also differ with respect to their perceived "credibility," defined as the extent to which they are trusted to follow through with their announced policies. In the extreme case of Barro and Gordon (1983), the absence of credibility (along with a preference for higher-than-equilibrium output) can lead central banks to choose higher inflation rates in a futile effort to boost output.[8] To the extent that it creates an upward inflation bias, the lack of credibility will therefore have observable implications that are similar to a higher π^T.

In some models, the lack of credibility is a generic problem facing newly appointed central bank governors. In Schaumburg and Tambalotti (2003) and Kara (2007), for example, the incumbent central bank governor can commit to policy during his or her own administration, but the commitment is not binding on his successor, who may have an incentive to exercise discretion immediately on taking office.

A similar phenomenon arises in models in which the market participants are uncertain about the underlying preferences of the incoming governor, as in Cukierman and Meltzer (1986). In their model, a less conservative ("weak") governor initially has an incentive to mimic the behavior of a more conservative ("strong") policymaker, at least until some point at which it becomes optimal to behave opportunistically, thus revealing his true colors. Uncertainty about a governor's type is therefore likely to be highest at the start of a governor's tenure, before he or she has had an opportunity to demonstrate his anti-inflation credentials. In this "weak until proven strong" view, markets may have a tendency to react adversely (i.e., with an increase in inflation expectations) to the announcement of a new central bank governor, thus creating an "inflation scare" à la Goodfriend (1993).

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1.2 Policy Expectations and Asset Prices

The theory sketched in the preceding section suggests central bank appointments could shift financial market expectations for future inflation and real interest rates. Empirically discerning such an effect is complicated by the lack of high-frequency expectations data, however. Surveys, such as those compiled by Consensus Economics,

7. There may be practical reasons for choosing $\pi^T > 0$, such as to compensate for the upward bias in measured inflation rates or to create a buffer zone in order to avoid the zero lower bound on the nominal interest rate and the possibility of outright deflation.

8. This should be seen not as a literal mistake or willful ignorance by central bank governors, but as a proxy for political and other pressures to expand output in an unsustainable way or for the lack of will to follow through with a difficult period of disinflation.

are too infrequent to be of any use for our purpose. Market-based measures derived from nominal and inflation-indexed bonds, such as those used by Gürkaynak et al. (2005c) and Meyer and Sack (2005), are recent innovations and only available for a handful of countries. Lacking suitable expectations data, we rely on financial variables that are traded in deep and liquid markets, and are likely to be influenced by inflation and interest rate expectations: exchange rates and bond yields.

The theory of uncovered interest rate parity illustrates the mechanisms through which monetary policy expectations are likely to affect the exchange rate. The role of expectations is apparent in the interest rate parity condition, which equates the expected change in the (log) nominal exchange rate, $E_t \Delta e_{t+1}$, to the spread between domestic and foreign interest rates, $i_t - i_t^*$,

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

Solving equation (2) forward makes this linkage more explicit,

$$e_t = E_t \left(\sum_{s=0}^{T-1} (i_{t+s}^* - i_{t+s}) + e_T \right), \tag{3}$$

where e_T, the nominal exchange rate at some future date T, is interpreted as the long-run equilibrium exchange rate, determined, for example, by the purchasing power parity principle.

Expected changes in monetary policy can therefore affect the nominal exchange rate either via the path of future interest rate differentials, or through an effect on the perceived equilibrium exchange rate. Expectations of a more restrictive monetary policy, which would result from the appointment of a more conservative (smaller λ) central banker in an environment of higher-than-desired inflation, would tend to decrease e (appreciate) through two channels: first, by increasing i relative to i^*, and second, by reducing the expected future price level via the PPP effect. Announcements affecting the central bank's perceived credibility (or alternatively, π^T), on the other hand, would tend to produce ambiguous effects. While an increase in inflation expectations would tend to increase i relative to i^*, reducing e, it would at the same time *raise* the expected equilibrium e_T via the PPP channel. Consequently, the exchange rate is likely to be sensitive to perceived changes in the degree of conservatism (λ) attributed to the central bank, but less so to changes in the long-run inflation objective.

Notwithstanding the countless studies rejecting interest rate parity theory, evidence supports its implications regarding the qualitative effects of monetary policy and inflation. What is particularly relevant for this study is that tighter monetary policy leads to appreciations, an implication that has been borne out in several empirical studies. Eichenbaum and Evans (1995), for example, found that contractionary monetary policy shocks from vector autoregressions led to a stronger dollar. Fatum and Scholnick (2008) obtained a similar result in their event study analysis. Notably, Andersen et al. (2003) found virtually no effect of inflation news on the exchange rate, perhaps

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because of the tendency for the price level and interest rate effects to work in opposite directions.

The expectations hypothesis is a natural framework for understanding the link between bond yields and monetary policy. While its assumption of a constant term premium is at odds with the data, the theory is nonetheless useful for thinking about the the effects of inflation expectations and the real interest rate on bond yields. The standard formulation of the expectations hypothesis expresses the T-period nominal bond yield y as the average of expected future short-term (one-period) nominal interest rates, i, plus a (constant) term premium ϕ,

$$y_t = \frac{1}{T} E_t \sum_{s=0}^{T-1} i_{t+s} + \phi. \tag{4}$$

The effect of an increase in the desired inflation rate (or an increase in the inflation bias resulting from diminished credibility) is clear from equation (4): all else equal, an increase in expected inflation raises expected future nominal interest rates and thus bond yields. This response has been documented in a number of empirical studies, such as Fleming and Remolona (1997) and Gürkaynak et al. (2005c). The effect of an increase in central bank conservatism (i.e., a smaller λ) is less clear. While a tighter monetary policy will raise the nominal short-term interest rates over some horizon, it will also *reduce* those rates over a longer horizon as inflation expectations decline. Ellingsen and Söderström (2001) showed theoretically that the latter effect will dominate the former for bonds of a sufficiently long maturity, causing nominal yields to fall. In practice, however, surprise policy tightenings tend to be associated with small increases in long-term bond yields, as shown by Kuttner (2001) among others. Taken together, these results suggest that bond yields should be highly sensitive to changes in the central bank's perceived inflation objective, but less so for changes in the perceived degree of conservatism.

1.3 A Null Hypothesis and Two Alternatives

The preceding discussion suggests two economically interesting hypotheses regarding the information content of central bank governor announcements. The first is simply that the appointments convey *some* sort of information relevant to the future conduct of monetary policy. According to this view, market participants use whatever information they have available to form an opinion of the new governor's characteristics (λ, π^T, or "credibility"). If these characteristics are thought to differ from those of the incumbent governor, then the appointment will alter inflation and interest rate expectations. Then, through the mechanisms discussed earlier in Section 2.2, this shift in expectations will be reflected in exchange rates and bond yields. Under this first hypothesis, there is no presumption that the reaction will consistently tend in one direction or the other: the direction of movement will depend on the perceived governor-specific characteristics.

A second hypothesis is that credibility is a generic problem facing all new central bank governors: that is, they are perceived to be weak (in the sense of being willing

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to tolerate higher inflation) until they have had a chance to establish strong anti-inflation credentials. As noted earlier, this hypothesis is suggested by a number of theoretical models, and implies that changes in central bank governors will tend to be associated with at least a transitory rise in inflation expectations. This view is also firmly established in the folklore of central banking, which Walter Bagehot expressed perfectly in *Lombard Street*:

> "There is almost always some hesitation when a Governor begins to reign. He is Prime Minister of the Bank Cabinet; and when so important a functionary changes, naturally much else changes too. If the Governor be weak, this kind of hesitation continues throughout his term of office. The usual defect then is, that the Bank of England does not raise the rate of interest sufficiently quickly. . . A cautious man, in a new office, does not like strong measures." (pp. 176–77 Bagehot 1873)

The "weak until proven strong" hypothesis therefore implies either that the announcement of *any* new governor *or* the announcement of an incumbent's departure should be accompanied by an exchange rate depreciation and/or an increase in bond yields.

The underlying null hypothesis in either case is that central bank appointments contain no discernible information and thus generate no market reaction. There are several reasons the appointment of a new central bank governor might be a nonevent. One possibility is that macroeconomic outcomes are determined primarily by luck (i.e., exogenous shocks) or by policies outside of the central bank's control, rendering the central bank, and its governor, largely irrelevant. Another possibility is that financial market participants lack the information required to make meaningful inferences about the appointee's preferences. Alternatively, there may be little perceived variation among central bankers. If all governors were selected from a relatively homogeneous pool of candidates, then presumably any new appointee would be expected to pursue policies similar to those of his predecessor.

We would also expect a muted financial market response in cases where the ability of governors to reset policy objectives is constrained by the institutional environment. When the central bank is committed to a well-defined nominal anchor, such as an inflation target, there will be little scope for an individual central bank governor to impose his or her preferences on the policy process. Conversely, it is unlikely that someone favoring, say, a 4% rate of inflation would agree to serve as a governor of a central bank whose target was 2%. A slightly more subtle argument applies for central bank independence. By insulating it from external pressure, independence allows a central bank to pursue its long-term policy objectives without political interference. Superficially, it might seem that a greater degree of independence would allow the central bank governor to exert greater discretion over monetary policy. In the case of independence, however, the appointment of a new governor would be unlikely to signal a politically motivated policy shift. Furthermore, Posen (1995) argued that more independent central banks are associated with societies that are more conservative in Rogoff's (1985) sense (i.e., a smaller value of λ in equation (1)), and this

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would also tend to reduce the information conveyed by new appointments. For these reasons, central bank independence and a well-defined nominal anchor, separately but especially in combination, should attenuate the financial market's reactions to new governor appointments. We investigate this possibility in our empirical work by splitting the sample according to criteria reflecting central bank autonomy and the existence of an operational domestic nominal anchor.

2. DATA AND SAMPLE SELECTION

We used two criteria to determine the set of countries to be included and the time period to be covered. First, we limit our analysis to industrialized countries. One reason to do so is that a great deal of turnover among central bank governors in emerging markets is related to—or in some cases, precipitated by—macroeconomic or financial crises. This connection makes it hard to distinguish the impact of the appointment from the contemporaneous financial turmoil. In addition, because reliable English-language press reports from these countries are scarce, it is often hard to pin down the precise announcement dates with any certainty.

The second criterion used in selecting the sample is that the currency in question must exhibit some degree of exchange rate flexibility. Because a credible hard peg effectively removes any scope for an independent monetary policy, central bank appointments in these cases would contain no information on the likely future path of inflation and interest rates.[9] Consistent with this criterion, the sample is limited to the post-Bretton Woods and (for euro adopters) the pre-euro periods.[10] European countries maintaining a hard Deutsche mark peg during the pre-Euro period (Austria, Denmark, and Belgium) were also dropped from the sample.[11] The application of these two criteria yields a set of 15 countries, covering the years from 1974 through 2006 (through 1999 for those countries adopting the euro).

The next step is to determine the dates of the governor appointments. It is important to note that, because the analysis focuses on the financial market impact, the relevant dates are those for the *announcements* of a new central bank governor's appointment or his predecessor's departure, rather than the dates on which the new governor

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9. For less than fully credible pegs, appointments could be seen as affecting the likelihood of exiting or adjusting the parity. Such a "peso-problem" phenomenon would, presumably, be reflected in interest rates and inflation expectations.

10. Although many of the countries in the sample were members of the Exchange Rate Mechanism (ERM), during most of the period the bands were of sufficient width to allow for some degree of exchange rate variation and monetary autonomy, as reflected in the measurable and persistent inflation differentials between ERM members outside of the hard-DM core. Matti Vanhala's June 1998 appointment to head the Bank of Finland was dropped, however, as the adoption of the euro was imminent, all but eliminating any variability in the markka-DM exchange rate.

11. When Klaus Liebscher left the presidency of the Austrian National Bank in 1998 to join the General Council of the European Central Bank, the *Financial Times* quipped that he would have a "proper" job for the first time since he took over as head of the Bank 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" (Hall 1998).

formally took office. Unfortunately, these announcement dates are not documented in any official sources, requiring us to turn to published news sources available electronically through LexisNexis, Factiva, and other online repositories. In the end, announcement dates for 50 central bank appointments were determined through this process.

2.1 *Defining and Classifying Events*

There is considerable variation in the circumstances surrounding the 50 appointments in the dataset, making for a fairly heterogeneous set of events. Some are orderly transitions to a widely anticipated successor, while others are more abrupt or involve the appointment of a relative unknown. All but one are plausibly exogenous with respect to financial market activity, in the sense that they were not precipitated by a sudden change in the exchange rate or bond yield. The lone exception is the resignation of Finland's Rolf Kullberg in a public tiff over monetary policy in 1992, a dispute that resulted in a spike in the Helibor rate of nearly four percentage points.[12] Sirkka Hamalainen's appointment to replace Kullberg took place in the midst of this turmoil, but it would be inaccurate to say that Hamalainen's appointment *caused* the observed financial market gyrations. We therefore drop the Hamalainen event from the analysis to guard against reverse causation. Because the appointment was associated with a 3.3 standard deviation appreciation of the markka, dropping this observation will weaken the evidence for a significant aggregate financial market response.

We distinguish between events along two dimensions in an effort to account for the differing circumstances surrounding the appointments. One dimension has to do with whether the transition to the new governor was *scheduled* or *unscheduled*. Scheduled transitions are those involving the expiration of a term or a planned retirement; by contrast, unscheduled appointments would be those in which the incumbent retired unexpectedly or was replaced. This is also a potentially useful distinction because, in cases where there is a lag between the two, the incumbent's departure and the announcement of the successor can be treated as two separate events—at least for those cases in which the date of the departure announcement can be determined. In addition to the 50 new governor announcements, there are 12 such unscheduled departures, yielding the 62 distinct events listed in Table 1; excluding the Hamalainen observation leaves 61.

Distinguishing between scheduled and unscheduled transitions is in most cases straightforward. Expirations of terms, planned retirements, and the like are generally matters of public record and thus easy to verify from press reports, central bank sources, and Pringle (2007). Cases in which the incumbent was eligible for reappointment, but did not receive it, are classified as unscheduled, on the grounds that the typical pattern is to serve an additional term, if allowed. Examples of events classified as unscheduled for this reason include the transitions from Arthur Burns

12. A contemporary press account described the dispute, and Kullberg's resignation, as sending a "shock wave through the Finnish money markets" (Webb 1992).

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TABLE 1

ANNOUNCEMENTS OF GOVERNOR DEPARTURES AND APPOINTMENTS

Governor	Date	Anticipated?	Weak/Strong	Exchange rate		Bond yield	
				$\%\Delta e$	$\%\Delta e/\hat{\sigma}_e$	$\%\Delta y$	$\%\Delta y/\hat{\sigma}_y$
Australia							
Fraser	7/5/1989	Y	W	−0.53	−0.70	15	1.4
MacFarlane	8/14/1996	Y	S	0.03	−0.09	5	0.63
Stevens	8/1/2006	Y	S	0.42	0.76	[illegible]	0.01
Canada							
Crow	12/17/1986	N	W	−0.02	−0.08	−4	0.63
Thiessen	12/22/1993	N	S	−0.60	−1.96	−10	−1.60
Dodge	12/20/2000	N	S	−0.03	−0.16	−5	−1.32
Finland							
Koivisto departure	6/14/1979		W	0.01	0.11		
Karjalainen	2/5/1982	Y	W	−0.50	−1.81		
Karjalainen departure	5/13/1983		W	0.16	0.33		
Kullberg	5/27/1983	Y	W	−0.38	−0.80		
Hamalainen	4/3/1992	N	W	−2.55	−3.29	−19	−1.14
France							
Clappier	6/12/1974	N	W	−0.81	−1.37		
De la Geniere	11/14/1979	N	W	0.28	1.24		
Camdessus	11/14/1984	N	W	0.00	−0.01		
Camdessus departure	12/17/1986		W	0.03	0.02		
De Larosiere	1/16/1987	Y	W	0.19	1.50	1	0.15
De Larosiere depart.	8/17/1993		S	−0.77	−2.77	6	1.41
Trichet	9/13/1993		S	−0.73	−2.64	−3	−0.33
Germany							
Emminger	3/9/1977		S	0.17	0.61		
Poehl	9/19/1979	Y	S	−0.33	−0.99		
Poehl departure	5/16/1991		S	0.41	0.32	−4	−0.70
Schlesinger	5/29/1991	Y	S	0.91	0.88	−3	−0.51
Tietmeyer	6/23/1993	Y	S	−0.21	−0.37	2	0.66
Italy							
Baffi	7/30/1975	N	W	−0.61	−1.47		
Ciampi	9/27/1979	N	W	0.46	1.83		
Ciampi departure	4/26/1993		W	−1.22	−2.07	−3	−0.30
Fazio	5/4/1993	N	W	−0.12	−0.29	−3	−0.30
Japan							
Mieno	11/22/1989	Y	W	0.07	0.07	−1	−0.21
Matsushita	11/10/1994	Y	W	0.14	0.38	0	−0.14
Matsushita departure	3/12/1998		W	−0.04	−0.04	2	0.70
Hayami	3/16/1998	N	W	0.91	1.22	−4	−1.09
Fukui	2/24/2003	N	W	−0.85	−1.50	−2	−0.62
New Zealand							
Brash	6/14/1988	N	W	0.53	0.90		
Brash departure	4/26/2002		S	0.20	0.40	−8	−1.42
Bollard	8/22/2002	N	S	0.22	0.43	3	0.41
Norway							
Moland departure	11/17/1995		W	0.09	0.40		
Storvik	2/23/1996	Y	W	−0.05	−0.18	−19	−4.66
Gjedrem	10/2/1998	N	W	1.74	2.78	−1	−0.17
Portugal							
Constancio departure	3/24/1986		W	−0.69	−1.37		
Moreira	5/16/1986	N	W	0.28	0.45		
Beleza	4/9/1992	Y	W	−0.26	−0.93		
De Sousa	6/23/1994	N	W	−0.15	−0.62	−14	−1.41
Spain							
Rubio	7/20/1984	Y	W	−0.59	−1.12		
Luis Rojo	6/29/1992	N	W	0.45	1.96	8	1.43

(Continued)

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TABLE 1
CONTINUED

Governor	Date	Anticipated?	Weak/Strong	Exchange rate		Bond yield	
				$\%\Delta e$	$\%\Delta e/\delta_e$	$\%\Delta y$	$\%\Delta y/\delta_y$
Sweden							
Dennis	10/1/1982	N	W	0.10	0.27		
Baeckstroem	11/3/1993	N	S	0.00	−0.09	−13	−0.68
Heikensten	6/13/2002	Y	S	−0.19	−1.02	−7	−1.14
Heikensten departure	9/29/2005		S	−0.53	−2.12	3	0.88
Ingves	10/11/2005	N	S	−0.02	−0.17	2	0.60
Switzerland							
Leutwiler	3/15/1974	Y	S	0.15	0.45		
Leutwiler departure	6/13/1984		S	0.01	0.07		
Languetin	10/31/1984	Y	S	−0.04	−0.24		
Lusser	9/10/1987	Y	S	0.08	0.44		
Meyer	10/26/1995	N	S	−0.21	−1.12		
Roth	9/18/2000	N	S	−0.21	−0.64	4	1.10
United Kingdom							
Leigh-Pemberton	12/23/1982	N	W	1.15	2.49	−1	0.08
George	1/22/1993	N	W	0.64	0.59	3	0.42
King	11/27/2002	Y	S	−0.36	−0.89	0	−0.01
United States							
Miller	12/28/1977	N	W	1.17	2.62	1	0.25
Volcker	7/25/1979	N	W	−0.80	−2.47	−2	−0.52
Greenspan	6/2/1987	N	W	1.65	2.23	27	3.52
Bernanke	10/24/2005	Y	W	0.33	0.67	6	1.29

NOTES: The table lists the events (announcements of new governors plus unscheduled departures) used in the analysis. For new appointments, the column labeled "Anticipated?" indicates whether the identity of the appointee was anticipated in advance of the announcement. Weak monetary policy frameworks are distinguished by a "W" in the column labeled "Weak/Strong." For the exchange rate, positive numbers correspond to depreciations. The Hamalainen observation is included for reference, but excluded from the analysis.

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to William Miller in the United States, and from John Crow to Gordon Thiessen in Canada.

We also distinguish between events according to whether the identity of the new governor was known in advance of the official announcement. The reason for doing so is to differentiate between those announcements that contain "news" and those that are merely the ratification of a *fait accompli* already anticipated by the markets. The distinction is crucial for the purposes of this paper, as efficient financial markets should respond to the information contained in surprise appointments, but not those that are widely anticipated.

These distinctions allow us to partition the 61-event sample into three nonoverlapping subsamples. One consists of 12 resignations and other unscheduled departures. The second includes the 29 announcements of new governors whose identities were not known ahead of time, and the third consists of 20 appointments in which the appointee's identity was widely anticipated. Dividing the sample in this way will allow us to determine whether the market reacts to attributes specific to the incoming governor, or to *any* turnover in the governor's post. It will also enable us to verify the efficient-markets implication that markets respond only to new information.

Discerning the extent to which the new governor's identity was known in advance is a challenge, as there is no direct means to divine the market's expectation of the next

central bank governor.[13] In the absence of market data, we rely on press accounts during the period leading up to and including the announcement date. Often, the accounts are very clear as to whether the appointment was as expected; in others, some judgment is required.[14] Preventing sample selection bias naturally requires that this judgment be based exclusively on external sources, such as contemporary press accounts, and not on the financial market reaction itself.

This classification method is admittedly somewhat subjective and based on limited information. Some errors are therefore inevitable.[15] Fortunately, the possibility of classification errors should not undermine the results. Misclassifying anticipated appointments as "surprises" should tend to attenuate the measured response to announcements, biasing the results *against* finding a significant reaction to central bank appointments. It is therefore unlikely that any such random misclassification would result in the spurious rejection of the "no reaction" null hypothesis, although it could lead to the erroneous conclusion that anticipated announcements generated reactions.

Another important question is whether the monetary policy framework affects the strength of the markets' response to new appointments. As discussed earlier in Section 2.3, there is good reason to suspect that it does: the policy pursued by an independent central bank with a well-defined nominal anchor is less likely to be influenced by the governor's preferences than one lacking those two features.

One could make a number of distinctions along these lines, and in the ideal world it would be interesting to distinguish between inflation targeters and nontargeters, for example, or between those with money targets and those without. The relatively small number of observations precludes such fine-grained distinctions, unfortunately; instead, we make a cruder distinction between "strong" and "weak" policy frameworks. Strong frameworks satisfy two criteria: First, the central bank must enjoy at least partial autonomy, as defined in Kuttner and Posen (2001).[16] And second, the framework must include an explicit nominal anchor, such as an inflation target or an operational intermediate money target. The United Kingdom, post-1997, and New Zealand, post-1989, are well-known examples of the former; pre-European Monetary Union Germany and Switzerland are examples of the latter. Central banks not

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13. At least not until recently: in 2005, the betting site Intrade.com offered a futures contract allowing investors to take positions on Greenspan's successor. According to Intrade, Bernanke was the favored candidate, in the weeks leading up to the appointment, with a 40% probability of appointment; but Martin Feldstein and Glenn Hubbard were also thought to be serious possibilities, with probabilities of 27 and 20%, respectively (Pethokoukis 2005). This is consistent with the view of Meyer and Sack (2005) who, writing at the end of August 2005, observed that "none of the candidates on the list has even emerged as a clear favorite."

14. In the case of Mervyn King's initial appointment to head the Bank of England, for example, the press accounts suggest that, although King was the clear front-runner, Andrew Crockett was also a possibility. But because King was so heavily favored, his appointment is coded as "known in advance."

15. In the absence of a large textual database, automated algorithms like those used by Lucca and Trebbi (2009) and Bokus and Rosenberg (2006) are obviously not feasible.

16. Specifically, to be classified as fully autonomous, a central bank must be under no obligation to finance government spending, and the governor cannot be dismissed without cause. Banks meeting one of these two conditions are classified as partially autonomous.

satisfying both criteria are classified as having weak policy frameworks.[17] The column labeled "W/S" in Table 1 gives the framework in effect at the time of the event (W for weak, S for strong).

2.2 *Financial Data*

Having identified a set of events, as well as several interesting subsets, the next step is to assemble high-frequency exchange rate and bond yield data. The daily exchange rate data were taken from the Federal Reserve's H.10 release. For the nine European countries in the sample (other than Germany), the exchange rate is the bilateral rate relative to the Deutsche mark. For Germany, and the other non-European countries in the sample, the bilateral exchange rate with the United States is used; the U.S. exchange rate is relative to the Deutsche mark (the euro, post 1999).[18]

We obtained daily bond yields from a number of different sources. Some were reported by the central banks themselves, while others were collected by the Federal Reserve Bank of New York. All represent are the yields on benchmark long-term government securities, typically of a 10-year maturity. The availability of high-frequency bond yield data is limited, however, as liquid long-term bond markets are a relatively recent development in many countries in our dataset. Consequently, bond yields are available for only 37 of the 61 events.

3. MEASURING THE MARKET RESPONSE TO APPOINTMENTS

An important consideration in gauging the markets' response to central bank appointments is that the news may move the markets in *either* direction, depending on the nature of the information conveyed by the appointment. The unexpected appointment of a governor with a preference for very low inflation, for example, would be expected to strengthen the exchange rate, while the appointment of one who was perceived to be soft on inflation would generate the opposite response. The challenge is to determine the extent to which markets perceive that the incoming governor will bring with him or her a shift in policy, while remaining agnostic on the direction of that shift.

3.1 *A Simple Statistical Framework*

A stylized statistical model will make this idea more precise. We hypothesize that on days without appointment announcements, the change in the relevant financial

17. Although the U.S. Federal Reserve published monetary aggregate targets throughout much of the 1970s and 1980s, Friedman and Kuttner (1996) showed that these targets had no discernible impact on the conduct of monetary policy at the times of the appointments. Consequently, despite the Fed's high level of independence, the United States is defined as having a weak framework.

18. It might seem at first that using the Federal Reserve exchange rate data, which are collected at noon Eastern time, would complicate the analysis—but the timing is such that announcements taking place during normal business hours in both Europe and Asia would be reflected in the Fed's data.

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variable can be described as a stochastic shock, ε, embodying the impact of nonappointment related news on the financial markets. On appointment days, the financial markets receive the usual shock ε, plus a second shock, η, incorporating the information content of the appointment. Specifically, we assume that the asset return, R_t, obeys:

$$R_t = \begin{cases} \varepsilon_t & \text{for nonannouncement days} \\ \varepsilon_t + \eta_t & \text{for announcement days.} \end{cases} \tag{5}$$

The null hypothesis of interest is therefore that $\sigma_\eta^2 = 0$. To the extent that $\sigma_\eta^2 > 0$, the variance of R would be higher on announcement days, and this would be consistent with the hypothesis that announcements contain information of relevance to the financial markets.

The specification readily encompasses a situation in which only some subset of the announcements is perceived to contain information. For whatever reason, some appointments—even among those classified as newsworthy—probably convey little or no new information. This could be the case for a variety of reasons. The new appointee's preferences might be perceived as similar to his or her predecessor's, for example; or, the announcement may have been misclassified or dated incorrectly. This can be captured with a minor generalization of equation (5), in which only some fraction α of appointment days is associated with the arrival of news in the form of an η shock; the remaining $1 - \alpha$ fraction would receive only the ε shock. In this case, the variance of appointment days would still be higher than that of other days, but the difference would be smaller to the extent that $\alpha < 1$.

3.2 Estimation Methods

Our focus on financial markets' response to a number of discrete announcements makes this an event study analysis. One common method used in this context is that described in MacKinlay (1997), and applied to macroeconomic announcements by Almeida et al. (1998) and Andersen et al. (2003), among others. This is based on a standard time-series regression of the form

$$R_t = \beta_0 + \sum_{m=1}^{M} \beta_m R_{t-m} + \sum_{k=1}^{K} \sum_{j=1}^{J} \gamma_{kj} S_{k,t-j} + u_t \tag{6}$$

where R is the asset return, S_k is the kth announcement, t indexes time, and u_t is the error term.

A second widely used approach involves a regression on a sample limited to a discrete set of events,

$$R_i = \beta_0 + \gamma S_i + u_t \tag{7}$$

where R and S again represent the asset return and the announcement, but the unit of observation is the *event* (meetings of the Federal Reserve's Federal Open Market

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Committee, for example) rather than the time period. Cook and Hahn (1989), Kuttner (2001), Gürkaynak et al. (2005a,c), Bernanke and Kuttner (2005), Fatum and Scholnick (2006), and Beechey and Wright (2009), among others, have used this method to estimate financial markets' responses to macroeconomic news and changes in the Federal Reserve's funds rate target.

Our analysis has three unusual features that make these standard methods not directly applicable. First, as noted above, we are interested in detecting an unusually large market reaction in either direction: for some governors the relevant γ may be positive, while for others it may be negative. Second, the time series dimension of the data spans several decades, rather than the relatively short time periods typically analyzed in the macro announcement literature, and there is also a cross sectional dimension to the data. This means that the error term u is likely to exhibit heteroskedasticity, as the variances of exchange rates and bond yields will surely depend on country-specific features and the prevailing monetary policy framework (e.g., managed vs. freely floating exchange rates). And third, unlike macro data releases and interest rate changes, our announcement series is a binary variable—either an appointment occurs, or it does not. This rules out the second of these conventional approaches, as the variance of the independent variable would be zero for the set of event days.

We propose instead two slightly nonstandard approaches for assessing the information content of governor announcements. The first is a modification of Equation (6) in which the dependent variable is the absolute value of the change in the financial variable, divided by an estimate of its standard deviation: $\tilde{R}_t^e = (|\Delta \ln e_t|)/\hat{\sigma}_e$ for the exchange rate, and $\tilde{R}_t^y = (|\Delta y_t|)/\hat{\sigma}_y$ for the bond yield. The reasons for defining the dependent variable in this way are twofold. First, using the absolute value as the dependent variable allows announcements to affect the magnitude of interest rate and exchange rate changes, regardless of their direction. Dividing the variable by a suitable estimate of the standard deviation takes into account the differences over time and across countries in the volatilities of exchange rates and interest rates.[19] (These normalized changes are listed in Table 1.) Second, the transformation means we can interpret the coefficients in terms of number of standard deviations. The coefficients of interest are the γs on the dummy variables D. One dummy variable is set to 1 on announcement days, and additional dummies are created by the interaction of this announcement dummy with other binary variables corresponding to the event classifications discussed earlier in Section 3.1.

The modified version of equation (6) used in our analysis is

$$\tilde{R}_{it}^a = \beta_0 + \beta \tilde{R}_{i,t-1}^a + \sum_{j=1}^{2} \sum_{k=1}^{K} \gamma_{kj} D_{i,k,t-j} + u_t, \tag{8}$$

in which the i indexes the country, t indexes the day, and a indexes the asset (y or e). The sample consists of 120-day windows of data prior to and including

19. This is similar to a weighted least squares procedure, except the intercept is not also divided by the standard deviation.

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the announcements, stacked for the 61 events.[20] In principle this yields a sample of 7320 observations, although some observations are lost to holidays.[21] The same 120-day window, excluding the two days before the announcement, is used for the calculation of the $\hat{\sigma}_e$ and $\hat{\sigma}_y$.

We also use a second approach based directly on equation (5), comparing the volatility of R realizations on announcement versus nonannouncement days. One way to do this is simply to count the number of unusually large realizations, "large" being defined as exceeding the critical value associated with a given tail probability. If the suitably normalized ys were distributed normally, for example, under the null hypothesis that $\sigma_\eta^2 = 0$ (or $\alpha = 0$), the expected value of the share exceeding 1.645 will be 0.10. The binomial distribution can be used to determine critical values for the number of observations exceeding the threshold. Another way to estimate announcement-day volatility involves calculating the sum of the squared R realizations. If exchange rate and bond yield changes were distributed normally, then the sum of the normalized changes ($\sum_{i=1}^{N}[(\Delta \ln e_t)/\hat{\sigma}_e]^2$ for example) would follow a χ_N^2 distribution under the null hypothesis.

These two procedures are based on the assumption that the Rs are independent across countries and time. This condition is quite likely to hold in practice, as the events are separated by both space and time; that is, there is no reason to believe that a change in the Finnish exchange rate in May 1983, for example, would affect the conditional expectation of a change in the Swiss exchange rate in October 1984.

Unfortunately, exchange rate and bond yield changes are not distributed normally; both are skewed and leptokurtotic. To account for this, we used bootstrapped critical values instead of those derived from the normal distribution. The bootstrap procedure involved sampling with replacement normalized exchange rate and bond yield realizations from the population consisting of the combined 120-day windows. The critical values of the sum-of-squares and tail-based tests correspond to the fractiles of the empirical distribution of the test statistics, based on 10,000 replications. Not surprisingly, the bootstrapped critical values for the sum of squares statistic tend to be larger than those based on the χ^2 distribution. For exchange rates, for example, with $N = 60$ the 5% threshold is 91, versus 79 for the χ^2. For the tail-based test, the differences between the bootstrapped and theoretical critical values are relatively small.

These sum-of-squares and tail-based tests have reasonably good power in moderately large samples. Unreported Monte Carlo simulations (under the assumption of a normal distribution) show that with $N = 200$, the sum-of-squares test rejects the no-reaction null with probability 0.8 when $\alpha = 0.3$. The tests' power falls off markedly as the sample size shrinks, however. The rejection rate falls to 0.5 for $N = 60$, and for $N = 20$, the rate is only 0.25. The lack of financial data for many of the appointments in the sample will therefore limit our ability to discern a significant market impact.

20. We obtain very similar results with window sizes of 90 and 180 days.

21. In two cases, there were insufficient pre-announcement bond yield data, and so a 120-day windows beginning ten days following the announcement were used instead.

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TABLE 2

REGRESSION TESTS FOR AN EXCHANGE RATE REACTION

	(a)	(b)	(c)	(d)	(e)
Intercept	0.63***	0.63***	0.63***	0.63***	0.62***
Lagged dependent variable	0.13***	0.13***	0.13***	0.13***	0.13***
Announcement dummy	0.17*	0.16*			
Lagged announcement	0.14				
Unknown × announce			0.34***		
Known × announce			−0.05		
Departure × announce			0.11		
Weak × announce				0.25**	
Weak (no U.S.) × announce					0.24*
Strong × announce				0.04	−0.05

NOTES: The dependent variable in each regression is the absolute value of the one-day percentage (logarithmic) change in the exchange rate, divided by an estimate of the standard deviation from the pre-announcement window. The sample consists of 120-day windows prior to and including the announcement for 61 events, a total of 6545 usable observations. Superscripts indicate the level of statistical significance: *** for 1%, ** for 5% and * for 10%.

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3.3 *Results for the Exchange Rate*

Table 2 displays the results for the regression-based tests involving the exchange rate. Column (a) shows the results for the full 61-event sample from a regression that includes two lags of the announcement. The statistical insignificance of the lagged announcement dummy indicates that responses tend to occur only on the day of the announcement, and dropping the second lag leaves the coefficient on the contemporaneous announcement virtually unchanged. The full-sample 0.16 parameter estimate shown in column (b) has the expected positive sign, indicating a tendency for larger exchange rate movements on announcement days. The effect is relatively small, however, and significant at only the 10% level.

We obtain much stronger results when we divide the sample according to the circumstances of the appointment, and the tests soundly reject the no-reaction null hypothesis for those cases in which the appointee's identity was not known in advance. As shown in column (c), the response to an unknown appointee is 0.34—double the full-sample estimate—and the estimate is now statistically significant at the 1% level. Consistent with the efficient markets principle, there is no significant response either to departures, or to widely anticipated appointments.

The volatility tests shown in Table 3 corroborate the regression-based results. As shown in row 1, the full-sample evidence of a reaction is somewhat stronger than it was for the regression-based tests. The tail-based test is especially striking, with a highly significant 13 appointments (21%) associated with exchange rate changes in in excess of 1.645. For unknown appointees (row 2), the sum-of-squares statistic of 56.8 rejects the no-reaction null hypothesis at the 5% level, and the tail-based test rejects it at the 1% level.

We also obtain stronger results when we partition the sample according to the type of monetary framework and, as hypothesized, there is evidence of a more pronounced reaction for those with weak frameworks. As shown in column (d) of Table 3, the

TABLE 3

SUM OF SQUARES AND TAIL TESTS FOR AN EXCHANGE RATE REACTION

		SOS	Tail	SOS	Tail	SOS	Tail
1.	All announcements (61)	96.4**	13***				
2.	Identity unknown (29)			56.8**	8***		
3.	Identity known (20)			20.7	2		
4.	Departures (12)			18.9	3*		
5.	Weak frameworks (37)					66.1**	9***
6.	Weak, excluding U.S. (33)					47.7*	6
7.	Strong frameworks (24)					30.5	4

NOTES: The numbers in the columns labeled "SOS" are the sum-of-squares test statistics, while the numbers in the columns labeled "Tail" are the tail-based statistics based on the number of observations exceeding 1.645. The figures in parentheses are the number of announcements in each category. Superscripts indicate the level of statistical significance: ** for 5% and * for 10%. A bootstrap procedure is used to determine the critical values.

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announcement dummy is statistically significant at the 5% level or better for the weak frameworks. Just as important, the response for strong frameworks is economically and statistically insignificant.

The volatility tests in Table 3 again confirm the regression results. The sum-of-squares statistic for weak frameworks rejects the no-reaction null at the 5% level, and a statistically significant nine unusually large (exceeding 1.645 standard deviations) reactions are observed in this subset of central banks. Neither statistic can reject the null for the set of central banks with strong frameworks.

One possible objection is that the results for the weak policy framework are unduly influenced by Federal Reserve appointments, three of which—those of Miller, Volcker, and Greenspan—generated exchange rate changes in excess of two standard deviations. To verify that this is not the case, we recalculated the test statistics for those central banks classified as having a weak framework, excluding the observations corresponding to the four Fed appointments. The results, displayed in column (e) of Table 2 and row 7 of Table 3, show that the U.S. experience is not anomalous. Excluding these four observations leaves the parameter estimates virtually unchanged. And even with these four observations deleted, the null of no reaction is rejected, albeit at only the 10% level.

5.4 *Results for the Bond Yield*

Several large bond yield movements are apparent in Table 1. The most conspicuous of these is the 27 basis point (3.5 standard deviation) jump on the day of with Alan Greenspan's appointment, apparently on fears that he would be too soft on inflation.[22] The statistical analysis indicates that such reactions are not pervasive, however, and neither set of tests reported in Tables 4 and 5 lends much support for a consistent bond market reaction. This is perhaps not surprising given the relatively small number of observations (37) for which bond yields are available.

22. Meyer and Sack (2005) characterized the episode as an "inflation scare."

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TABLE 4

REGRESSION TESTS FOR A BOND YIELD REACTION

	(a)	(b)	(c)	(d)	(e)
Intercept	0.68***	0.69***	0.69***	0.69***	0.67***
Lagged dependent variable	0.09***	0.09***	0.09***	0.09***	0.10***
Announcement dummy	0.09	0.09			
Lagged announcement	0.03				
Unknown × announce			0.25*		
Known × announce			−0.22		
Departure × announce			0.16		
Weak × announce				0.04	
Weak (no U.S.) × announce					−0.12
Strong × announce				0.34	0.08

NOTES: The dependent variable in each regression is the absolute value of the one-day percentage (log difference) change in the exchange rate, divided by an estimate of the standard deviation from the pre- announcement window. The sample consists of 120-day windows prior to and including the announcement for 37 events, a total of 3932 usable observations. Superscripts indicate the level of statistical significance: *** for 1%, ** for 5% and * for 10%.

TABLE 5

SUM OF SQUARES AND TAIL TESTS FOR A BOND YIELD REACTION

		SOS	Tail	SOS	Tail	SOS	Tail
1.	All announcements (37)	63.3**	3				
2.	Identity unknown (19)			29.6	2		
3.	Identity known (12)			27.9	1		
4.	Departures (6)			5.8	0		
5.	Weak frameworks (20)					45.3**	2
6.	Weak, excluding U.S. (16)					30.8*	1
7.	Strong frameworks (17)					18.0	1

NOTES: The numbers in the columns labeled "SOS" are the sum-of-squares test statistics, while the numbers in the columns labeled "Tail" are the tail-based statistics based on the number of observations exceeding 1.645. The figures in parentheses are the number of announcements in each category. Superscripts indicate the level of statistical significance: ** for 5% and * for 10%. A bootstrap procedure is used to determine the critical values.

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In the regression-based results presented in Table 4, the coefficient on the announcement dummy is statistically significant only in the case of the appointment of a governor whose identity was not known ahead of time (column c), and even then it is significant at only the 10% level. The tests based on the sum of squares statistic in Table 5 are slightly more encouraging. In this case, the null of no reaction is rejected at the 5% level for the full sample (row 1), and also for the "weak framework" subsample (row 5). The reaction is even significant when the United States—and the Greenspan observation—are excluded (row 7). The tail-based results are weaker, however, and in no case is the share of reactions exceeding the 1.645 critical value significant at even the 10% level. The fact that two of the three unusually large reactions in the sample are quantitatively very large (three and four standard deviations) may account the strength of the results based on the sum-of-squares statistic, compared with the tail-based test.

3.5 Discussion

Having established a *statistically* significant financial market response to new governor appointments, at least for exchange rates, a fair question is whether the results are also *economically* meaningful. One indicator of economic significance is the substantial proportion of appointments associated with large reactions. The tail-based tests statistics presented earlier suggest that there is a 24% probability of observing a 1.645 standard deviation exchange rate movement on the appointment of an unknown, compared with a 10% probability on nonannouncement days.[23] (For reference, a 1.645 standard deviation exchange rate movement for the United States in 2005 corresponded to a change of 0.9%; for the United Kingdom in 1993, the analogous figure is 1.5%.)

The regression results also lend themselves to a straightforward interpretation, where the relevant comparison is between the estimated intercept and dummy variable coefficients. For the exchange rate's response to unanticipated appointments, the estimated dummy coefficient of 0.35 says that the mean absolute deviation of the exchange rate change is 56% larger than the 0.62 deviation on nonannouncement days.

A third way to assess the results' quantitative significance uses the sum-of-squares statistic. The standard deviation of the normalized nonevent day is 1 by construction, and from Equation (5), the event-day standard deviation is $1 + \sigma_\eta^2$. The sum-of-squares statistic can therefore be used to calculate the standard deviation of the η shock,

$$\hat{\sigma}_\eta = \sqrt{\widehat{\text{var}}(R) - 1}.$$

For the exchange rate, for example, the "unknown announcement" test statistic of 56.8 from Table 3 implies $\hat{\sigma}_\eta = 0.9\%$, roughly the same magnitude as the nonannouncement day news shock ϵ.[24]

Having established that central bank appointments are perceived to contain information relevant to exchange rates, the next question is whether the observed reactions tend to go systematically in one direction or the other. In particular, we would like to determine whether there is any evidence to support the "weak until proven strong" hypothesis discussed above in section 2.3: if true, then the responses should be consistent with a jump in expected inflation (a depreciation of the currency and higher bond yields). Regressing the changes in the exchange rate and bond yield on the announcement dummies will reveal whether this is actually observed in the data.

Table 6 reports the results from this regression. The main finding here is a negative one, with no consistent pattern in the responses to new governor announcements. In the full sample, the average appointment-day change in the exchange rate is a statistically insignificant appreciation of 0.16 standard deviations. (Resignations and

23. In the population used for the bootstrap, only 9% of the changes exceeded 1.65 standard deviations.

24. The implied shock variance would of course be larger if only a subset of announcements actually contained information.

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TABLE 6

EXCHANGE RATE AND BOND YIELD CHANGES ON ANNOUNCEMENT DAYS

	Exchange rate			Bond yield		
	(a)	(b)	(c)	(d)	(e)	(f)
1. Intercept	0.0003	0.0003	0.0003	−0.002	−0.002	−0.002
2. Lagged dependent variable	−0.05***	−0.05***	−0.05***	0.03*	0.03*	0.03*
3. Announcement dummy	−0.16			0.01		
4. Unknown × announce		0.16			−0.01	
5. Known × announce		−0.31			0.08	
6. Departure × announce		−0.58**			−0.01	
7. Weak × announce			0.06			0.21
8. Strong × announce			−0.48**			−0.21

NOTES: The dependent variables are the one-day changes in the exchange rate and bond yield, each divided by an estimate of its standard deviation from the pre-announcement window. The sample consists of 120-day windows prior to and including the announcement for 61 countries, a total of 6545 usable observations for the exchange rate, 3932 for the bond yield. Superscripts indicate the level of statistical significance: *** for 1%, **for 5% and * for 10%.

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strong frameworks appear to be associated with statistically significant appreciations, but this odd result is entirely attributable to De Larosière's departure and Trichet's appointment a month later.) None of the coefficients in the bond yield regressions is statistically significant.

Perhaps the most puzzling aspect of the results is the failure to find a consistently significant response of bond yields in light of the strong reaction of the exchange rate. A purely statistical reason for this is the limited availability of daily bond yield data: 37 observations, compared with 61 for the exchange rate. There may also be an economic explanation for the bond market's less pronounced reaction. As noted above in section 2.2, an increase in the central bank's degree of conservatism (defined as the weight on inflation in the objective function) has an *a priori* ambiguous effect on the bond yield. Tighter monetary policy will lead to a higher real interest rate for some period of time, and a higher nominal rate to the extent that inflation adjusts gradually. Over a longer horizon, however, bond yields should fall as the inflation rate declines. By contrast, the effects of an increase in conservatism on the exchange rate are unambiguous: tighter policy increases both the relevant interest rate differential *and* the equilibrium value of the currency implied by purchasing power parity. A plausible interpretation of the results, therefore, is that the markets' reactions are driven primarily by perceptions of the appointees' conservatism, and less by inferences about the new governors' long-run inflation objectives.

4. CONCLUSIONS

This paper has investigated the question of whether the appointment of a new central bank governor, or the departure of the incumbent, affects financial markets—and if so, why. To address this question, we assembled a unique dataset consisting of the

announcement dates of appointments and unscheduled departures and merged it with high-frequency data on exchange rates and bond yields.

Our first conclusion is that the foreign exchange market *does* seem to care who chairs the central bank. We tend to observe larger-than-normal changes in the exchange rate on the days of announcements, and these changes are larger for unanticipated appointments. The results are mixed for the bond market, with weak evidence at best of a larger-than-normal response. This could be due either to the offsetting effects on real interest rates and inflation caused by changes in the degree of the central bank's conservatism, or to the relatively small number of observations for bond yields.

Second, the exchange rate reaction tends to be larger for central banks with weak monetary policy frameworks compared with those with strong frameworks, defined as some degree of independence plus an operational domestic nominal anchor. This suggests that strong policy frameworks effectively stabilize inflation expectations, thus corroborating the analysis of Gürkaynak et al. (2005b) and Levin et al. (2004) for inflation-targeting central banks. It would, of course, be interesting to further partition the sample on other criteria, such as the size and structure of the policymaking committee, but the relatively small number of observations in our sample precludes a more fine-grained analysis.

Third, we find no systematic tendency for bond yields to rise, or the exchange rate to depreciate, in response to the announcement of a new governor; nor is there a significant negative response to the unscheduled departure of the incumbent. These findings contradict the "weak until proven strong" view sometimes expressed in the academic literature and in the business press. The lack of support for this hypothesis suggests that financial market participants tend to sift through the available information on the new governor in an effort to form an unprejudiced (but not necessarily correct *ex post*) inference regarding the appointee's likely policy preferences. This conclusion supports and generalizes that of Meyer and Sack (2005), who infer, based on their case study of the Greenspan appointment, that the Federal Reserve's credibility is largely tied to the credentials of the its chairman.

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