One Central Bank to Rule Them All

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Abstract

While global stock markets enjoy high returns on days surrounding FOMC meetings, there is no comparable result for other central banks either internationally or, more surprisingly, domestically. Neither announcement surprises nor currency moves drive these findings, which hold even for stocks with a domestic focus. The difference in announcement premia is not explained by economy size, exposure to multinationals, or policy activism. We conclude that the Fed exerts a unique impact on global equities. Consistent with this hypothesis, uncertainty drops across global markets following FOMC announcements but not those of other central banks. Furthermore, the Fed is generally the leader among central banks in setting monetary policy.

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1. Introduction

Central bank policies have a large impact on securities markets. Equity prices respond strongly to Federal Open Market Committee (FOMC) interest rate decisions (Bernanke and Kuttner (2005)). Investors also demand a high premium to bear risks associated with scheduled FOMC announcements: average stock market returns and Sharpe ratios in the U.S. are 20-40 times higher on days with such announcements relative to non-announcement days (Savor and Wilson (2013); Lucca and Moench (2015)), an effect that is much larger than for other macroeconomic announcements.[1] Furthermore, on FOMC announcement days, the Capital Asset Pricing Model (CAPM) explains the cross-section of stock returns, with a strong positive relation between market beta and returns (Savor and Wilson (2014)).[2]

In this paper, we study how and why announcement risk premia vary globally across major central banks. We focus our analysis on the Federal Reserve (Fed), the Bank of England (BoE), the Bank of Japan (BoJ), and the European Central Bank (ECB), but later also extend it to other central banks. During the 1998-2016 period, these four central banks were all independent and held regular, scheduled meetings after which they announced their decisions about current monetary policy, including changes to target interest rates, monetary aggregates, and planned asset purchases. All four central banks pursued an active monetary policy over this period, and all four associated free-floating currency zones possess large, liquid, and active equity markets, both by turnover and market capitalization.

We begin by showing that high equity returns around monetary policy announcements are a phenomenon that is unique to the Fed. In Figure 1, each panel presents the difference between average stock market excess returns for the countries associated with our four major central banks (Germany in the case of the ECB) over a two-day window sur-

[1] In addition to FOMC announcements, Savor and Wilson (2013) document a positive risk premium in U.S. equity markets for inflation and employment announcements. Jones, Lamont, and Lumsdaine (1998), Savor and Wilson (2013), Faust and Wright (2009), and Balduzzi and Moneta (2015) find positive risk premia in fixed income markets for various macroeconomic announcements. Savor and Wilson (2014) and Mueller, Tahbaz-Salehi, and Vedolin (2017) find high average returns for different forms of the carry trade on various announcement days.

[2] A number of recent asset pricing papers explore the link between monetary policy and risk premia. See, for example, Drechsler, Savov, and Schnabl (2018b) and Shaliastovich and Yamarthy (2015).

rounding the relevant central bank's scheduled announcements and average excess returns on non-announcement days (also over two-day windows for comparison purposes). In the top left panel, we can see a strong FOMC effect on average excess returns for all four stock markets, in line with previous work (Lucca and Moench (2015) and Cieslak, Morse, and Vissing-Jorgensen (2018)). By contrast, as the remaining three panels show, there are no comparable results for the BoE, BoJ, and ECB. The equity returns on announcement days for these central banks are similar in magnitude to and not statistically different from returns on non-announcement days, which themselves are close to zero. Surprisingly, for the non-U.S. central banks, there is no announcement premium even in their home market. Investors in Germany, Japan, and the United Kingdom seem to demand a high premium for risks associated with FOMC decisions but no premium at all for risks associated with decisions by those countries' own central banks.

[FIGURE 1 ABOUT HERE.]

More generally, we find a strong FOMC effect in almost all international stock markets, and it is on average similar to that in the U.S. itself. The global average market excess return is 43.4 bps over a two-day FOMC window compared to 3.3 bps on non-announcement days, and the difference is positive (and significant) in 37 (26) out of 38 countries.[3] At the same time, there is virtually no effect for the three other major central banks, whose announcements do not command a risk premium in a large majority of stock markets, including all major ones.

While it is natural to focus on central banks representing large, globally important economies, these results hold more broadly. We study announcement premia in eight more countries covering different geographic regions and at different stages of development: Australia, Brazil, Canada, Indonesia, Mexico, South Korea, Switzerland, and Turkey. The

[3]It is not necessarily surprising that, conditional on returns being high in the U.S. on a given day, returns during the same period are also high in other markets. However, the key distinction between announcement days and "regular" trading days with high returns is that the former can be identified ex ante. On announcement days, we can therefore more plausibly identify the origin of the shock: the announcement itself.

domestic announcement premium is not statistically significant in any of these markets, and is negative more often than it is positive (at the same time, all eight enjoy a high FOMC announcement premium). There is also no domestic announcement premium during the 1973-1998 period for the Bundesbank, the German central bank widely considered as the predecessor of the ECB.

We next show that there exists a positive relation between global market beta and stock returns on FOMC announcement days. This result that the World CAPM captures the cross-section of global stock returns on announcement days is exclusive to the Fed, as there is no similar finding for other central banks, further suggesting a unique role for the Fed.

These are puzzling findings. Given the magnitude and near-universal presence of FOMC announcement premia, we would expect to see at least a moderate impact for other major central banks. Furthermore, if central bank announcements (or the signal those announcements offer about economic prospects) matter for stock prices, the effect should typically be the strongest for the domestic central bank.

Before conclusively attributing our results to different risk premia for FOMC announcements relative to those of other central banks, we need to explore a number of alternative explanations. One important concern is that during our sample period the Fed on average delivered good news for equities, so that the high FOMC announcement return reflects news rather than risk premia. Similarly, if other central banks on average delivered negative news, this could obscure any risk premia associated with their decisions. Contrary to these hypotheses, our findings remain the same both in terms of economic magnitudes and statistical significance when we control for announcement surprises. They also do not change if we measure returns in local currencies rather than U.S. dollars, showing that exchange rate movements do not drive the announcement effects we observe (although they do contribute to the FOMC effect). The results are broad-based and not limited to any particular types of stocks. Large, small, value, and growth stocks across countries all enjoy a positive and significant FOMC premium, while there is no corresponding premium for announcements by

other central banks.

Combined, our results raise an important question: why is the Fed so important to global investors compared to other central banks, even those in charge of monetary policy for comparable economies? We discuss and test a variety of potential answers.

One straightforward possibility is that the domestic economy associated with certain central banks is too small for its macroeconomic announcements to affect risk premia, even in their own markets.[4] This argument potentially holds for countries such as Switzerland or even the U.K., whose stock markets contain a large share of multinational firms that are not overly exposed to the local economy. It is, though, a less plausible hypothesis for a country like Japan or a whole region like the eurozone. Moreover, when we investigate other macroeconomic announcements outside the U.S., such as inflation and employment, we find in most cases a significant effect on average domestic stock market returns. Based on these findings, we conclude that economy size does not explain our results.

Since the U.S. is the largest economy in the world, a related concern is that many multinational firms headquartered in other countries have significant exposure to its economy. Fed decisions would affect these firms even if they had purely domestic impact. Given that multinationals represent a major fraction of total market capitalization in most countries, the global FOMC premium we observe may simply reflect the Fed's status as the central bank of the world's largest economy. However, we find that the premium exists even for an index of U.K. firms that are primarily focused on their domestic market, with a magnitude that is slightly larger than for the overall U.K. stock market. Furthermore, consistent with our previous findings, there is no premium associated with Bank of England announcements for this domestic U.K. index. These results suggest that FOMC announcement premia have a more complex origin that just direct firm exposure to economic conditions in the U.S.

Even if non-U.S. central banks potentially matter to investors, perhaps they choose not

[4]Macroeconomic announcements may matter both for the information they provide about the economy and as a tool to forecast future monetary policies. For example, Gilbert, Scotti, Strasser, and Vega (2017) develop a measure of the intrinsic value of a U.S. macroeconomic announcement, which is based on its ability to predict GDP growth, inflation, and the Federal Funds Rate.

to pursue an active monetary policy (or at least have not done so in the past), thereby greatly reducing investor uncertainty regarding their decisions. Contrary to this hypothesis, in the period we study all three major central banks outside the U.S. at times exhibit an avowedly activist policy, with large variations in interest rates as well as use of unconventional monetary policy tools. A related explanation is that these central banks actually pursue an active policy, but that their decisions are widely anticipated in advance, whether by design or inadvertently. In this scenario, there is little scope for the markets to be surprised by information released through scheduled announcements. To address this conjecture, we study futures-implied interest-rate changes for the euro, yen, and sterling. We find that ECB, BoJ, and BoE announcement days are all associated with much larger absolute changes in domestic interest-rate expectations than non-announcement days, which is consistent with the hypothesis that these central banks at least occasionally surprise investors. Consequently, central banks' level of activism or policy predictability likely do not account for the difference in announcement premia between the Fed and other central banks.

Finally, after ruling out economy size, exposure to U.S. economic conditions, and observable central bank policies as explanations for our results, we propose that the Fed may simply be unique among the world's central banks. One explanation for why the Fed is special is that it is the "world's central bank," whose policies have greater impact and wider reach than those of other central banks. Supporting this hypothesis, we show that implied volatility decreases across global equity markets following FOMC announcements, whereas for other central banks the effect exists only in their domestic market (crucially, these results hold controlling for announcement returns).[5] This result suggests that FOMC announcements provide new information (about future monetary policy, the Fed's policy function, and/or economic prospects) that is relevant to equity prices on a global scale, while the impact of other central banks is limited to their home market.[6]

[5] More broadly, Dew-Becker, Giglio, and Kelly (2017) detect strong linkages between realized and implied volatility in 19 markets and macroeconomic uncertainty.

[6] We also find that the the commonly assumed negative relation between equity returns and surprise interest rate cuts holds only for the Fed, in whose case the relation exists worldwide.

The Fed's ability to affect global developments may have its origin in the Fed's role as the leader in terms of setting monetary policy. In this case, its announcements would provide information about the direction of monetary policy not only for the U.S. but also worldwide, and therefore command a higher risk premium than announcements by other central banks. We show that FOMC announcements are associated with higher volatility of interest-rate expectations in Japan and the eurozone, while there is no such relation between announcements by other central banks and U.S. interest-rate expectations. This evidence is suggestive of a leading role for the Fed among central banks. The role extends beyond just setting interest rates, as we provide a number of examples of various central banks following the Fed's lead in other aspects of central bank operations.[7]

Overall, our results are consistent with the hypothesis that the Fed's actions have a greater and broader impact because of its special role in the global financial system. This hypothesis also fits with recent work on global financial cycles in capital flows, asset prices, and credit growth, which argues that one of the major determinants of these cycles is U.S. monetary policy (Rey (2013)).[8]

The rest of the paper is organized as follows. Section 2 describes our data and methodology. Section 3 presents our results on the risk premia associated with different central banks' announcements across global stock markets. Section 4 studies announcement returns in greater detail. Section 5 explores possible explanations for why announcement premia are high for the Fed but not for other major central banks. Section 6 concludes and discusses directions for further research. Details about data sources, time and date alignment across time zones, the World CAPM, and FOMC premia over an extended sample period and for

[7]There exist a number of other potential reasons for why the Fed is unique, including the degree to which global conditions influence its policies, its capabilities and data sources (Cieslak, Morse, and Vissing-Jorgensen (2018)), and its responsiveness to stock market developments (Cieslak and Vissing-Jorgensen (2017)). These reasons are not mutually exclusive and are potentially complementary, both with each other and with the Fed's leader role among central banks.

[8]Miranda-Agrippino and Rey (2018) and Bruno and Shin (2015) document that U.S. monetary policy affects the balance sheets of systemically important financial intermediaries, global credit growth and spreads, and cross-border credit flows. Drechsler, Savov, and Schnabl (2018a) provide a review of the literature on the transmission of monetary policy through the financial system.

global banks are available in the Online Appendix.

2. Data and methodology

The focus of our paper is on global equity returns associated with central bank announcements on monetary policy. Our tests cover stock markets in 38 countries, which are assigned into four groups: Europe (17 countries), North America (2 countries), Asia-Pacific (5 countries), and Emerging (14 countries). We obtain daily total equity return series (denominated in U.S. dollars or domestic currency) from Datastream Global Equity Indices, with coverage starting in January 1973 for those countries with the longest available time series and ending in December 2016. Individual stock returns for the U.S. are from the Center for Research in Security Prices and for Germany, Japan, and the U.K. from Worldscope. Daily risk-free rates come from Professor Kenneth French's website. Since we typically measure returns in U.S. dollars, we use the U.S. risk-free rate in computing excess returns (using local risk-free rates produces the same results for all tests).

2.1. U.S. announcements

We collect the dates of scheduled FOMC meetings directly from the Federal Reserve, with coverage starting in 1978. Before February 1994, we assume the FOMC decision became public one day after its meeting (as in Kuttner (2001)). Starting in February 1994, the FOMC would reveal its decision to investors through a prescheduled statement released in the afternoon of the day the meeting ended. Before April 2011, the release time was 2:15pm, and since then it varied between 12:30pm and 2pm.[9] We exclude any unscheduled announcements from our sample.

An important issue is to establish which trading day, the same day or the following day, is the first day on which investors in a particular market can respond to a U.S. announcement. To do this, we collect data on time differences relative to the U.S. and on market-open hours

[9]Since April 2011, the Fed holds a press conference after half of FOMC meetings. Boguth, Gregoire, and Martineau (2017) show that investors expect important policy changes to occur during meetings with press conferences, and consequently pay more attention to such meetings.

for each of the 38 countries in our sample. Because local clocks lose or gain time at various dates in the year (as in, for example, daylight savings time in the U.S.) and because these timing conventions have changed at various points in our sample period, this is not a trivial task. Table A.1 in the Online Appendix reports which day (the same or next day) represents the effective announcement day for all international stock markets in our sample, as well as information on time differences and market hours.

In our tests, we focus on two-day cumulative returns. Our announcement return window includes the first trading day when investors in a given market can react to an announcement as well as the preceding trading day. For example, for a post-February 1994 FOMC announcement in the U.S., the U.S. return window includes the day on which the announcement occurred and the immediately preceding trading day. For an Asian stock market, which is closed by the time the FOMC releases its decision, the return window includes the FOMC announcement day and the next trading day (since these markets can only then react to the announcement). Panel I of Table A.2 in the Online Appendix provides more details on how we construct return windows for markets across different geographies.

We use a two-day window for two reasons. First, it ensures we do not exclude the "correct" announcement day from our window (European markets, which are open for part of the U.S. trading day, are potentially problematic, especially after March 2011 when the exact FOMC announcement timing varied) and facilitates easier comparisons across markets in different time zones. Second, Lucca and Moench (2015) identify an upward drift in the U.S. stock market in a 24-hour window before the scheduled FOMC release time, a result they claim is inconsistent with risk-based explanations. However, it is also possible that some investors occasionally receive signals about the content of FOMC statements before the actual announcement. Cieslak, Morse, and Vissing-Jorgensen (2018) provide a number of examples of current and former Fed insiders selectively communicating with market participants, as well as more systematic evidence consistent with leaks. In addition to a number of past investigations, there is also an investigation in progress of a potential Fed leak in 2012

that resulted in the recent resignation of Jeffrey Lacker, the president of the Federal Reserve Bank of Richmond. Bernile, Hu, and Tang (2016) find evidence that is suggestive of informed trading during FOMC news embargoes.

If FOMC decisions sometimes leak out before they are announced, this would affect the exact timing of any risk premium's realization. For example, Ai and Bansal (2018) develop a revealed preference theory for the macroeconomic announcement premium (Savor and Wilson (2013)), and show that in the presence of potential information leakage we would observe a pre-announcement positive drift that depends on the risk associated with the affected announcement. In other words, if the content of an announcement is sometimes observed before the actual announcement, the risk premium would also be partially realized before the announcement. Since our paper is primarily about the absolute and relative size of the announcement premium for different central banks in global stock markets, and not about whether some agents observe information early, we use a two-day window and so can remain agnostic about the exact timing of the actual release of news.[10]

We define non-announcement days for all stock markets in our sample as those trading days on which there are no scheduled announcements by the Fed, BoE, BoJ, or ECB. We compute non-announcement-day returns in an analogous way to our approach for announcement-day returns: we cumulate pairs of returns on consecutive non-announcement days. We do this so we can directly compare returns on announcement- and non-announcement days. As an exception, we use three-day windows to account for any "lone" non-announcement day preceding a two a-day return. This procedure is conservative: increasing the horizon for non-announcement-day returns relative to announcement-day returns will understate the announcement premium (the average return difference between two types of days).

Henceforth, we refer to announcement days as a-days (which are really two a-days) and non-announcement days as n-days (which are really two n-days). We define the announcement premium as the difference between average excess returns on a particular set of an-

[10]Savor and Wilson (2016) deal with a similar issue about the exact timing of corporate earnings announcements by using one-week windows.

nouncement days (which will be different for different announcements) and the average excess returns on non-announcement days (which will always be the same, except for different sample coverage).

The dates of U.S. employment and inflation announcements come from the Bureau of Labor Statistics, with coverage starting in 1958. These announcements occur each month, and are released before the stock market opens in the U.S., typically at 8:30am EST.

2.2. International announcements

We focus our analysis of central banks outside the U.S. on three major central banks: the Bank of England (BoE), the Bank of Japan (BoJ), and the European Central Bank (ECB). By any measure, these three are among the world's most important central banks and are very probably the top three after the Federal Reserve (at least until China's recent emergence). The three central banks have four key common characteristics: they manage interest rates in economies with a floating exchange rate regime; they have independent mandates (politicians cannot directly order them to adopt certain policies, and their senior staff cannot easily be replaced by politicians); these mandates are clearly defined (for example, price stability in the eurozone or the dual mandate for the Federal Reserve) and almost certainly generally understood by market participants (even though they may disagree about what exactly is meant by these mandates in practice); and they hold regular scheduled meetings to decide policies and reach conclusions about the economy whose outcomes are communicated to the public according to a timetable that is published in advance.

Even though it is now accepted as a given, these banks have only recently been granted their independence. The BoE gained independent control of interest rates in June 1997, and the BoJ attained full independence with control of interest rates in April 1998. The ECB was independent from its inception, but it was only established in June 1998 and started exercising its full powers in January 1999. Since the empirical approach we adopt requires scheduled announcements of monetary policy decisions, our primary sample covers the 1998-2016 period (1999-2016 for the ECB). Although not very long, this period includes many

notable financial events, such as the Asian crisis, the LTCM-Russia crisis, the internet boom and bust, the global financial crisis of 2008-2009, and the eurozone crisis.

We collect data on the scheduled announcements of these central banks, typically from their websites or printed publications. Table A.3 in the Online Appendix lists the exact sources for our data and the method of collecting it, together with information on the central banks' status. This table also details the release dates and data sources for these countries' (or currency zones') other macroeconomic releases, namely employment and inflation, which we obtain from the relevant countries' national statistics agencies.[11] As in the U.S., these monthly macroeconomic announcements are released before the market opens: at 8am in Germany, 8.30am in Japan, and 8.30 or 9.30am in the U.K.

For most of our sample period, all three central banks held scheduled meetings more frequently than the Fed, so that over a comparable period we have more observations for these banks. Recently, though, they adopted the Fed approach with eight scheduled meetings per year, which was the culmination of a longer-term trend of reducing the number of scheduled meetings. The ECB initially met twice per month to assess monetary policy, then in November 2001 moved to one monthly meeting, and finally in January 2015 adopted a six-week monetary policy cycle. The ECB announces its monetary policy decisions through a press release at 1:45pm Central European time on the day of its meeting.

Between 1998 and 2005, the BoJ progressively reduced the number of monetary policy meetings from 20 to 15 per year, and then settled on 14 in 2006. In 2016, the BoJ further reduced the number of meetings to eight, in line with other major central banks. Since inception, BoJ monetary policy announcements are released immediately after each policy meeting. In the early years, the timing of the release was highly volatile, ranging from 10am to 6pm, as documented in the BoJ minutes. In order to provide sufficient time for deliberation and to enable financial markets to digest its decisions in a timely manner, the BoJ introduced two-day meetings in April 2001, with the expectation that its decisions will

[11] Surprisingly, sometimes this data is hard to obtain, requiring freedom of information requests or access to hard copies of reports.

be made public by 3pm of the second meeting day.

The BoE held one monthly meeting from its independence until October 2016 (with the exception of 2008, when one scheduled meeting was replaced by an unscheduled one), when it also adopted an eight-meeting schedule. Since independence, interest rate decisions are announced at noon on the second day of the meeting.

As with the Fed, when classifying trading days as announcement or non-announcement days, we account for time differences and market-open hours across countries, and exclude any unscheduled announcements from the sample.[12] Generally, other central banks do not schedule their policy announcements to coincide with those of the Fed. Out of 152 scheduled FOMC announcements since 1998, none occur on the same day as BoE or ECB announcements and 15 occur on the same day as BoJ announcements. All the results in the paper remain the same if we exclude these 15 BoJ announcements from our sample.

We also collect data for eight additional central banks that held or introduced regular scheduled meetings during our sample period: the Swiss National Bank (starting in January 2000), the Bank of Canada (December 2000), the Reserve Bank of Australia (January 1998), the Bank Sentral Republik Indonesia (July 2005), Banco de Mexico (January 2003), Banco Central do Brazil (January 1998), the South African Reserve Bank (October 1999), and the Central Bank of the Republic of Turkey (January 2005). The countries represented by these central banks all have economies and stock markets of at least meaningful size by global standards, and they cover different geographical regions and range from very developed to fully emerging. Details about the frequency and timing of their meetings come from their websites or freedom of information requests, and are summarized in Table A.4 in the Online Appendix.[13]

Finally, we obtain the dates of scheduled announcements for the Bundesbank, the German central bank that has a history of firm independence from the government and is considered

[12] Panel II of Table A.2. in the Online Appendix defines the announcement windows for these three central banks.

[13] Panel III of Table A.2. in the Online Appendix defines the announcement windows for these eight central banks.

by most to be the direct predecessor of the ECB. Between 1958 and 1998, the Bundesbank's monetary policy meetings took place every two weeks in the morning, and it announced its decisions either in the afternoon of the meeting day or the next morning.

3. Central bank announcements and global stock markets

In this section we examine how central bank announcements affect stock market risk premia for the 38 countries in our sample. We start by presenting and discussing the results for FOMC announcements. Next we cover findings for the other three major central banks, and then show our analysis for eight additional central banks. We further confirm our principal results in an extended sample for the Fed and the Bundesbank. Finally, we explore the cross-section of returns on announcement days.

Table 1 reports the mean announcement-day excess return and the difference between mean announcement- and non-announcement-day excess returns (announcement premium) for the Fed, BoE, BoJ, and ECB. t-statistics are reported in brackets. Countries are grouped into four geographical areas: Europe in Panel A, North America in Panel B, developed Asia-Pacific in Panel C, and Emerging in Panel D.

3.1. Federal Reserve

Column I of Panel B shows that the FOMC a-day average excess return in the U.S. is 48.4 bps, which is 46.9 bps higher than on non-announcement days and represents a statistically significantly difference, with a t-statistic of 3.32. This result replicates the finding in Savor and Wilson (2013) and Lucca and Moench (2015) that FOMC days command a positive premium. The n-day average excess return is low at only 1.5 bps (for a two-day cumulative return) and not statistically different from zero, indicating that the bulk of the 1998-2016 U.S. equity premium was earned on FOMC a-days.[14] Return volatility is very similar on FOMC days and on n-days (the difference, though statistically significant, is economically

[14] The cumulative excess return for eight FOMC announcements equals 3.87% in an average year, compared to 1.26% for non-announcement days, of which there are roughly 170 (the rest are a-days of other central banks).

marginal). Consequently, Sharpe ratios are much greater on FOMC days, 3.27 in annualized terms, than on n-days, 0.1 annualized.

[TABLE 1 ABOUT HERE.]

Turning next to the rest of the world, the pattern we document is of widespread FOMC premia, with almost all countries exhibiting much higher average excess returns on FOMC days than on n-days.[15] The difference is statistically significant for 26 countries, spanning all geographical regions. Apart from three exceptions (Chile, China, and Venezuela), the magnitudes of the premia are economically large, typically ranging between 30 and 60 bps. These findings are consistent with those in Lucca and Moench (2015), who document a positive market return *before* FOMC announcements in the U.S., Canada, and five European countries (though not in Japan), and Cieslak, Morse, and Vissing-Jorgensen (2018), who show that both the developed and emerging market indices earn high returns in even weeks starting with the last FOMC meeting.

On n-days average excess returns are negligible: not a single country has positive n-day average excess returns that are statistically significant. As in the U.S., return volatility is typically similar on FOMC and n-days, meaning that FOMC-day Sharpe ratios are again orders of magnitude higher, with numbers that are roughly equal to the ones given in the above paragraph for the U.S.

The global market portfolio, constructed from the 38 stock markets weighted by their lagged total market capitalization, enjoys an average excess return of 44.9 bps on FOMC a-days, with a t-statistic of 3.37 (43.4 bps for the equal-weighted global market portfolio). This is extraordinarily high and close in magnitude to the level in the U.S., suggesting investors in other countries demand a similar risk premium for exposure to FOMC decisions as do U.S. investors. Our estimates imply that even outside the U.S. a highly disproportionate share of total market returns occurs on FOMC days.

[15] Table C.1 in the Online Appendix shows that in Europe the first day accounts for a greater fraction of the two-day announcement excess return, while in the rest of the world the second day is more important. In a large majority of countries (30), both days contribute to the announcement premium.

Of course, conditional on knowing that market returns over a given period are high in the U.S., it is not surprising that they are also high in other markets. However, on a typical day it is hard to identify the origin of the shocks - did a shock in the U.S. spill over to Germany or vice versa? On announcement days, which occur on a regular schedule set month in advance, it is at least plausible to argue that the announcement itself caused the price move.[16] Thus, while not unexpected given the existence of the FOMC premium in the U.S., these results show that FOMC announcements are a leading driver of stock market returns in every important and investible stock market in the world.

3.2. Major non-U.S. central banks

The remaining columns in Table 1 present announcement premia for the other three major central banks. In strong contrast to FOMC announcements, average excess returns are not significantly higher on BoE, BoJ, and ECB a-days in a large majority of markets. The BoE announcement premium is not statistically significant anywhere in the world, and its point estimate is actually negative in a substantial majority of countries. Most notably, U.K. stock market average excess returns on BoE a-days are lower than on n-days. Even investors in the U.K. market do not seem to demand a premium to bear risks associated with BoE scheduled announcements.

The BoJ announcement premium is positive and significant in only three out of 38 markets, and the number drops to one once we control for announcement surprises (see section below). In Japan itself, the premium is low at 5.2 bps (t-statistic = 0.37). The ECB premium is significant in five countries, all of which are not in Europe itself. Of the eurozone countries, the premium is actually negative in France (-4.1 bps), Germany (-0.7 bps), and the Netherlands (-1.5 bps), and is economically negligible everywhere else except Belgium (18.7 bps) and Finland (27.5 bps), where it is still far from statistically significant.[17]

[16] Consistent with this view, Albuquerque and Vega (2009) find that U.S. public information has an effect on stock returns in Portugal, while cross-country market return co-movement does not change around the release of U.S. macroeconomic news.

[17] Schmeling and Wagner (2017) and Ulrich, Jakobs, May, and Landwehr (2017) document a positive drift before ECB announcements for the Euro Stoxx 50 index, which is followed by a full reversal after the

Aggregating across markets, the announcement premium of the global market portfolio is not statistically significant for any of the three central banks. It is also always significantly lower than the portfolio's FOMC announcement premium: the difference is 51.6 bps (t-statistic = 3.10) for the BoE, 37.1 bps (t-statistic = 2.31) for the BoJ, and 36.7 (t-statistic = 2.16) for the ECB. Together, the results in this section document an important and potentially puzzling finding: not only do risk premia associated with FOMC announcements dwarf those associated with announcements by major non-U.S. central banks across global markets, they even do so in the non-U.S. banks' home markets.[18] In terms of equity risk premia associated with central banks' announcements, the Fed is the only game in town.

As noted previously, during almost the entire period we study the BoE, BoJ, and ECB held policy meetings more frequently than the Fed. More scheduled announcements over a given period potentially diminishes the importance of any single one, which would result in lower announcement risk premia. However, even when we take this effect into account (by scaling returns by the inverse of the number of announcements per year), the magnitude of FOMC premia greatly exceeds the premia for other central banks, indicating that the different number of announcements does not explain our findings.

3.3. Additional central banks

Our analysis above focused on four central banks representing large, developed economies, which account for a major fraction of global GDP and stock market capitalization (especially before China's recent rapid growth). As such, these four represent obvious targets of special interest for our study. To confirm our results are not limited to a particular set of central banks sharing similar characteristics, we explore here announcement premia for central banks in eight more countries: Australia, Brazil, Canada, Indonesia, Mexico, South Korea, Switzerland, and Turkey. We choose this set based on two criteria: 1) countries with

announcement. This drift is largely driven by the Euro-crisis period (2010-12), as shown by Ulrich, Jakobs, May, and Landwehr (2017). Over our sample period, domestic market returns are not statistically significant either on the day before or the day of the ECB announcement (see Figure C.1 in the Online Appendix).

[18] When we split the announcement window into its two constituent days in Table C.1 in the Online Appendix, these results also hold separately on each day.

reasonably sizeable economies and stock markets; and 2) countries in different geographical regions and at different stages of economic development.

Figure 2 presents the announcement premia in their home market for the eight central banks in U.S. dollar (USD) and local-currency terms. To distinguish our findings from those for the four major central banks, we exclude from our analysis any announcements that overlap with those of the Fed, BoE, BoJ, or ECB.[19] The key take-away is that none of the eight countries enjoy a statistically significant domestic announcement premium either in USD or local currency. The premium in USD is actually negative in five countries. It is relatively high in Brazil at 37.3 bps (t-statistic = 1.22), but this result seems to be driven by global market movements, as the average a-day return for the world market portfolio is 30.3 bps. The announcement premia are similar expressed in local currency, with four positive and four negative estimates, none of which are close to being statistically significant. These findings provide further support for the conclusion that the Fed is special among global central banks in how its announcements affect equity risk premia worldwide.

[FIGURE 2 ABOUT HERE.]

3.4. Extended sample

As our next step, we establish the robustness of our findings by studying announcement premia in two additional samples: i) for the FOMC over a longer 1978-2016 period; and ii) for the Bundesbank before it was incorporated into the ECB.

The Fed has a longer history of operational independence than the other three major central banks, allowing us to significantly expand the sample period for FOMC announcements relative to our main 1998-2016 one.[20] Over the 1978-2016 period, the FOMC premium in the U.S. remains high, both in terms of economic magnitude (31.2 bps) and statistical significance (t-statistic = 3.70). Similar to the results for our primary sample, this premium

[19] All results stay the same if we include such observations in our sample.

[20] Fed independence is typically dated to 1977, when the Congress specified its current objective of maximum employment and price stability, and 1978, when the Congress exempted monetary policy operations from reviews by the Government Accountability Office.

is present in most stock global markets. It is 25.5 bps (t-statistic = 2.41) in Germany, 27.2 bps (t-statistic = 2.43) in Japan, and 31.5 bps (t-statistic = 2.91) in the U.K. Overall, out of 38 markets, the FOMC announcement premium is positive in 37 and statistically significant in 29, confirming this is not a phenomenon that exists only since 1998.[21]

The Fed is not the only major central bank with long-standing independence. The German Bundesbank, which is currently part of the ECB, enjoyed independence almost from its inception and was generally regarded as the second most influential central bank in the world for most of its history. Still, the Bundesbank announcement premium in the German stock market over the 1973-1998 period is only 6.3 bps, which is not statistically significant (t-statistic = 0.96) and is much lower than the corresponding FOMC premium.

3.5. World CAPM on central bank announcement days

Savor and Wilson (2014) show that the CAPM prices U.S. stocks on FOMC, inflation, and employment announcement days, while it fails to do soon non-announcement days.[22] Other authors examine whether an international version of the CAPM prices stocks globally (see Brusa, Ramadorai, and Verdelhan (2015) and references therein), with most of the evidence suggesting that it fails even more than the U.S.-only version. We study the performance of the global CAPM ("World CAPM") on central bank announcement days, and show that on FOMC days it prices the cross-section of global stock returns. More specifically, on days of FOMC announcements the slope of the security market line is positive and very close to the realized average excess return of the world market portfolio; the R^2 of the cross-sectional regression is high; and the intercept is not statistically significant. None of these results hold on announcement days of other central banks, providing further evidence that the Fed is unique and different from other central banks in its impact on equity markets. The details of our empirical approach and findings are given in Section B of the Online Appendix.

[21] Table C.2 in the Online Appendix provides the details.

[22] Using a similar approach, Hendershott, Livdan, and Rösch (2018) find that the CAPM holds overnight both in the U.S. and internationally.

4. Dissecting announcement returns

High FOMC announcement returns in global stock markets are consistent with the hypothesis that investors demand a risk premium for exposure to Fed decisions. Similarly, the much lower announcement returns for other central banks are consistent with the hypothesis that there is no risk premium for exposure to their decisions. However, these are not the only possible interpretations. We therefore next explore whether announcement surprises, currency movements, and stock-market composition explain our results on announcement returns across different central banks.

4.1. Central bank announcement surprises

A simple explanation for why market returns are high on FOMC a-days is that over our sample period the Fed on average positively surprised equity investors. For example, during this period market participants and commentators often discussed the "Greenspan put" or the "Bernanke put," referencing a belief that the Fed will step in to support the market if a downturn occurred. Under this explanation, high returns on FOMC days do not reflect any risk premia investors require to bear risks associated with FOMC announcements but rather reflect good news coming from the Fed. Applying the same logic, it is also possible that the risk premium for other central banks' decisions is actually positive, but that these banks on average disappointed equity investors, thus obscuring the positive announcement premium.

To address these hypotheses, we need to control for the content of news released through central bank announcements. We do so by including the monetary policy surprise in our analysis and estimating the following OLS regression:

$$ret_t^i = \alpha + \gamma D_t^a + \delta \Delta r_t^u + \varepsilon_t, \tag{1}$$

where ret_t^i is the excess market return in country i on day t, D_t^a is a dummy variable for a-days associated with a given central bank, and Δr_t^u is the unexpected target rate change for that central bank, our measure of monetary policy surprise.

Bernanke and Kuttner (2005) show that U.S. stock prices increase in response to surprise FOMC interest rate cuts. Similar to that paper, we measure the FOMC monetary policy surprise by using Federal Funds Futures, a financial product tied to the Fed funds rate that investors use to speculate on or hedge the actual FOMC interest rate announcements. More specifically, we define this surprise as the unexpected target rate change, Δr_t^u, computed as:

$$\Delta r_t^u = \frac{K}{K-t}\left(f_{m,t}^0 - f_{m,t-1}^0\right), \tag{2}$$

where $f_{m,t}^0$ is the 30-day Federal Funds Futures rate, K is the number of days in the current month, and t is the current day of the month.[23]

Unfortunately, in the sterling, yen, and euro currency zones there are no equivalent exchange-traded interest rate futures to the Federal Funds Futures. However, all three currency zones have an active interbank lending market, with their own versions of the London Interbank Offered Rate (Libor), the average of interbank lending rate quotes. Futures contracts on Euro Interbank Offered Rate (Euribor), Euroyen Tokyo Interbank Offered Rate (Euroyen Tibor), and Sterling London Interbank Offered Rate (Sterling Libor) are all traded on large and liquid exchanges in London or Chicago. Because these interbank rates are typically set with reference to central bank rates, we assume that central bank announcement surprises are reflected in the futures-implied rates. Therefore, we use the change in the rates implied by interest rate futures prices as our proxy for surprises associated with announcements by a particular central bank.

We collect 3-month Euribor, Euroyen Tibor, and Sterling Libor futures prices. (Although 1-month futures contracts exist, they have much lower volume and open interest.) We then create a continuous time series of implied rate changes that is based on the nearest-to-maturity contract. For example, for an announcement in June, we first use the 3-month futures contract expiring in March up to its expiration date, and then switch to the 3-month

[23] As in Kuttner (2001), we use the unscaled change in the Federal Funds Futures rate for the last three days of the month, and we use the next month's contract for rate changes occurring on the first day of the month.

contract expiring in June.

In Table 2, we estimate the regression specification given by Eq. (1) for the four major central banks. The coefficient of most interest is γ, which measures the a-day premium controlling for the monetary policy surprise associated with a particular central bank's announcements. For the Fed, this coefficient is positive in 35 out of 38 countries, and it is statistically significant in 23 countries. The γ magnitude is similar to the FOMC premia documented in Table 1, suggesting that our findings are not driven by FOMC interest-rate surprises. The point estimates are generally slightly lower than without controls for announcement surprises, consistent with the downward trend in U.S. interest rates over our sample period, but the magnitude of the effect is small.

Fed's δ coefficient, measuring the market response to interest rate rate surprises, is negative (and statistically significant) in all (31) countries, a result consistent with the hypothesis that markets respond positively to surprise FOMC rate cuts and in line with the findings in Bernanke and Kuttner (2005). This latter result also reassures us that the surprise measure we employ captures FOMC news that is relevant to investors.

Starting with the last quarter of 2008, the Fed provided advance guidance to market participants that its target rate would stay close to zero for the foreseeable future, so that there were no target rate surprises in most of the post-2008 period (the first change occurred in December 2015). This does not mean that FOMC announcements were irrelevant to investors in this period, as FOMC statements revealed important information such as guidance about the path of interest rates or about the Fed's unconventional monetary policy tools. It does mean, though, that our measure of monetary policy surprises is less relevant in this period. However, all the results we describe in this section continue to hold if we end our analysis in 2008 rather than in 2016.

[TABLE 2 ABOUT HERE.]

The γ coefficient is never statistically significant for the BoE, is only significant in New Zealand for the BoJ, and is (marginally) significant in four non-European markets (Hong

Kong, Indonesia, Philippines, and Turkey) for the ECB. Furthermore, its sign is negative as often as it is positive. Thus, we conclude that our results on the absence of risk premia associated with BoE, BoJ, and ECB announcements are robust to controls for monetary policy surprises.

Interestingly, the δ coefficient is often positive and significant (and never negative and significant) for the major non-U.S. central banks. The results suggest that equity markets respond *negatively* to surprise interest rate cuts by the three central banks, especially the ECB, which is a puzzling finding.[24] Potential explanations include these banks playing a different role than the Fed, their surprise rate cuts representing a negative signal about economic prospects, the fact that we measure returns in USDs rather than local currencies, or issues with our surprise measure derived from interbank futures. Given this question is not the focus of our paper, we leave it for future research.

4.2. Local vs. USD returns

Our tests so far measure returns in USDs. For non-U.S. markets, the USD return will reflect two components: the local-currency return and the exchange rate change. In Table 3, we examine how much our results above are influenced by currency movements. Each of the four panels presents announcement premia for a particular central bank in local-currency terms, as well as the difference between announcement premia measured in USD and the local currency.

[TABLE 3 ABOUT HERE.]

The first panel shows that the FOMC a-day premium also exists when returns are measured in the local currency, with a positive (and statistically significant) premium in 36 (25) out of 38 countries. Interestingly, for 34 out of 37 countries (in the U.S., there is by definition no currency effect), market returns are higher in USD terms, suggesting their currencies tend to appreciate against the dollar on FOMC a-days.[25] These results indicate that currency

[24] Schmeling and Wagner (2017) show that equity prices respond to the tone of ECB communications.

[25] These results are consistent with those in Savor and Wilson (2014) and Mueller, Tahbaz-Salehi, and Vedolin (2017).

movements contribute to the FOMC effect we document above, but that the bulk of the effect stems from underlying changes in equity prices.

The remaining three panels present the same analysis for the other three central banks. The general point is that the finding that there is no announcement premium for the BoE, BoJ, and ECB continues to hold when returns are measured in local currencies. Similarly, there is no consistent currency effect for these other central banks' announcements, with currencies depreciating as often as appreciating relative to the USD on a-days. We conclude that the Fed's unique impact extends to currency movements, but that these movements do not account for the majority of its stock market effect.

4.3. Characteristics-sorted portfolios

Our analysis above focused on aggregate market portfolios. A large literature (for a recent overview see McLean and Pontiff (2016)) finds that various stock characteristics predict the cross-section of stock returns, at least in-sample. A question then arises whether our results for the aggregate market are driven by a subset of stocks with certain characteristics. To address this issue, we study portfolios based on firm size and valuation, two of the best-known and established predictors of stock returns (Fama and French (1992) and Fama and French (1993)). We restrict our analysis to four major markets: the U.S., the U.K., Japan, and Germany, each representing one of the central banks covered in our analysis. We use four MSCI Style Indices: Large Cap, Small Cap, Value, and Growth.

Table 4 shows that in all four countries each of the four portfolios enjoys a positive and statistically significant FOMC announcement premium, while none of the four portfolios exhibits a significant domestic announcement premium. Furthermore, the FOMC premia are similar in magnitude both across and within countries. These findings suggest that the FOMC premium is a widespread phenomenon not limited to certain types of stocks.

[TABLE 4 ABOUT HERE.]

5. Origins of FOMC premia

In the previous sections we establish that equity risk premia are high on FOMC announcement days in almost all global stock markets, with no similar relation for announcements by other central banks. We also show that announcement surprises, currency movements, or choice of sample period and set of central banks do not explain these results. We now explore and discuss potential origins of FOMC announcement premia.

5.1. Central banks as proxies for economies: employment and inflation announcements

One straightforward potential explanation for the simultaneous presence of a high FOMC announcement premium and the absence of such a premium for other central banks is that, in contrast to the Fed, they do not matter to diversified equity investors because the economies they represent are not systematically important. For example, it would not be surprising if Croatian stocks do not exhibit elevated risk premia in response to Croatian inflation (or central bank) announcements, as the idiosyncratic component of Croatian inflation is very likely completely diversifiable to international investors holding Croatian stocks. This, though, is much less likely for holders of German, Japanese, or U.K. stocks, since the three economies are large by any global standard.

To address this size issue more formally, we study employment and inflation announcements in the U.S., U.K., Japan, and Germany. Both of these represent major macroeconomic news that can thus be associated with risk premia (see Savor and Wilson (2013)). Table 5 reports a-day average excess returns and their difference relative to n-day average excess returns (announcement premium) for each of the four stock markets, broken down by announcement type. We focus on the impact of announcements in their domestic markets.

[TABLE 5 ABOUT HERE.]

For the U.S., we estimate a positive premium of 2.9 bps for employment announcements and one of 5.5 bps for inflation announcements, but neither of these are statistically significant. This is consistent with the discussion in Savor and Wilson (2014) that notes the fading away of risk premia associated with inflation and especially employment in the U.S., and the

gradual increase in the FOMC premium.[26]

In the U.K., we find positive employment and inflation announcement premia of 9.7 and 10.9 bps, respectively. These are economically meaningful numbers, though only inflation is statistically significant. For Japan, the risk premium for employment announcements is positive at 7.1 bps but not significant, while the inflation premium is strongly positive and significant (12.1 bps, with a t-statistic of 2.18). Turning to Germany, its stock market enjoys excess returns that are on average 14.7 bps higher (t-statistic = 2.36) on German employment a-days compared to n-days, and 10.4 bps higher (t-statistic = 1.81) on German inflation days.[27]

Taken together, the findings here provide support for the hypothesis that the economic news in the U.K., Japan, and Germany is systematically important to global investors, and that consequently investors demand a risk premium for exposure to this news. This is an intuitive and not overly surprising result. However, it makes our previous findings on non-U.S. central banks even more puzzling, suggesting that the explanation for why investors demand a high FOMC announcement premium but no premium for risks associated with BoE, BoJ, and ECB decisions is more complicated than just the importance of the economies associated with these central banks.

5.2. Exposure to the U.S. economy

While economy size does not explain the absence of announcement premia for non-U.S. central banks, it can potentially account for the global nature of FOMC premia. Many firms have major international operations, which can sometimes eclipse the firms' domestic business. Such global firms have exposure to economic conditions and policies in countries other than their home market. Given its status as the largest economy in the world, the

[26] One potential explanation for these trends is that in the 1950s, 60s, and 70s market participants used inflation and employment numbers to formulate expectations for Fed policy. After the Fed began to communicate its policy more clearly to the public starting in the mid-1970s and gaining in clarity in the 1990s, the information in employment and inflation announcements became less important.

[27] The higher inflation announcement premia outside the U.S. may reflect the fact that the BoE, BoJ, and ECB have price stability mandates, which can make them more sensitive to inflation than the Fed with its dual employment-inflation mandate.

U.S. exerts a substantial influence on the performance of many foreign multinationals. For example, the U.S. represents the single most important market in terms of revenue for three of the five largest FTSE 100 firms (Royal Dutch Shell, Unilever, and GlaxoSmithKline), four of the five largest DAX firms (Siemens, Bayer, SAP, and BASF), and one of the five Topix 100 firms (Toyota, the largest Japanese corporation).[28] With this in mind, it is perhaps not overly surprising that FOMC decisions impact stock market performance across the globe. Multinational firms represent a major fraction of total market capitalization in most countries, and such firms have large direct exposure to the U.S. economy. From this perspective, there may be nothing special about the Fed beyond its status as the central bank of the most important economy in the world.

To test whether direct reliance by multinationals on the U.S. economy explains widespread FOMC announcement premia, we study the returns of firms whose operations are focused on their home market. We use an index tracking the performance of domestic U.K. firms, which is compiled by the Bank of England using firm-level data from Thompson-Reuters Worldscope. This index comprises all companies in the FTSE All-Share index that generate at least 70% of their revenues in the U.K. We validate the U.K. domestic index by examining its performance after the referendum vote in favor of the U.K. exiting the European Union on June 23, 2016 (Brexit). While the outcome had global implications, its effect was strongest in the U.K. itself. We thus expect a more severe Brexit reaction for the domestic index, as it consists of stocks with high exposure to the U.K. The data confirm this hypothesis: the U.K.-focused index suffered a drop of 11.3% (11.1%) the day (week) after Brexit, which greatly exceeded the 4.1% drop (0.8% increase) for the aggregate U.K. stock market.

Table 6 reports the announcement-day returns, non-announcement-day returns, and announcement premia for the U.K. domestic index. It covers two periods: 1998 through 2016 (our main sample period) and 1995 through 2016 (the entire period for which the index

[28] We collect geographical revenue breakdown from Factset GeoRev.

exists). Even for this index that excludes multinationals, the FOMC premium is positive and significant, both in USD and British pound (GBP) terms. The premium is actually higher for the domestic index (47.3 bps in USD and 29.4 in GBP) than for the aggregate U.K. market over the same period (43.3 bps in USD and 25.3 in GBP). These results, which are the same over the longer 1995-2016 sample, are not consistent with the hypothesis that the FOMC premium arises simply due to direct exposure by international stocks to the U.S. economy.

[TABLE 6 ABOUT HERE.]

Similar intuition potentially applies to central banks outside the U.S. If multinationals depend only marginally on the economic conditions in the country where they are listed and they comprise a major fraction of the host stock market, we may be unable to detect at the aggregate level any risk premia associated with the decisions by that country's central bank (or with the signal these decisions provide about economic conditions). However, this argument does not apply to domestic firms, and therefore for such firms we should observe a positive risk premium for domestic central bank announcements.

Table 6 shows this is not the case. The BoE announcement premium for the domestic U.K. index is not statistically significant, with a negative point estimate. In terms of magnitudes, the domestic-stock announcement premium of -8.0 bps is very close to the -10.1 bps premium for the aggregate market. Investors do not demand a risk premium for exposure to BoE decisions even for stocks of primarily British businesses.

Combined, the findings here suggest that the Federal Reserve is unique in other ways than simply being the central bank of the largest global economy. More specifically, FOMC announcement premia do not arise just because the Fed affects, or signals, economic conditions in the U.S., which have a large *direct* impact on the performance of multinationals regardless of their home country. Given that FOMC premia also exist, and are similar in magnitude, for foreign stocks with a domestic focus, the origin of FOMC premia is more complex.

5.3. Inert central banks

Another potential explanation for why non-U.S. central banks do not appear to matter to investors is that these central banks do not pursue active monetary policies (or at least have not done so during our sample period). In this case, investors would face little uncertainty regarding these banks' decisions, and consequently exposure to such decisions would not command a risk premium. However, contrary to this hypothesis, in the period we study the BoE, ECB, and BoJ all exhibit activist monetary policies, with large variations in interest rates (see Figure 3) as well as use of unconventional monetary policy tools.

Even if major central banks outside the U.S. engage in active monetary policies, it is still possible that their decisions are widely anticipated, either by design or inadvertently. This would reduce the associated uncertainty and thus also reduce any announcement-day risk premia. For example, a central bank may manage investors' expectations of monetary policy so effectively that its announcements are common knowledge before they occur; control of monetary policy may reside elsewhere (as it did in the U.K. and Japan before 1997 and 1998, respectively); or a central bank may rely on a rules-based approach in setting interest rates to such an extent that investors anticipate its decisions based on economic developments.[29] Decisions by a central bank might be unsurprising if it is inactive, which we argue above is not the case, or if it is active but its actions are known to investors in advance of its announcements. We describe such banks as inert.

If a central bank is inert, its announcements should not be surprising to investors, and consequently there should be no discernible effect of its announcements on the volatility of price changes for the affected assets. To explore this hypothesis, we look at the market most directly impacted by central bank decisions, the one for short-run interest rates in the relevant currencies. Because this phenomenon is already well explored in the U.S., we study only the three other central banks, the ECB, BoJ, and BoE. As before, we measure expected

[29] The evidence above documenting positive domestic premia for employment and inflation announcements in the U.K., Japan, and Germany is consistent with this last hypothesis, with investors updating their expectations about monetary policy based on information provided by these announcements.

interest rates using futures contracts, more specifically interbank rate futures.

Table 7 shows the results of OLS regressions of daily changes/absolute changes in the implied interest rates on the relevant central bank announcement dummy for the 1999-2016 period (the period during which all three central banks are independent), with t-statistics computed using Newey-West standard errors with five lags. We also include a dummy variable, 'Contract Switch', which equals 1 on the first date of a new contract, to deal with any effects of switches in the front contract. The specification where the dependent variable is the absolute change is of special interest, as it tests whether (implied) interest rate expectations experience larger changes on announcement days. If a given central bank is inert, we should find no relation between the absolute change in implied rates and its announcement dummy.

[TABLE 7 ABOUT HERE.]

Panel I presents the results for Euribor. The first row shows no relation, either economically or statistically, between 3-month Euribor changes implied by futures prices and the ECB announcement dummy. This is not at all surprising: there is no reason to think that euro interest rates should on average move in a particular direction when the ECB announces its policy decisions. However, the second row shows that the absolute value of Euribor changes is significantly higher on ECB announcement days, with a coefficient of 1.15 (t-statistic = 6.01), which represents a very meaningful effect relative to the mean of 1.48 bps on other days. Since implied interest rates on average experience significantly larger moves on ECB a-days, we conclude that the content of ECB announcements does not appear to be fully anticipated by investors.

Panel II shows similar results for futures-implied yen interest rates, which are significantly more volatile on BoJ a-days. The absolute value of rate changes is higher on announcement days than on other days, with a coefficient on the BoJ a-day dummy that is high (0.29 bps relative to the n-day mean of 0.51 bps) and significant (t-statistic = 3.78). Finally, Panel III contains results for sterling futures-implied rates. The key result is again in the second

row, where we see that the absolute change in futures-implied sterling interbank rates is 1.43 bps (t-statistic = 4.23) higher on BoE a-days relative to the mean of 1.84 on other days. Overall, our results suggest that the inertness hypothesis cannot explain the lack of a significant market risk premium for ECB, BoJ, and BoE announcements.[30]

5.4. The Fed is unique

Our analysis suggests that in terms of impact on equity risk premia the Fed is unique among global central banks, and that this impact is not a direct result of the size and importance of the U.S. economy or the level of policy activism by different central banks. Why would the Fed be special? One potential explanation is that the Fed is the "world's central bank," whose decisions exert greater and more widespread influence on global developments than those of other central banks. Consistent with this hypothesis, Table 2 shows that the common conception that equity markets respond positively to surprise interest rate cuts actually holds only for the Fed, in whose case it holds universally.

We proceed below by directly testing the hypothesis that the Fed has broader impact on global equity markets than other major central banks. We then explore a number of reasons for why the Fed is special in this way, most prominently its potential role as the leader in setting global monetary policy. In addition to our tests, we also discuss related work and other evidence consistent with our findings.

A. Central bank announcements and uncertainty

A potential origin of worldwide FOMC risk premia is that its announcements provide new information about future monetary policy, the Fed's policy function, and/or economic prospects, and that this information is relevant to equity prices on a global scale. Stanley Fischer, in his role as the vice chairman of the Fed, shared the view that Fed's policies (and thus information about its policies) have worldwide impact (Fischer (2015)): "There is little doubt that the aggressive actions the Federal Reserve took to mitigate the effects of

[30] More informally, we also identify through Google searches multiple surprise decisions by all three central banks, which resulted in significant moves in equity, fixed income, and currency markets.

the global financial crisis significantly affected asset prices at home and abroad as well as international capital flows."

To corroborate this hypothesis, we explore changes in forward-looking uncertainty about stock prices on announcement days. More specifically, we test whether central bank announcements are associated with a decrease in uncertainty in a given equity market, consistent with the release (anticipated by investors) of new information affecting this market.

Our measure of uncertainty is the implied volatility derived from option prices, a standard proxy in the literature. For the U.S. stock market, we use the VIX, a popular index that reflects the expected 30-day volatility based on implied volatilities of S&P 500 index options. We collect analogous measures for the other three major markets: the VSTOXX index for Germany, the VFTSE index for the United Kingdom, and the VXJ index for Japan.

We start by relating equity market uncertainty to domestic central bank announcements. Panel A of Table 8 presents regressions of log changes in implied volatility (in percent) on an intercept, an announcement-day dummy for the domestic central bank, contemporaneous domestic equity excess returns, and an interaction term between domestic equity excess returns and the domestic announcement-day dummy. In all countries, we confirm the well-established negative and statistically significant relations between implied volatility and excess returns. Column I shows that a 1% increase in U.S. excess returns is associated with a 3.95% decrease in the VIX (t-statistic = -26.50). The effect is of similar magnitude (between 2% and 3%) in the other three markets (Columns II to IV), with high levels of statistical significance.

[TABLE 8 ABOUT HERE.]

The coefficient of most interest is the announcement-day dummy for the domestic central bank. In addition to any change explained by the domestic equity market moves, the VIX index declines by 1.59% (t-statistic = -4.55) on FOMC a-days, the VSTOXX index by 1.11% (t-statistic = -3.44) on ECB a-days, and the VFTSE index by 2.44% (t-statistic = -5.70) on BoE a-days. The estimate for the VXJ index on BoJ a-days is also negative (-0.56%) but

not quite statistically significant (t-statistic = -1.57). These results confirm the hypothesis that the Fed, ECB, and BoE announcements convey information that is relevant for their domestic stock markets. The interaction term coefficient is negative for all four central banks, but is never statistically significant.

Panel B extends the exercise to foreign central bank announcements. It presents the same set of regressions but now includes announcement-day dummies and interaction terms for all four major central banks. This test shows that the Fed is unique among central banks in that its announcements have impact on foreign equity markets. While uncertainty significantly decreases in all four equity markets on FOMC a-days, for the non-U.S. central banks the effect is confined to their domestic market. The coefficient for the FOMC dummy is -1.37 (t-statistic = -3.04) for the VSTOXX index, -1.59 (t-statistic = -3.70) for the VFTSE index, and -2.22 (t-statistic = -4.44) for the VXJ index. The magnitudes are actually greater for the Fed than for the ECB in Germany or for the BoJ in Japan. Since FOMC a-day returns are on average positive globally, a decline in implied volatilities is not necessarily surprising. However, these estimates control for domestic market returns and also their interaction with announcement dummies.

Overall, the results in Table 8 indicate that FOMC announcements are associated with heightened uncertainty in global equity markets, which declines after the Fed's decision is released. In other words, FOMC announcement risk is priced in the option markets, and in contrast to other major central banks the effect exists globally. This evidence is consistent with Fed's decisions having a systematic impact on economic and financial conditions globally, while other central banks, even in major countries, have only domestic relevance.

At a daily frequency, it is hard to pin down the transmission channel for Fed policies. However, recent work uses lower-frequency tests to argue that U.S. monetary policy plays a key role in the global financial system. Rey (2013) discusses the existence of a global financial cycle in capital flows, asset prices, and credit growth, which co-moves with the VIX index and has U.S. monetary policy as a major determinant. Miranda-Agrippino and

Rey (2018) use a Bayesian VAR to study this international transmission channel. They find that U.S. monetary policy has an important effect on the balance sheets of systemically important financial intermediaries in the U.S. and Europe, as well as on leverage, global credit growth, credit spreads, and cross-border credit flows. Bruno and Shin (2015) show that contractionary U.S. monetary policy shocks lead to lower leverage of international banks. Consistent with the hypothesis that FOMC announcements impact risk premia through their effect on global financial intermediaries, we find that major international banks enjoy FOMC premia that are even higher than (the already high) premia for the aggregate market, though these returns are largely explained by the banks' betas (see Table C.3 in the Online Appendix for details).[31]

B. The Fed as leader

One channel through which the Fed can influence global developments is if central banks outside the U.S. follow its lead in setting monetary policy (the Fed could attain such a position due to the dominant role of the U.S. dollar in the global economic system, but may hold the position even in its absence). In this case, FOMC decisions would obviously be of special importance to equity investors across the world.[32]

In Panel I of Table 9, we regress daily changes/absolute changes in expected FOMC target rate on announcement-day dummies for the four central banks we study. As we would expect, the volatility is significantly higher on FOMC a-days, with a dummy coefficient of 1.04 (t-statistic = 3.52). This finding is in line with previous studies, and is also consistent with our earlier results for the BoE, BoJ, and ECB in terms of signs and magnitudes. The more novel result is that none of the dummy coefficients for the other three central banks are positive and significant, suggesting that BoE, BoJ, and ECB announcements do not impact investor expectations about future Fed decisions.

[31] The importance of the Fed can also stem from the fact that many globally important financial intermediaries are U.S. institutions. However, the direction of causation is not clear here: the pre-eminence of U.S. intermediaries can also easily be a consequence, rather than the cause, of the Fed's uniqueness.

[32] Our evidence on central bank inertness shows that the ECB, BoJ, and BoE do surprise investors, indicating that they at least sometimes act independently and not solely based on FOMC decisions. This, though, does not mean that the Fed has no impact on their policies.

We next reverse the analysis and study the relation between FOMC announcements and interest rate expectations for the other three central banks. We do so by regressing daily changes and absolute changes in implied interest rates for these central banks on the FOMC a-day dummy. Panel II shows that the volatility of interest-rate expectations is significantly higher on FOMC a-days for the BoJ (t-statistic = 1.93) and the ECB (t-statistic = 2.69), though not for the BoE (t-statistic = -1.12). This evidence indicates that investors use FOMC decisions to revise their expectations about future BoJ and ECB actions, and combined with findings in Panel I is consistent with a leading role for the Fed.

[TABLE 9 ABOUT HERE.]

If other central banks follow the Fed in setting monetary policy, the importance of their announcements may increase with the distance from the Fed's last announcement. For example, if ECB's announcement on a given day was immediately preceded by one from the Fed, there would be little incremental news associated with the ECB decision. On the other hand, if the last Fed announcement was six weeks ago, there is greater likelihood that the ECB announcement would provide new information. However, when we divide other central banks' announcements based on whether they are close or far away from previous FOMC announcements, we find no difference in announcement premia, which are still never statistically significant. It is possible, though, that central bank announcements occur frequently enough that there is little scope for divergence from the Fed's lead.

The Fed, ECB, and BoE tend to move gradually, typically changing rates multiple times in the same direction. This tendency is less pronounced for the BoJ, but the reason is that its rates were at or very close to the zero lower bound during our sample period. Figure 4 plots policy rates for our four central banks over time. It shows that the Fed in general leads the ECB and BoE (Miranda-Agrippino and Rey (2018) use a Bayesian VAR to estimate the impact of U.S. monetary policy shocks and get similar results), in line with the hypothesis that it is the interest rate-cycle leader.[33]

[33] There are important instances when these banks diverge from the Fed, such as the most recent period with the ECB, BoE, and BoJ all engaging in easing policies while the Fed embarked on a tightening cycle.

[**FIGURE 3 ABOUT HERE.**]

Finally, there exists other evidence that central banks outside the U.S. adopt policies developed by the Fed. Most importantly, the Fed was the first central bank to embark on a policy of quantitative easing in response to the financial crisis of 2008-09, starting in November 2008. The BoE, BoJ, and ECB all eventually followed, and they were not the only ones, as other central banks, such as the Swiss National Bank and the Swedish National Bank, also launched quantitative easing. In terms of process, over time the ECB, BoJ, and BoE all moved to a six-week monetary policy cycle, which is a long-standing Fed approach. Looking beyond these four central banks, various countries pegged their currencies to the U.S. dollar at different points in time (for example, Argentina from 1991 to 2002, many Asian countries before the crisis of 1997, Hong Kong from 1972 through today), which meant their central banks effectively had to follow U.S. monetary policy.

Together, the evidence in this section is suggestive of the Fed's pre-eminent role among central banks, both in setting interest rates and deciding other aspects of monetary policy.

C. Fed policy function and capabilities

There exist a number of additional potential explanations for the Fed's uniqueness (which are not mutually exclusive and may actually be related). The Fed may take a broader view of its role in the global financial system than other central banks, and consequently engage in policies that have wider impact. For example, Stanley Fischer argued that "[the Fed's] financial stability responsibilities do not stop at our borders, given the size and openness of our capital markets and the unique position of the U.S. dollar as the world's leading currency for financial transaction (Fischer (2015))."

The Fed may also be special in terms of its general capabilities. Its researchers and proprietary data sources (see Cieslak, Morse, and Vissing-Jorgensen (2018) for a detailed description) could provide the Fed with better insights into global economic prospects than any of its peers, in turn increasing the importance of its pronouncements to investors both locally and globally. Romer and Romer (2000) show that the Fed has information about

inflation that is not known to private forecasters, who update their forecasts in response to signals provided by Fed's monetary-policy actions. This explanation is consistent with our results on the Fed's leading role in setting global monetary policy.

Finally, the Fed is potentially more responsive to stock market developments than other central banks. Such a stronger relation for the Fed can arise if consumption or investment in the U.S. respond to equity valuations more than in other countries. The Fed could also care more about stock market performance for political reasons. Cieslak and Vissing-Jorgensen (2017) find that the Fed indeed takes into account stock market conditions, with negative stock market returns representing a stronger predictor of its rate changes than any commonly used macroeconomic variables. In line with the above hypothesis, they argue the relation is causal, with the Fed reacting to stock returns themselves rather than the signal they provide about the future economic developments.

6. Conclusion

In this paper we show that the high average excess returns previously observed for U.S. stocks on days with scheduled FOMC announcements also exist in almost all other stock markets across the globe. Just as in the U.S., the FOMC effect is substantially stronger (roughly doubling) in recent years. By contrast, almost no stock markets display a similar effect for non-U.S. central bank announcements, not even the domestic stock markets of the announcing central banks. These results are not driven by announcement surprises or currency effects, and are present across different stock characteristics. They even hold for stocks of businesses with a domestic focus.

These are puzzling findings, especially since stock markets outside the U.S. do exhibit domestic inflation and employment announcement effects. Given that the BoE, BoJ, and ECB represent large and systemically important economies, and given that they pursue active monetary policies that sometimes surprise investors, why is there no premium around their announcements? Our conclusion is that the Federal Reserve is unique in its importance to global investors, and that this uniqueness does not simply stem from the size of the U.S.

economy and its securities markets.

Why might the Fed be special among central banks? One potential explanation is that the Fed is the "world's central bank," whose decision have broader impact than those of other central banks. In support of this hypothesis, we find that uncertainty drops across global markets following FOMC announcements, in contrast to announcements by other central banks which only have a local effect. We further provide evidence suggesting that the Fed acts as the leader among central banks in setting monetary policy. These findings are consistent with recent work showing that U.S. monetary policy exerts a special influence in the global financial system, affecting the balance sheets of systemically important financial intermediaries, credit growth and spreads, and cross-border credit flows (Rey (2013), Miranda-Agrippino and Rey (2018), and Bruno and Shin (2015)).

There are a number of factors, which are not mutually exclusive and are potentially mutually reenforcing, that could give rise to the Fed's unique position. One interesting avenue is the dominant role of the U.S. dollar in the global trade (Gopinath (2015)) and financial system (Shin (2012)), commonly referred to as its reserve currency role. For example, if all other central banks must to some extent manage the value of their currencies against the dollar, while the Fed does not have to manage the dollar against other currencies, we would expect the Fed to enjoy a special freedom of action, its policies to have impact beyond just the U.S., and for other central banks to follow Fed's lead.[34] The Fed may also be a leader among central banks due to its capabilities, its policy function, and its relationship with Wall Street. We leave further exploration of these important issues to future research.

[34] An intriguing, though speculative, hypothesis is that the reserve currency is less sensitive to depreciation in response to money creation, granting the central bank associated with such a currency a unique power to affect the value of assets around the world.

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Figure 1
Summary Chart for Announcement Premia

This chart reports announcement premia for four major equity markets: Germany (Ger, blue), Japan (Jap, yellow), United Kingdom (UK, green), and the United States (US, red). Announcement premia are defined as the difference between two-day average excess returns (in basis points) on announcement and non-announcement days. Announcement days are those trading days when interest rate decisions taken by the Federal Reserve (FOMC, Panel A), the Bank of England (BoE, Panel B), the Bank of Japan (BoJ, Panel C), and the European Central Bank (ECB, Panel D) are scheduled for release. Non-announcement days are those trading days with no announcements by any major central bank. Black dots denote confidence intervals (+/-2 standard deviations). Test assets are Datastream Global Equity indices denominated in U.S. dollars. The sample period is January 1998 (January 1999 for ECB) to December 2016.

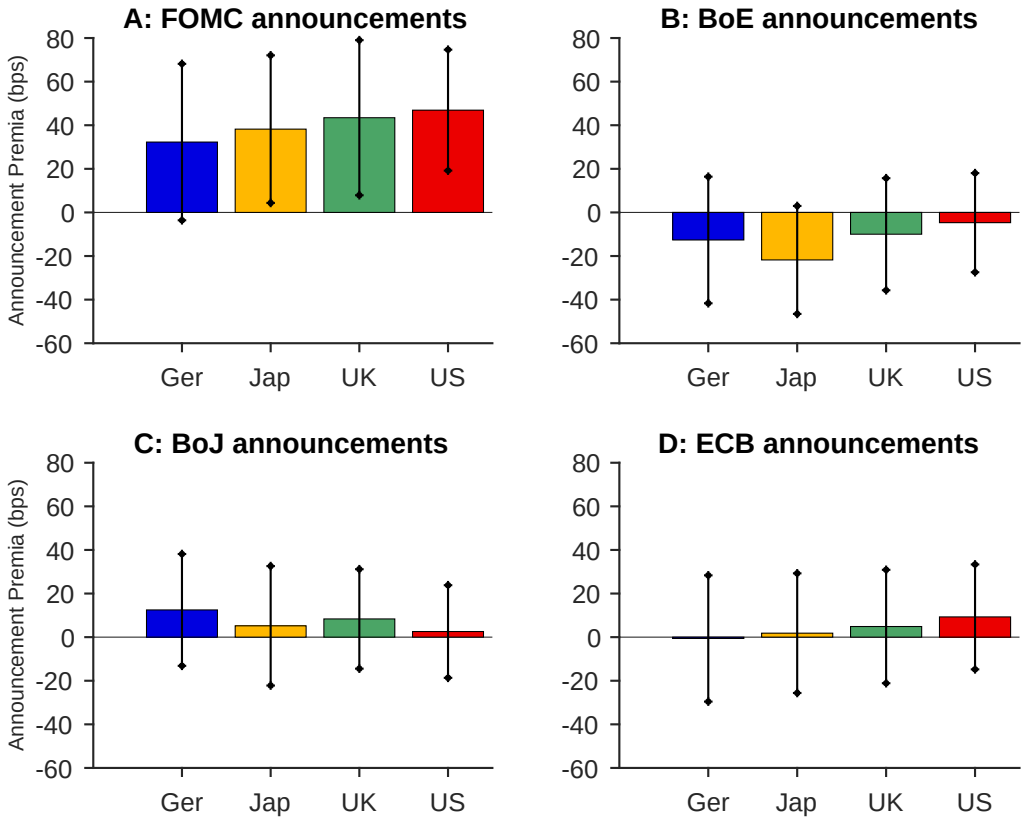


Figure 2
Domestic Announcement Premia for Smaller Central Banks

This chart reports domestic announcement premia for central banks in eight countries: Australia, Brazil, Canada, Indonesia, Mexico, South Africa, Switzerland, and Turkey. Announcement premia are defined as the difference between two-day average excess returns (in basis points) on announcement (a-days) and non-announcement days. Announcement days are those trading days when interest rate decisions taken by the domestic central bank are scheduled for release. Announcement days conflicting with a-days of the Fed, BoE, BoJ, and ECB are excluded from the sample. Non-announcement days are those trading days with no scheduled announcements by the domestic central bank or the Fed, BoE, BoJ, and ECB. Black dots denote confidence intervals (+/-2 standard deviations). Test assets are Datastream Global Equity indices denominated in U.S. dollars in Panel A and local currency in Panel B. Two-day announcement windows are defined in Table A.2. The sample period is January 1998 to December 2016 (data coverage varies across countries).

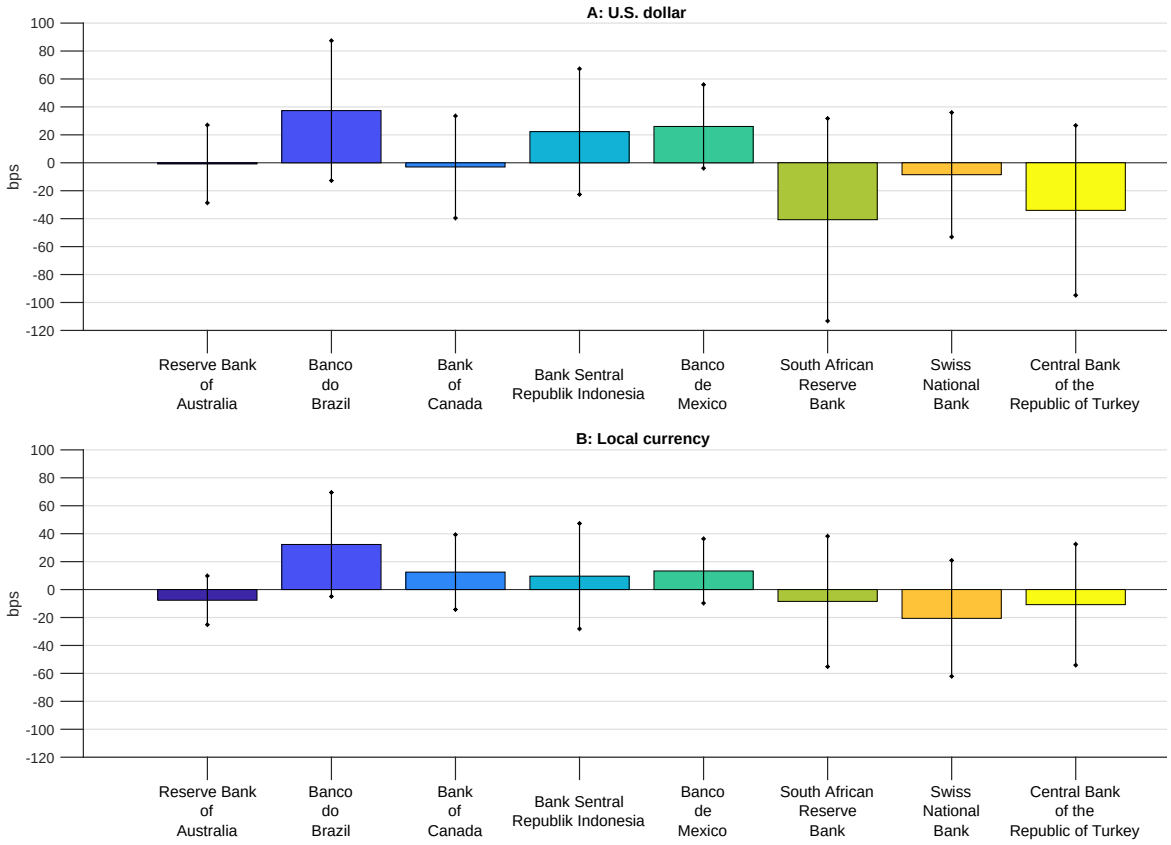


Figure 3
Policy Rates Over Time

This chart reports the daily time-series of the policy rates set by the Federal Reserve (Fed, red solid thick line), the Bank of England (BoE, green dotted line), the European Central Bank (ECB, blue dashed line), and the Bank of Japan (BoJ, orange solid line). The sample period is January 1998 to December 2016.

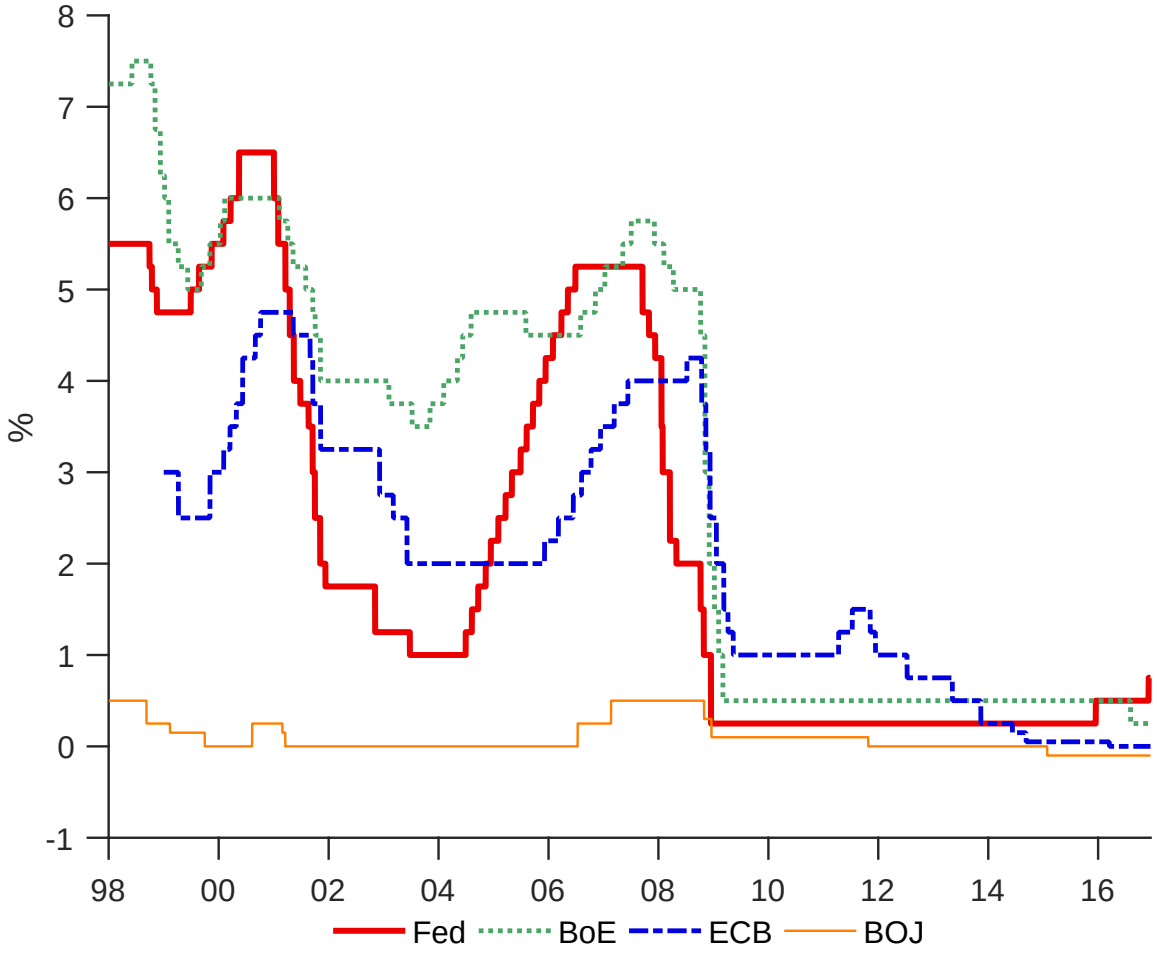


Table 1

Announcement Premia Across Countries: Major Central Banks (1998-2016)

This table reports average two-day excess returns (μ, in basis points) on announcement days (a-days) and the average excess return difference between announcement and non-announcement days (μ^a-μ^n) for 38 global markets. The number of a-days (N^a) and the world average equally-weighted ($\overline{\mu^a}^{EW}$) and value-weighted ($\overline{\mu^a}^{VW}$) a-day excess returns are reported at the bottom of the table. a-days are those trading days when interest rate decisions taken by the Federal Reserve (FOMC), the Bank of England (BoE), the Bank of Japan (BoJ), or the European Central Bank (ECB) are scheduled for release. a-day returns are computed over a two-day window spanning the announcement day and either the following or the previous trading day (see Table A.2 for details). n-days are those trading days with no scheduled announcements by any major central bank, with returns also computed over two-day windows. Equity series are Datastream Global Country total return indices. The daily risk-free rate is obtained from Kenneth French's website. Returns are denominated in U.S. dollars. The sample period is January 1998 (January 1999 for ECB) to December 2016. Countries are grouped into four geographical areas. t-statistics are in square brackets.

Country	I: FOMC		II: BoE		III: BoJ		IV: ECB	
	μ^a	μ^a-μ^n	μ^a	μ^a-μ^n	μ^a	μ^a-μ^n	μ^a	μ^a-μ^n
A: Europe								
Austria	45.38	42.03	8.99	5.43	5.65	1.85	4.43	0.71
	[2.29]	[2.05]	[0.68]	[0.38]	[0.47]	[0.14]	[0.34]	[0.05]
Belgium	35.22	31.78	5.57	1.94	12.06	8.36	20.21	18.70
	[1.93]	[1.68]	[0.45]	[0.14]	[1.06]	[0.67]	[1.51]	[1.31]
Denmark	53.66	46.08	-12.98	-20.47	7.13	-0.42	13.34	5.13
	[2.88]	[2.39]	[-1.04]	[-1.52]	[0.60]	[-0.03]	[1.01]	[0.36]
Finland	58.97	56.55	-8.55	-11.29	41.82	38.98	26.85	27.51
	[2.57]	[2.36]	[-0.44]	[-0.55]	[2.50]	[2.15]	[1.22]	[1.19]
France	45.44	39.69	-10.13	-16.16	12.97	6.85	0.63	-4.07
	[2.31]	[1.95]	[-0.75]	[-1.12]	[1.11]	[0.54]	[0.04]	[-0.27]
Germany	36.28	32.19	-8.39	-12.73	16.93	12.40	2.06	-0.71
	[2.07]	[1.76]	[-0.61]	[-0.86]	[1.41]	[0.95]	[0.15]	[-0.05]
Greece	40.80	48.31	7.81	15.34	23.17	30.53	0.98	13.98
	[1.56]	[1.76]	[0.37]	[0.68]	[1.24]	[1.50]	[0.05]	[0.67]
Ireland	49.00	48.86	4.71	4.16	16.42	15.87	11.22	11.11
	[2.26]	[2.19]	[0.34]	[0.28]	[1.13]	[1.02]	[0.79]	[0.73]
Italy	43.93	42.27	-4.42	-6.41	9.46	7.58	5.15	6.25
	[2.07]	[1.92]	[-0.29]	[-0.40]	[0.75]	[0.55]	[0.35]	[0.39]
Netherlands	44.39	41.14	-10.33	-13.69	9.12	5.70	0.60	-1.48
	[2.42]	[2.15]	[-0.78]	[-0.97]	[0.76]	[0.43]	[0.04]	[-0.10]
Norway	40.21	32.13	-11.51	-19.41	10.38	2.22	2.96	-5.30
	[1.68]	[1.30]	[-0.69]	[-1.08]	[0.65]	[0.13]	[0.17]	[-0.29]
Poland	42.39	40.99	-13.80	-15.80	14.13	11.90	21.03	19.48
	[1.71]	[1.59]	[-0.78]	[-0.83]	[0.86]	[0.67]	[1.19]	[1.03]
Portugal	30.64	31.50	10.25	10.52	10.49	10.73	-1.19	0.18
	[1.59]	[1.58]	[0.73]	[0.71]	[0.92]	[0.86]	[-0.09]	[0.01]
Spain	37.48	33.70	-6.55	-10.65	17.73	13.65	9.09	7.46
	[1.82]	[1.58]	[-0.41]	[-0.64]	[1.58]	[1.09]	[0.60]	[0.46]
Sweden	63.15	56.44	-17.23	-23.93	21.85	14.92	2.18	-4.45
	[2.66]	[2.29]	[-1.01]	[-1.30]	[1.44]	[0.90]	[0.12]	[-0.23]
Switzerland	40.38	36.35	-8.89	-13.22	3.70	-0.84	7.78	4.99
	[2.80]	[2.42]	[-0.86]	[-1.18]	[0.38]	[-0.08]	[0.77]	[0.46]
United Kingdom	44.49	43.35	-8.72	-10.10	9.75	8.26	5.67	4.77
	[2.54]	[2.39]	[-0.71]	[-0.77]	[0.92]	[0.71]	[0.46]	[0.36]

[continued]

Country	I: FOMC		II: BoE		III: BoJ		IV: ECB	
	μ^a	μ^a-μ^n	μ^a	μ^a-μ^n	μ^a	μ^a-μ^n	μ^a	μ^a-μ^n
B: North America								
Canada	44.33	40.81	-2.95	-6.58	12.12	8.37	10.60	6.71
	[2.75]	[2.42]	[-0.25]	[-0.52]	[1.13]	[0.71]	[0.86]	[0.50]
United States	48.41	46.94	-2.95	-4.67	4.32	2.61	9.91	9.32
	[3.59]	[3.32]	[-0.27]	[-0.40]	[0.43]	[0.24]	[0.86]	[0.76]
C: Asia-Pacific								
Australia	40.19	36.42	2.21	-1.67	22.47	18.57	20.77	17.81
	[2.16]	[1.88]	[0.16]	[-0.11]	[1.82]	[1.37]	[1.53]	[1.21]
Hong Kong	27.12	24.89	-2.25	-4.91	10.91	7.95	28.94	27.60
	[1.65]	[1.44]	[-0.16]	[-0.33]	[0.89]	[0.59]	[2.05]	[1.84]
Japan	40.40	38.23	-19.24	-21.78	7.71	5.21	3.38	1.84
	[2.44]	[2.21]	[-1.65]	[-1.72]	[0.59]	[0.37]	[0.26]	[0.13]
New Zealand	26.93	23.52	6.95	3.62	31.21	27.79	18.09	13.33
	[1.63]	[1.38]	[0.65]	[0.31]	[3.11]	[2.55]	[1.69]	[1.15]
Singapore	40.81	40.58	12.39	11.27	20.74	20.00	17.84	17.13
	[2.54]	[2.42]	[0.99]	[0.84]	[1.94]	[1.70]	[1.59]	[1.41]
D: Emerging								
Argentina	24.60	20.03	3.73	-1.00	-7.03	-11.75	13.30	9.23
	[1.16]	[0.89]	[0.22]	[-0.05]	[-0.39]	[-0.60]	[0.82]	[0.52]
Brazil	42.85	39.03	-6.19	-9.94	23.77	19.84	18.78	13.48
	[1.60]	[1.40]	[-0.31]	[-0.47]	[1.36]	[1.04]	[0.99]	[0.66]
Chile	3.21	0.09	13.75	10.69	6.80	3.51	24.04	19.70
	[0.26]	[0.01]	[1.13]	[0.83]	[0.62]	[0.30]	[2.24]	[1.70]
China	12.28	4.04	2.44	-6.17	18.77	9.74	35.62	27.29
	[0.50]	[0.16]	[0.14]	[-0.32]	[1.20]	[0.56]	[2.26]	[1.57]
Indonesia	77.23	77.48	35.48	32.49	37.81	36.15	43.95	41.78
	[3.25]	[3.08]	[1.59]	[1.35]	[1.81]	[1.59]	[2.56]	[2.23]
Malaysia	50.63	46.13	7.02	0.18	1.80	-4.24	14.31	10.29
	[3.06]	[2.69]	[0.56]	[0.01]	[0.11]	[-0.24]	[1.51]	[1.00]
Mexico	40.71	36.39	-16.49	-20.33	3.92	-0.23	28.06	23.14
	[2.37]	[2.01]	[-1.05]	[-1.21]	[0.28]	[-0.01]	[1.85]	[1.42]
Philippines	50.01	50.72	15.22	13.60	14.75	14.20	27.34	29.49
	[2.97]	[2.87]	[1.09]	[0.90]	[0.90]	[0.82]	[2.27]	[2.25]
South Africa	68.15	62.39	-6.49	-12.88	14.26	7.61	-5.68	-12.60
	[2.82]	[2.49]	[-0.39]	[-0.72]	[1.00]	[0.48]	[-0.36]	[-0.74]
South Korea	87.11	80.39	6.54	-2.67	18.83	11.64	-1.19	-4.43
	[3.18]	[2.83]	[0.34]	[-0.13]	[1.09]	[0.61]	[-0.06]	[-0.21]
Taiwan	40.51	39.29	-0.02	-2.04	-9.73	-11.67	20.63	17.80
	[2.11]	[1.96]	[-0.00]	[-0.13]	[-0.67]	[-0.75]	[1.33]	[1.07]
Thailand	23.13	18.00	32.86	24.44	28.27	20.38	12.73	6.86
	[1.22]	[0.90]	[2.07]	[1.41]	[1.49]	[1.01]	[0.77]	[0.39]
Turkey	100.62	102.32	-15.38	-12.89	23.38	25.31	51.41	51.35
	[3.28]	[3.17]	[-0.63]	[-0.49]	[0.99]	[0.99]	[1.77]	[1.68]
Venezuela	6.53	-11.01	15.99	-1.24	12.92	-4.85	6.99	-14.21
	[0.29]	[-0.45]	[0.74]	[-0.05]	[0.63]	[-0.21]	[0.40]	[-0.69]
N^a	152		226		284		243	
$\overline{\mu^a}^{EW}$	43.36		-0.04		14.23		14.02	
$\overline{\mu^a}^{VW}$	44.93		-6.66		7.86		8.23	

Table 2
Central Bank a-day Excess Returns and Monetary Policy Surprises

This table reports coefficients and t-statistics (in square brackets) for OLS regressions of two-day stock market excess returns on an intercept, a central bank announcement dummy variable (D_t^a), and a proxy for central bank surprises (Δr_t^u) for 38 global markets:

$$r_t^i = \alpha + \gamma D_t^a + \delta \Delta r_t^u + \epsilon_t.$$

Announcement days (a-days) are those trading days when interest rate decisions taken by the Federal Reserve (FOMC, Panel I), the Bank of England (BoE, Panel II), the Bank of Japan (BoJ, Panel III), and the European Central Bank (ECB, Panel VI) are scheduled for release. In Panel I, Δr_t^u is a measure of unexpected changes in the Fed funds target proposed by Bernanke and Kuttner (2005). In the other panels, Δr_t^u is a continuous time-series of implied rate changes that is based on the nearest-to-maturity 3-month futures price contracts (Sterling Libor, Euroyen Tibor, and Euribor, respectively). Surprises are cumulated over a two-day window. Test assets are Datastream Global Country indices denominated in U.S. dollars. Countries are grouped into four geographical areas. The sample period is January 1999 to December 2016.

Country	I: FOMC		II: BoE		III: BoJ		VI: ECB	
	γ	δ	γ	δ	γ	δ	γ	δ
A: Europe								
Austria	38.75	-8.94	9.91	0.24	-4.13	3.78	-0.37	1.78
	[2.27]	[-3.75]	[0.65]	[0.35]	[-0.30]	[1.54]	[-0.03]	[2.10]
Belgium	26.52	-9.27	3.95	0.89	4.8	4.00	18.39	2.09
	[1.62]	[-4.06]	[0.28]	[1.38]	[0.36]	[1.69]	[1.36]	[2.61]
Denmark	43.02	-12.30	-18.37	0.83	-6.31	4.08	7.15	2.19
	[2.62]	[-5.38]	[-1.24]	[1.24]	[-0.48]	[1.74]	[0.51]	[2.66]
Finland	48.61	-8.92	-4.66	1.15	28.44	5.00	23.15	2.83
	[2.02]	[-2.66]	[-0.22]	[1.24]	[1.53]	[1.50]	[1.20]	[2.48]
France	37.80	-8.01	-11.54	1.46	2.45	2.02	-4.52	2.90
	[2.16]	[-3.28]	[-0.75]	[2.12]	[0.18]	[0.82]	[-0.31]	[3.40]
Germany	32.92	-1.41	-7.93	2.47	13.85	1.09	-2.39	2.58
	[1.92]	[-0.59]	[-0.52]	[3.64]	[1.02]	[0.45]	[-0.17]	[3.08]
Greece	39.54	-12.64	20.68	0.95	27.28	6.88	10.37	1.43
	[1.52]	[-3.48]	[0.90]	[0.93]	[1.29]	[1.82]	[0.48]	[1.12]
Ireland	43.73	-7.97	3.17	0.88	1.04	1.05	9.36	2.89
	[2.40]	[-3.14]	[0.20]	[1.23]	[0.07]	[0.41]	[0.64]	[3.32]
Italy	38.21	-8.81	-0.06	1.12	8.35	3.05	3.79	2.34
	[2.03]	[-3.35]	[-0.00]	[1.54]	[0.58]	[1.19]	[0.25]	[2.57]
Netherlands	38.68	-8.61	-8.04	1.31	3.56	2.17	-2.75	3.45
	[2.23]	[-3.57]	[-0.53]	[1.94]	[0.26]	[0.89]	[-0.19]	[4.09]
Norway	30.56	-9.00	-7.53	1.86	-3.71	3.78	-6.05	3.58
	[1.41]	[-2.98]	[-0.40]	[2.20]	[-0.22]	[1.25]	[-0.34]	[3.44]
Poland	34.4	-8.51	-17.11	1.03	4.36	5.57	16.68	2.42
	[1.53]	[-2.71]	[-0.87]	[1.17]	[0.24]	[1.73]	[0.91]	[2.23]
Portugal	26.8	-8.44	13.61	-0.28	4.24	0.14	-1.33	1.47
	[1.60]	[-3.62]	[0.92]	[-0.42]	[0.33]	[0.06]	[-0.10]	[1.78]
Spain	28.15	-11.46	-3.76	0.98	9.64	1.01	6.15	1.99
	[1.51]	[-4.42]	[-0.23]	[1.33]	[0.68]	[0.39]	[0.40]	[2.18]
Sweden	53.29	-10.45	-20.2	0.29	11.3	2.42	-6.87	3.96
	[2.42]	[-3.41]	[-1.07]	[0.34]	[0.65]	[0.77]	[-0.39]	[3.77]
Switzerland	34.68	-5.99	-9.07	1.16	-3.57	0.2	3.57	2.13
	[2.50]	[-3.10]	[-0.75]	[2.16]	[-0.33]	[0.10]	[0.31]	[3.18]
United Kingdom	38.61	-9.52	-7.23	2.41	5.14	1.74	2.74	2.71
	[2.43]	[-4.30]	[-0.51]	[3.82]	[0.41]	[0.77]	[0.21]	[3.45]

[continued]

Country	I: FOMC		II: BoE		III: BoJ		VI: ECB	
	γ	δ	γ	δ	γ	δ	γ	δ
B: North America								
Canada	32.36	-15.18	-5.78	2.20	3.34	3.29	4.10	3.08
	[1.94]	[-6.52]	[-0.39]	[3.34]	[0.26]	[1.44]	[0.30]	[3.83]
United States	39.71	-12.33	-1.41	3.34	-1.83	0.51	6.00	2.28
	[2.82]	[-6.28]	[-0.12]	[6.14]	[-0.16]	[0.25]	[0.52]	[3.36]
C: Asia-Pacific								
Australia	30.42	-8.44	2.88	2.63	12.29	7.38	15.47	3.43
	[1.79]	[-3.57]	[0.19]	[3.81]	[0.83]	[2.73]	[1.12]	[4.32]
Hong Kong	18.97	-6.75	4.23	2.02	5.05	6.11	25.65	2.04
	[1.07]	[-2.74]	[0.29]	[3.01]	[0.38]	[2.47]	[1.92]	[2.65]
Japan	34.54	-9.44	-18.88	2.76	0.15	11.16	-0.13	3.08
	[2.15]	[-4.21]	[-1.37]	[4.31]	[0.01]	[4.69]	[-0.01]	[4.26]
New Zealand	17.9	-7.41	2.98	1.99	24.99	3.49	11.95	1.91
	[1.28]	[-3.80]	[0.25]	[3.58]	[2.16]	[1.65]	[1.07]	[2.97]
Singapore	34.03	-6.4	14.80	1.10	11.83	7.81	13.54	2.35
	[2.18]	[-2.94]	[1.21]	[1.94]	[1.00]	[3.60]	[1.19]	[3.58]
D: Emerging								
Argentina	20.24	-3.80	14.55	0.73	-3.54	2.81	10.41	1.36
	[0.83]	[-1.12]	[0.70]	[0.79]	[-0.19]	[0.84]	[0.54]	[1.20]
Brazil	27.00	-17.55	-8.92	1.76	22.91	5.06	8.66	2.07
	[1.07]	[-4.98]	[-0.40]	[1.78]	[1.14]	[1.41]	[0.42]	[1.68]
Chile	-5.67	-6.96	17.56	1.00	-1.72	1.94	18.85	1.32
	[-0.39]	[-3.41]	[1.38]	[1.76]	[-0.15]	[0.97]	[1.57]	[1.86]
China	-5.43	-13.32	-0.73	0.37	12.07	4.32	26.26	1.14
	[-0.23]	[-4.10]	[-0.04]	[0.40]	[0.65]	[1.28]	[1.44]	[1.09]
Indonesia	69.01	-3.58	23.92	0.94	15.92	8.70	37.11	4.54
	[2.29]	[-0.85]	[1.15]	[0.97]	[0.80]	[2.39]	[1.89]	[4.02]
Malaysia	46.59	-0.87	8.23	0.41	-2.17	4.05	8.59	1.40
	[2.63]	[-0.35]	[0.72]	[0.78]	[-0.20]	[2.05]	[0.80]	[2.27]
Mexico	30.00	-11.87	-17.11	2.48	6.87	-0.13	21.53	2.23
	[1.54]	[-4.38]	[-1.05]	[3.39]	[0.46]	[-0.05]	[1.39]	[2.44]
Philippines	44.81	-2.93	22.06	1.42	14.92	5.34	24.14	2.34
	[2.45]	[-1.15]	[1.48]	[2.05]	[1.06]	[2.07]	[1.78]	[2.99]
South Africa	57.84	-11.13	-9.05	0.59	5.65	1.00	-17.9	2.35
	[2.66]	[-3.67]	[-0.48]	[0.70]	[0.33]	[0.33]	[-1.00]	[2.22]
South Korea	66.23	-22.72	-4.04	0.55	2.19	8.45	-10.68	1.18
	[2.55]	[-6.29]	[-0.19]	[0.57]	[0.11]	[2.32]	[-0.56]	[1.06]
Taiwan	34.67	-8.69	-1.28	2.08	-20.53	4.15	19.58	1.50
	[1.83]	[-3.29]	[-0.08]	[2.76]	[-1.35]	[1.49]	[1.31]	[1.73]
Thailand	10.10	-5.86	22.74	1.29	7.32	3.82	4.59	2.98
	[0.45]	[-1.86]	[1.32]	[1.62]	[0.46]	[1.30]	[0.28]	[3.20]
Turkey	96.38	-2.47	-13.25	1.54	8.85	-3.69	45.52	3.89
	[2.83]	[-0.52]	[-0.46]	[1.20]	[0.34]	[-0.79]	[1.67]	[2.42]
Venezuela	-7.51	-1.91	2.47	0.43	-4.77	3.27	-10.95	0.21
	[-0.22]	[-0.39]	[0.09]	[0.34]	[-0.22]	[0.82]	[-0.40]	[0.13]

Table 3

Announcement Premia Across Countries: Domestic vs. USD Excess Returns

This table reports the average two-day excess return difference in domestic currency terms between announcement and non-announcement days (LOC, in basis points), namely the announcement premium, and the difference between the announcement premium denominated in U.S. dollars and the announcement premium denominated in local currency (USD-LOC, in basis points) for 38 global markets. Announcement days (a-days) are those trading days when interest rate decisions taken by the Federal Reserve (FOMC, Panel I), the Bank of England (BoE, Panel II), the Bank of Japan (BoJ, Panel III), and the European Central Bank (ECB, Panel IV) are scheduled for release. a-day returns are computed over a two-day window spanning the announcement day and either the following or the previous trading day (see Table A.2 for details). n-days are those trading days with no scheduled announcements by any major central bank, with returns also computed over two-day windows. Equity series are Datastream Global Country total return indices. The daily risk-free rate is obtained from Kenneth French's website. The sample period is January 1998 (January 1999 for ECB) to December 2016. Countries are grouped into four geographical areas. *t*-statistics are in square brackets.

	I: FOMC		II: BoE		III: BoJ		IV: ECB	
	LOC	USD-LOC	LOC	USD-LOC	LOC	USD-LOC	LOC	USD-LOC
A: Europe								
Austria	31.64	10.39	2.86	2.57	0.37	1.48	6.71	-6.00
	[2.07]		[0.24]		[0.03]		[0.59]	
Belgium	21.57	10.21	-0.66	2.59	6.87	1.49	24.61	-5.90
	[1.36]		[-0.06]		[0.61]		[1.97]	
Denmark	35.92	10.16	-23.02	2.55	-1.50	1.08	11.32	-6.20
	[2.31]		[-1.94]		[-0.13]		[0.92]	
Finland	46.17	10.38	-13.94	2.66	37.49	1.49	33.62	-6.12
	[2.21]		[-0.72]		[2.11]		[1.51]	
France	29.13	10.56	-18.89	2.74	5.38	1.47	1.92	-5.99
	[1.79]		[-1.47]		[0.46]		[0.14]	
Germany	22.07	10.11	-15.31	2.59	10.85	1.55	5.29	-6.00
	[1.45]		[-1.13]		[0.90]		[0.40]	
Greece	37.66	10.65	13.02	2.32	30.37	0.16	19.88	-5.90
	[1.56]		[0.63]		[1.63]		[1.06]	
Ireland	38.65	10.21	2.35	1.80	14.24	1.63	17.10	-5.99
	[2.04]		[0.18]		[0.98]		[1.23]	
Italy	31.83	10.44	-8.97	2.57	6.15	1.42	12.28	-6.03
	[1.84]		[-0.62]		[0.49]		[0.89]	
Netherlands	30.79	10.35	-16.33	2.63	4.21	1.49	4.52	-6.00
	[1.99]		[-1.28]		[0.34]		[0.35]	
Norway	25.11	7.02	-22.75	3.34	-0.67	2.89	-3.94	-1.36
	[1.48]		[-1.51]		[-0.05]		[-0.27]	
Poland	30.52	10.47	-10.80	-5.00	8.16	3.74	16.24	3.24
	[1.64]		[-0.73]		[0.57]		[1.09]	
Portugal	21.02	10.48	7.32	3.20	9.08	1.64	6.09	-5.91
	[1.45]		[0.58]		[0.84]		[0.51]	
Spain	23.42	10.28	-13.38	2.72	12.29	1.36	13.41	-5.95
	[1.38]		[-0.91]		[1.09]		[0.98]	
Sweden	49.43	7.01	-26.99	3.06	10.08	4.84	-2.05	-2.40
	[2.72]		[-1.78]		[0.71]		[-0.13]	
Switzerland	22.61	13.74	-16.27	3.05	-0.47	-0.37	12.14	-7.15
	[1.85]		[-1.52]		[-0.05]		[1.20]	
United Kingdom	25.26	18.10	-12.60	2.50	-0.81	9.07	3.45	1.32
	[1.79]		[-1.11]		[-0.08]		[0.29]	
B: North America								
Canada	32.86	7.95	-13.50	6.93	6.53	1.84	5.24	1.48
	[2.59]		[-1.37]		[0.70]		[0.48]	
United States	46.94	-	-4.67	-	2.61	-	9.32	-
	[3.32]		[-0.40]		[0.24]		[0.76]	

[continued]

	I: FOMC		II: BoE		III: BoJ		IV: ECB	
	LOC	USD-LOC	LOC	USD-LOC	LOC	USD-LOC	LOC	USD-LOC
C: Asia-Pacific								
Australia	27.59	8.83	-9.97	8.30	2.03	16.54	6.38	11.43
	[2.44]		[-1.07]		[0.23]		[0.66]	
Hong Kong	24.63	0.26	-4.94	0.03	7.64	0.31	26.95	0.65
	[1.43]		[-0.34]		[0.57]		[1.80]	
Japan	43.85	-5.62	-17.13	-4.65	2.98	2.23	12.88	-11.03
	[2.55]		[-1.28]		[0.22]		[0.91]	
New Zealand	12.37	11.16	-3.17	6.79	7.30	20.49	3.68	9.66
	[1.52]		[-0.46]		[1.15]		[0.54]	
Singapore	37.20	3.39	9.97	1.30	10.65	9.35	13.83	3.30
	[2.72]		[0.85]		[1.03]		[1.26]	
D: Emerging								
Argentina	17.67	2.36	-10.22	9.23	-9.61	-2.15	2.56	6.67
	[0.78]		[-0.58]		[-0.63]		[0.15]	
Brazil	44.91	-5.88	-3.81	-6.13	13.04	6.80	16.10	-2.62
	[2.35]		[-0.24]		[0.97]		[1.07]	
Chile	3.00	-2.90	-4.11	14.80	2.26	1.25	4.70	15.00
	[0.32]		[-0.44]		[0.26]		[0.53]	
China	-8.17	12.21	5.60	-11.77	17.89	-8.15	10.79	16.50
	[-0.45]		[0.39]		[1.31]		[0.78]	
Indonesia	46.37	31.11	27.24	5.25	26.76	9.40	27.12	14.65
	[2.21]		[1.50]		[1.52]		[1.86]	
Malaysia	26.12	20.00	1.17	-0.99	5.04	-9.28	6.66	3.63
	[2.23]		[0.11]		[0.44]		[0.73]	
Mexico	30.97	5.42	-13.71	-6.62	-0.35	0.12	22.48	0.66
	[2.29]		[-1.09]		[-0.03]		[1.73]	
Philippines	42.17	8.55	13.88	-0.28	13.41	0.79	19.87	9.63
	[2.77]		[1.02]		[0.99]		[1.80]	
South Africa	50.02	12.37	-8.40	-4.48	9.60	-1.99	-7.46	-5.15
	[3.22]		[-0.67]		[0.83]		[-0.59]	
South Korea	55.52	24.87	1.86	-4.54	20.96	-9.32	0.14	-4.56
	[2.94]		[0.11]		[1.33]		[0.01]	
Taiwan	31.51	7.78	-4.27	2.23	-11.51	-0.16	14.91	2.89
	[1.72]		[-0.29]		[-0.79]		[0.95]	
Thailand	12.41	5.60	27.82	-3.38	15.29	5.09	7.35	-0.49
	[0.70]		[1.83]		[0.85]		[0.45]	
Turkey	68.44	33.88	-19.89	7.00	11.90	13.41	34.63	16.71
	[2.60]		[-0.89]		[0.56]		[1.37]	
Venezuela	-35.20	24.19	-9.52	8.28	-14.48	9.64	-23.46	9.25
	[-1.74]		[-0.54]		[-0.84]		[-1.71]	

Table 4
Announcement Premia Across Equity Characteristics

This table reports average excess returns (μ, in basis points) for indices based on equity characteristics for stock markets in the United States (US), the United Kingdom (UK), Japan (Jap), and Germany (Ger). For each country, the table shows average two-day excess returns on announcement- (μ^a) and non-announcement days (μ^n), as well as the difference between returns on the two types of days (μ^a-μ^n). Panel I covers announcements by the Federal Reserve, and Panel II covers announcements by the domestic central bank for each country (the Bank of England, the Bank of Japan, and the European Central Bank). Announcement-day returns are computed over a two-day window spanning the announcement day and the previous trading day. Non-announcement days are those trading days with no scheduled announcements by any major central bank. Equity series are MSCI Style Indices from Datastream. The sample period is January 2001 to December 2016. The number of a-days (N^a) is reported at the bottom of each panel. t-statistics are in square brackets.

	I: FOMC announcements								II: Domestic CB announcements					
	US	UK	Jap	Ger	US	UK	Jap	Ger	UK	Jap	Ger	UK	Jap	Ger
	A: Large Caps				B: Small Caps				A: Large Caps			B: Small Caps		
μ^a	35.93	46.88	47.88	56.42	51.06	56.04	40.67	59.62	-0.30	13.61	8.95	13.33	17.28	9.19
	[2.38]	[2.28]	[2.50]	[2.54]	[2.89]	[2.88]	[2.52]	[2.72]	[-0.02]	[1.04]	[0.50]	[0.95]	[1.37]	[0.55]
μ^n	3.58	-0.06	0.79	2.43	8.50	2.10	6.03	6.47	0.07	0.69	2.43	2.06	5.96	6.47
	[0.82]	[-0.01]	[0.15]	[0.39]	[1.57]	[0.39]	[1.20]	[1.07]	[0.01]	[0.13]	[0.39]	[0.38]	[1.18]	[1.07]
$\mu^a - \mu^n$	32.36	46.94	47.08	53.99	42.56	53.94	34.64	53.15	-0.37	12.92	6.51	11.27	11.31	2.72
	[2.06]	[2.21]	[2.37]	[2.34]	[2.30]	[2.67]	[2.05]	[2.34]	[-0.03]	[0.92]	[0.34]	[0.75]	[0.83]	[0.15]
	C: Value				D: Growth				C: Value			D: Growth		
μ^a	40.20	51.02	49.89	70.17	33.64	51.26	46.14	47.50	3.08	8.58	8.55	-3.59	18.58	8.74
	[2.48]	[2.41]	[2.64]	[2.36]	[2.24]	[2.54]	[2.43]	[2.25]	[0.22]	[0.69]	[0.46]	[-0.24]	[1.38]	[0.49]
μ^n	4.85	-0.05	2.43	1.47	3.30	0.74	0.80	3.64	0.10	2.44	1.47	0.87	0.66	3.64
	[1.04]	[-0.01]	[0.48]	[0.21]	[0.74]	[0.14]	[0.15]	[0.58]	[0.02]	[0.48]	[0.21]	[0.16]	[0.12]	[0.58]
$\mu^a - \mu^n$	35.34	51.08	47.47	68.71	30.34	50.52	45.34	43.87	2.98	6.14	7.08	-4.46	17.92	5.11
	[2.10]	[2.33]	[2.43]	[2.25]	[1.94]	[2.42]	[2.30]	[1.99]	[0.20]	[0.46]	[0.35]	[-0.29]	[1.24]	[0.27]
N^a	128	128	128	128	128	128	128	128	190	227	196	190	227	196

Table 5
Domestic Announcement Premia for Macroeconomic Announcements

This table shows daily average excess returns (μ, in basis points) on domestic announcement days (a-days), the number of a-days in each sample (N^a), and the average excess return difference between announcement- and non-announcement days (μ^a-μ^n) for the United States, United Kingdom, Japan, and Germany. Announcement days are those trading days when employment numbers (Panel I) and inflation numbers (Panel II) are scheduled for release in each country. Non-announcement days are those trading days with no scheduled central bank and macroeconomic announcements in any of the four major economies. Equity series are Datastream Global Country total return indices. The daily risk-free rate is obtained from Kenneth French's website. Returns are denominated in U.S. dollars. The sample period starts with the first available announcement and ends in December 2016. *t*-statistics are in square brackets.

Country	I: Employment			II: Inflation		
	μ^a	N^a	μ^a-μ^n	μ^a	N^a	μ^a-μ^n
United States	4.40	528	2.87	7.03	526	5.51
	[0.94]		[0.60]	[1.42]		[1.09]
United Kingdom	9.56	395	9.74	10.82	423	10.94
	[1.62]		[1.58]	[1.97]		[1.90]
Japan	7.82	527	7.06	12.77	528	12.06
	[1.32]		[1.16]	[2.40]		[2.18]
Germany	16.12	406	14.74	11.42	481	10.44
	[2.69]		[2.36]	[2.06]		[1.81]

Table 6
Announcement Premia: UK-Focused Equity Index

This table reports average excess returns for a sub-index of the UK stock market on announcement (μ^a) and non-announcement days (μ^n), as well as the difference between excess returns on the two types of days (μ^a-μ^n). This sub-index comprises all companies in the FTSE All-Share index that generate at least 70% of their revenues in the United Kingdom. It is compiled by the Bank of England using firm-level data from Thompson-Reuters Worldscope. The left panel covers announcements by the Federal Reserve (FOMC) and the Bank of England (BoE) from January 1998 to December 2016. In the right panel, the sample starts in January 1995. Announcement-day returns are computed over a two-day window spanning the announcement day and the previous trading day. Non-announcement days are those trading days with no scheduled announcements by any major central bank. Returns are denominated in U.S. dollars in Panel I and British pounds in Panel II.

	1998-2016				1995-2016	
	FOMC		BoE		FOMC	
	μ	Obs	μ	Obs	μ	Obs
Panel I: USD						
μ^a	43.85	152	-12.95	226	49.61	176
	[2.59]		[-1.06]		[3.30]	
μ^n	-3.46	1739	-4.91	1727	-2.10	2067
	[-0.73]		[-1.03]		[-0.51]	
$\mu^a - \mu^n$	47.31		-8.03		51.72	
	[2.69]		[-0.61]		[3.31]	
Panel II: GBP						
μ^a	28.46	152	-12.41	226	32.56	176
	[2.21]		[-1.19]		[2.85]	
μ^n	-0.98	1739	-1.90	1727	0.21	2067
	[-0.25]		[-0.47]		[0.06]	
$\mu^a - \mu^n$	29.44		-10.50		32.35	
	[2.19]		[-0.94]		[2.71]	

Table 7

Central Bank Announcements and Domestic Interest Rate Changes

This table presents the results of OLS regressions of daily interbank rate futures on announcement-day dummies for the Bank of England, the Bank of Japan, and the European Central Bank. In Panel I, the dependent variable is the change or absolute change in the 3-month futures-implied Euribor rate (in basis points), and the announcement day dummy is set to 1 on days of scheduled ECB announcements and to 0 otherwise. In Panel II, the dependent variable is the change or absolute change in the 3-month futures-implied Euroyen Tibor rate (in basis points), and the announcement day dummy is set to 1 on days of scheduled BoJ announcements and to 0 otherwise. In Panel III, the dependent variable is the change or absolute change in the 3-month futures-implied Sterling Libor rate (in basis points), and the announcement day dummy is set to 1 on days of scheduled BoE announcements and to 0 otherwise. Contract switch is a dummy variable for days of contract changes, which occur when we roll the futures contract to the next available one. The last column reports the R-squared (in percent). Newey-West t-statistics are in brackets. The sample period is January 1999 to December 2016.

	Intercept	a-day	Contract Switch	R^2 (%)
Panel I: 3-month futures-implied Euribor				
$\Delta(Euribor)$	-0.09	0.25	0.22	0.03
	[-1.53]	[0.96]	[1.98]	
$\lvert\Delta(Euribor)\rvert$	1.48	1.15	-1.01	0.79
	[20.75]	[6.01]	[-11.94]	
Panel II: 3-month futures-implied Euroyen Tibor				
$\Delta(Tibor)$	-0.02	0.10	0.12	0.05
	[-1.02]	[0.99]	[2.68]	
$\lvert\Delta(Tibor)\rvert$	0.51	0.29	-0.28	0.49
	[18.58]	[3.78]	[-8.04]	
Panel III: 3-month futures-implied Sterling Libor				
$\Delta(SterlingLibor)$	-0.09	-0.39	-0.08	0.03
	[-1.38]	[-0.91]	[-0.28]	
$\lvert\Delta(SterlingLibor)\rvert$	1.84	1.43	-0.72	0.60
	[20.07]	[4.23]	[-3.01]	

Table 8

Announcement Days: Excess Returns and Changes in Implied Volatility

This table presents OLS regressions of log changes in domestic implied volatility (in percent) for four major equity markets: the United States (US, Column I), Germany (Ger, Column II), the United Kingdom (UK, Column III), and Japan (Column IV). In Panel A, log changes are regressed on a intercept, an announcement-day dummy for the domestic central bank (D_t^a), domestic equity excess returns (ret_t), and the interaction term between the dummy variable and the excess return (ret_t^a). Panel B presents the same regressions with the addition of announcement-day dummies and interaction terms for the three foreign major central banks. Implied volatility is measured by the VIX index in the United States, the VSTOXX index in Germany, the VFTSE index in the United Kingdom, and the VXJ index in Japan. Test assets are Datastream Global Equity indices denominated in U.S. dollars. Newey-West t-statistics are in brackets. The sample period is January 1998 to December 2016.

	I: US equity Δ VIX (%)		II: Ger equity Δ VSTOXX (%)		III: UK equity Δ VFTSE (%)		IV: Japan equity Δ VXJ(%)	
	coeff	t-stat	coeff	t-stat	coeff	t-stat	coeff	t-stat
A: Domestic central bank announcements								
Intercept	0.14	[2.50]	0.10	[1.66]	0.13	[1.94]	-0.05	[-0.66]
ret_t	-3.95	[-26.50]	-2.52	[-20.69]	-2.92	[-17.88]	-2.00	[-18.00]
D_t^a	-1.59	[-4.55]	-1.11	[-3.44]	-2.44	[-5.70]	-0.56	[-1.57]
ret_t^a	-0.38	[-0.74]	-0.10	[-0.34]	-0.45	[-0.94]	-0.61	[-1.13]
B: Domestic and foreign central bank announcements								
Intercept	0.18	[2.93]	0.18	[2.72]	0.21	[2.94]	0.01	[0.17]
ret_t	-3.96	[-26.00]	-2.55	[-19.61]	-2.92	[-16.74]	-2.11	[-17.10]
D_{FOMC_t}	-1.61	[-4.59]	-1.37	[-3.04]	-1.59	[-3.70]	-2.22	[-4.44]
ret_{FOMC_t}	-0.38	[-0.73]	0.54	[1.83]	0.10	[0.31]	1.58	[4.26]
D_{ECB_t}	-0.50	[-1.71]	-1.03	[-3.01]	-0.36	[-0.86]	-0.43	[-1.27]
ret_{ECB_t}	0.51	[1.48]	0.19	[0.52]	-0.25	[-0.38]	0.14	[0.47]
D_{BoE_t}	0.12	[0.39]	-0.08	[-0.24]	-2.22	[-4.40]	0.40	[1.06]
ret_{BoE_t}	-0.63	[-1.53]	-0.61	[-1.80]	-0.32	[-0.47]	0.65	[1.93]
D_{BoJ_t}	-0.26	[-0.99]	-0.60	[-2.29]	-0.39	[-1.18]	-0.54	[-1.53]
ret_{BoJ_t}	0.24	[0.60]	0.35	[1.01]	0.00	[0.00]	-0.61	[-1.17]

Table 9

Central Bank Announcements and Global Interest Rate Changes

This table presents the results of OLS regressions of the Federal funds rate on announcement-day dummies for the Bank of England (BoE), the Bank of Japan (BoJ), the European Central Bank (ECB), and the Federal Reserve (Fed) in Panel I. In Panel II, it reports the results of OLS regressions of interest rates for the U.K., Japan, the eurozone, and the U.S. on the announcement dummy for the Fed. Interest rates are, respectively, 3-month futures-implied Sterling Libor rate, 3-month futures-implied Euroyen Tibor rate, 3-month futures-implied Euribor rate, and the Federal funds futures-implied rate. In both panels, the dependent variable is the change (Δi) or absolute change ($|\Delta i|$) in the interest rate. The announcement day dummy is set to 1 on days of scheduled central bank announcements and to 0 otherwise. All regressions include a dummy variable for days of contract changes, which occur when we roll the futures contract to the next available one. For announcements made by the Federal Reserve, implied rates are cumulated over a two-day window spanning the FOMC meeting day and either the following or the previous trading day (see Table A.2 for details). All rates are expressed in basis points. Newey-West t-statistics are in brackets. The sample period is January 1999 to December 2016.

Panel I: Impact of central bank announcements on Federal funds rate

Interest rate		a-day			
		BoE	BoJ	ECB	Fed
Fed funds	Δi	0.07	-0.23	-0.27	-0.05
		[0.77]	[-0.97]	[-1.07]	[-0.15]
	$\|\Delta i\|$	-0.33	0.11	0.37	1.04
		[-4.12]	[0.52]	[1.61]	[3.52]

Panel II: Impact of FOMC announcements on futures-implied rates

a-day		Interest rates			
		Sterling Libor	Tibor	Euribor	Fed funds
Fed	Δi	-0.18	-0.37	-1.56	-0.05
		[-0.28]	[-1.39]	[-1.90]	[-0.15]
	$\|\Delta i\|$	-0.51	0.47	1.99	1.04
		[-1.12]	[1.93]	[2.69]	[3.52]

One Central Bank to Rule Them All

- Supplementary Online Appendix -

This Appendix is divided into three sections. Section A complements the data section in the main text. It provides further details about index construction, announcement times and dates, and time and date alignment across time zones. Section B presents the findings on the World CAPM on central bank announcement days. Section C reports the breakdown of two-day average excess returns around major central bank announcement days, FOMC premia over a longer sample period, and FOMC premia for global banks.

A Data Appendix

Table A.1
U.S. Announcements: Timing around the globe

This table reports country details about the timing of announcement days (a-days) and data coverage. Countries are grouped into four geographical regions (Europe, North America, Asia-Pacific, Emerging) and are listed in Column 1. Columns 2 and 3 report, respectively, the minimum and maximum time difference between the country local time and Eastern Standard Time, where the time difference is measured in number of hours h. Column 4 reports country trading hours (in local time). Columns 5 presents the timing of announcement days around the globe. Announcement days are those trading days when FOMC interest rate decisions are scheduled for release in the United States. According to the time zone, country-i a-days either coincide with U.S. a-days (Same) or are led by one day (Next). The last column reports the starting date of the return series for each Datastream Country Global Equity Index.

Country	Time Difference (h)		Trading Hours	a-days Timing	Data Coverage
	Min	Max	(Local Time)	FOMC	
Europe					
Austria	5	7	08:55-17:35	Next	02-Jan-73
Belgium	5	7	09:00-17:40	Next	02-Jan-73
Denmark	5	7	9:00-17:00	Next	03-Jan-73
Finland	6	8	10:00-18:30	Next	28-Mar-88
France	5	7	9:00-17:35	Next	02-Jan-73
Germany	5	7	09:00-17:30	Next	02-Jan-73
Greece	6	8	10:30-17:00	Next	02-Jan-90
Ireland	4	6	08:00-16:30	Next	02-Jan-73
Italy	5	7	9:05-17:35	Next	02-Jan-73
Netherlands	5	7	09:00-17:30	Next	02-Jan-73
Norway	5	7	9:00-16:20	Next	03-Jan-80
Poland	5	7	09:00-16:50	Next	02-Mar-94
Portugal	4	7	08:00-16:30	Next	03-Jan-90
Spain	5	7	09:00-17:30	Next	03-Mar-87
Sweden	5	7	09:00-17:30	Next	05-Jan-82
Switzerland	5	7	09:00-17:30	Next	02-Jan-73
United Kingdom	4	6	8:00-16:30	Next	02-Jan-73
North America					
Canada	-1	0	9:30-16:00	Same	02-Jan-73
United States	0	0	9:30-16:00	Same	02-Jan-73
Asia-Pacific					
Australia	14	16	10:00-16:00	Next	02-Jan-73
Hong Kong	12	14	9:30-12:30, 14:30-16:00	Next	02-Jan-73
Japan	13	14	9:00-11:30, 12:30-15:00	Next	02-Jan-73
New Zealand	17	18	10:00-16:45	Next	05-Jan-88
Singapore	11.5	13	9:00-12:30, 14:00:-17:00	Next	02-Jan-73
Emerging					
Argentina	1	3	11:00-17:00	Same	03-Aug-93
Brazil	1	3	11:00-18:00	Same	05-Jul-94
Chile	0	2	09:00-17:30	Same	04-Jul-89
China	12	13	09:30-11:30, 13.00-15.00	Next	27-Jul-93
Indonesia	11	12	09:30-12:00, 13.30-16.00	Next	03-Apr-90
Malaysia	11.5	13	09:00-12:30, 14.30-17.00	Next	03-Jan-86
Mexico	-2	-1	08:30-15:00	Same	11-May-89
Philippines	12	14	09:30-12:10	Next	09-Nov-88
South Africa	6	7	09:00-17:00	Next	02-Jan-73
South Korea	13	14	09:00-15:00	Next	10-Sep-87
Taiwan	12	13	9:55-12:30, 14:45-16:40	Next	03-May-88
Thailand	11	12	09:00-13:30	Next	05-Jan-87
Turkey	6	9	09:30-12:30, 14:00-17:30	Same	13-Jun-89
Venezuela	-0.5	1		Same	03-Jan-90

Table A.2
Two-Day Windows: Monetary Policy Announcements

This table defines two-day trading windows around the scheduled monetary policy announcements of the central banks examined in the main text. Panel I presents FOMC windows, Panel II shows BoE, BoJ, and ECB windows, and Panel III covers smaller central banks. *FOMC/Major CB/Domestic CB* denote the trading day when the announcement of the central bank of interest is scheduled to take place. *Previous* and *Next* denote, respectively, the trading day before and after each scheduled monetary policy announcement. Countries are grouped by geographical area (Asia-Pacific, North America, Europe, Western/Eastern Emerging) in Panel I and Panel II. Panel III lists the countries where the smaller central banks are located.

Panel I: FOMC

Group A:
North America and Western Emerging

	Previous	FOMC	Next
Pre Feb-94		a-day 1	a-day 2
Afterwards	a-day 1	a-day 2	

Group B:
Europe, Asia-Pacific and Eastern Emerging

	Previous	FOMC	Next
Pre Feb-94		a-day 1	a-day 2
Afterwards		a-day 1	a-day 2

Panel II: BoE/BoJ/ECB

Group A:
Europe, North America, and Western Emerging

Previous	Major CB	Next
a-day 1	a-day 2	

Group B:
Asia-Pacific and Eastern Emerging

Previous	Major CB	Next
	a-day 1	a-day 2

Panel III: Smaller Central Banks

Group A:
Canada, Indonesia, Mexico
South Africa, Switzerland, Turkey

Previous	Domestic CB	Next
a-day 1	a-day 2	

Group B:

Brazil

Previous	Domestic CB	Next
	a-day 1	a-day 2

Group C
Australia

	Previous	Domestic CB	Next
Pre Jan-07		a-day 1	a-day 2
Afterwards	a-day 1	a-day 2	

Table A.3
Scheduled Announcements Outside the U.S.: Data Overview for Major Countries

This table reports details about scheduled releases of monetary policy decisions (Panel I), inflation numbers (Panel II), and employment numbers (Panel III) in the United Kingdom, Japan, and Germany. The table shows the number of releases (Obs), the sample period covered, the details about the timing of the releases, and data sources.

Announcement	Obs	Period	Timing of scheduled releases	Source
			Panel I: Monetary Policy	
United Kingdom	51	Feb1992-May1997	Monthly. Regular meetings between the Chancellor and the Governor (Monthly Monetary Meetings). The former was not obliged to accept the bank's advice; financial markets were able to see the decision with a certain time lag.	Bank of England
	232	Jun1997-2016	Monthly. Independent Bank of England.	
Japan	47	Mar1973-1995	Sparse. BoJ was independent, but very weak in legal status.	Bank of Japan
	284	1998-2016	Monthly. Independent Bank of Japan.	
Germany	1006	Aug1957-1998	Every two weeks.	Bundesbank
	243	1999-2016	Progressively decreasing from twice per month in 1999 to a six-week cycle in 2015.	ECB
			Panel II: Inflation	
United Kingdom	423	1981-2016	Monthly. Retail Price Index (prior to Nov2003), Consumer Price Index (afterwards).	ONS
Japan	564	1970-2016	Monthly. Consumer Price Index.	Statistics Bureau of Japan
Germany	481	Sep1976-2016	Monthly. Preliminary CPI.	Federal Statistical Office
			Panel III: Employment	
United Kingdom	210	Feb1984-Jun2001	Monthly. Prior to Dec1984: Unemployment releases. Unemployment and employment releases were announced independently from Dec1984 to May1986 and jointly afterwards. Releases are from: "Employment Gazette" (Feb1984-Oct1995) and "Labour Market Trends" (Nov1995-Jun2001).	Hard copies
		Jul2001-2016	Monthly. From: "Labour market trends" (Jul2001-Dec2006), "Economic and Labour Market Review" (Jan2007-Apr2011) and "Labour Market Statistics" (Jan2008-onwards).	ONS website
Japan	810	Oct1949-2016	Monthly. From"Labour Force Survey."	Statistics Bureau of Japan
Germany	406	Feb1983-Dec2016	Monthly.	Federal Employment Agency

Table A.4

Scheduled Monetary Policy Announcements by Smaller Central Banks

This table reports details about scheduled releases of interest rate decisions for the set of smaller central banks. Column 1 and Column 2 present countries and the associated central banks. Column 3 shows the number of scheduled monetary policy announcements (a-days) over the period January 1998 to December 2016. Column 4 summarizes information about the frequency and timing of those announcements.

Country	Central bank	a-days	Frequency and timing of announcements
Australia	Reserve Bank of Australia	206	Eleven meetings per year, on the first Tuesday of the month except in January. Decisions announced the next day at 9.30am until December 2007, and on the meeting day at 2.30pm since 2008.
Brazil	Banco Central do Brazil	181	Monthly meetings from January 1998 to December 2005 (few exceptions in 1998 and 1999). Eight meetings per year since 2006. Decisions announced on the last day of meeting after the closing time of local financial markets.
Canada	Bank of Canada	128	Eight meetings per year since December 2000. Decisions announced at 9am. *Notes*: Bank of Canada releases the schedule of forthcoming announcements rather than meeting dates.
Indonesia	Bank Sentral Republik Indonesia	140	Monthly meetings (with few exceptions) since July 2005. Press release published on meeting day.
Mexico	Banco de Mexico	174	Twice per month from 2003 to 2005 (once in December). Monthly meetings in 2006 and 2007. Eleven meetings per year from 2008 to 2010. Eight meetings per year afterwards. Decisions announced at 9am until December 2014, and at 1pm afterwards.
South Africa	South African Reserve Bank	108	Six meetings per year since 2004. Press release published on the last meeting day (two- or three-day meetings).
Switzerland	Swiss National Bank	67	Quarterly meetings (March, June, September, December) since March 2000. Press release published on meeting day.
Turkey	Central Bank of the Republic of Turkey	142	Monthly meetings (with few exceptions) since January 2005. Decisions announced at 2pm.

B World CAPM on central bank announcement days

We construct the world market portfolio from the 38 stock markets covered in our paper. Country index returns are denominated in USD and are weighted by one-month lagged total market capitalization, which we obtain from Datastream. Weights are rebalanced at the end of each month. The correlation between daily returns of our world market portfolio and the MSCI World Index (available since February 2001) is 99%. The FOMC risk premium for the world market portfolio is 37.1 bps (t-statistic = 2.75), and is economically and statistically higher than its announcement premium for other central banks, confirming our prior results.

We construct test portfolios from stocks from four major markets: Germany, Japan, the U.K., and the U.S. Data coverage is proportional to stock market size: the average number of stocks in each decile portfolio is 75 for Germany, 344 for Japan, 112 for the U.K., and 660 for the U.S. We estimate the betas of all listed stocks in our four markets with the world market portfolio by regressing their returns on a constant and the world market portfolio return, employing rolling windows of 250 trading days (approximately 1 year).

We next sort all stocks by their betas into ten value-weighted portfolios, and then estimate the betas of these beta-sorted portfolios over the full sample. We use two different methodologies for the sorting procedure. In the first approach, we sort stocks by betas within each country, resulting in four sets of ten value-weighted portfolios. For each decile, we then equal-weight the four associated country portfolios. This approach ensures that all countries are represented equally in the resulting test portfolios, but there may be substantial variation in stock betas within each portfolio. In the second approach, we pool all stocks in our sample and then sort them into ten beta portfolios, regardless of their country. These pooled portfolios will have much less variation in stock betas within each portfolio, but country representation will vary across portfolios (typically, the proportion of U.S. stocks increases in higher-beta portfolios).

There is wide variation in world market portfolio betas in all four countries. In the U.S., the difference between the highest- and lowest-beta portfolios is 2.3, which is considerably greater than the range for the domestic CAPM. The range is 1.6 for the U.K., 1.2 for Japan,

and 2.1 for Germany. For the pooled test portfolios the range is 2.1.[1] Having such a large range increases the power of tests of the world CAPM compared to the domestic CAPM in the U.S. (see Kan & Zhang (1999) and Bryzgalova (2014)).

Figure B.1 plots the average excess returns against the betas for the ten beta-sorted portfolios, and does so separately for different central bank a-days and n-days. Panel I shows the country-level results and Panel II shows the pooled results. We plot the securities market line (SML) for n-days (dashed green line) and a-days (solid red line). Although the average world market excess return was positive on n-days (4.1 bps), in both panels the SML on n-days is downward-sloping and the intercepts are positive, contrary to what the CAPM predicts. For the country-level aggregated portfolios, the intercept is 10.5 bps (t-statistic = 9.51) and the slope is -8.1 (t-statistic = -5.61). For pooled portfolios, the intercept is 7.7 bps (t-statistic = 9.48) and the slope is -1.56 (t-statistic = -1.71).

[FIGURE B.1 ABOUT HERE.]

By contrast, Chart A shows that on FOMC a-days the SML is strongly upward-sloping in both panels, with a slope of 39.5 bps (t-statistic = 8.31) for country-level aggregated portfolios and 26.6 bps (t-statistic = 5.90) for pooled portfolios. The positive implied market risk premium on a-days, together with very high R^2s of 88.3% and 79.0%, is consistent with the hypothesis that stock returns follow the World CAPM on such days. The SML slope on a-days for pooled portfolios almost perfectly fits their average excess returns, indicating that the CAPM "works" extremely well. For country-level portfolios, the intercept is 0.9 bps and is not statistically different from zero (t-statistic = 0.25), while it is 7.9 bps (t-statistic = 1.96) for pooled portfolios. The positive intercept for pooled portfolios is the only result not supporting the CAPM on FOMC a-days.[2]

Charts B, C, and D repeat this analysis for the BoE, BoJ, and ECB, respectively. Clearly, in contrast to FOMC a-days, the world CAPM does not help explain the cross-section of returns on a-days of non-U.S. central banks. The highest R^2 is 38.9% (for country-level

[1] Table B.1 reports the betas and portfolio shares for our test portfolios. The betas resulting from the two different approaches are not very different across the ten portfolios, even though the composition of the portfolios often is.

[2] These findings remain the same over the longer 1978-2016 FOMC sample. They are also not driven by higher volatility on FOMC a-days, as the relation between beta and average returns is actually negative on large-move (those with absolute excess returns in the top decile) days.

portfolios on BoJ a-days), but is generally much lower. Furthermore, intercepts are mostly different from zero, while the SML slopes are typically different from the world market portfolio excess return on the corresponding announcement day. These results provide further evidence that the Fed is unique and different from other central banks in its impact on equity markets.

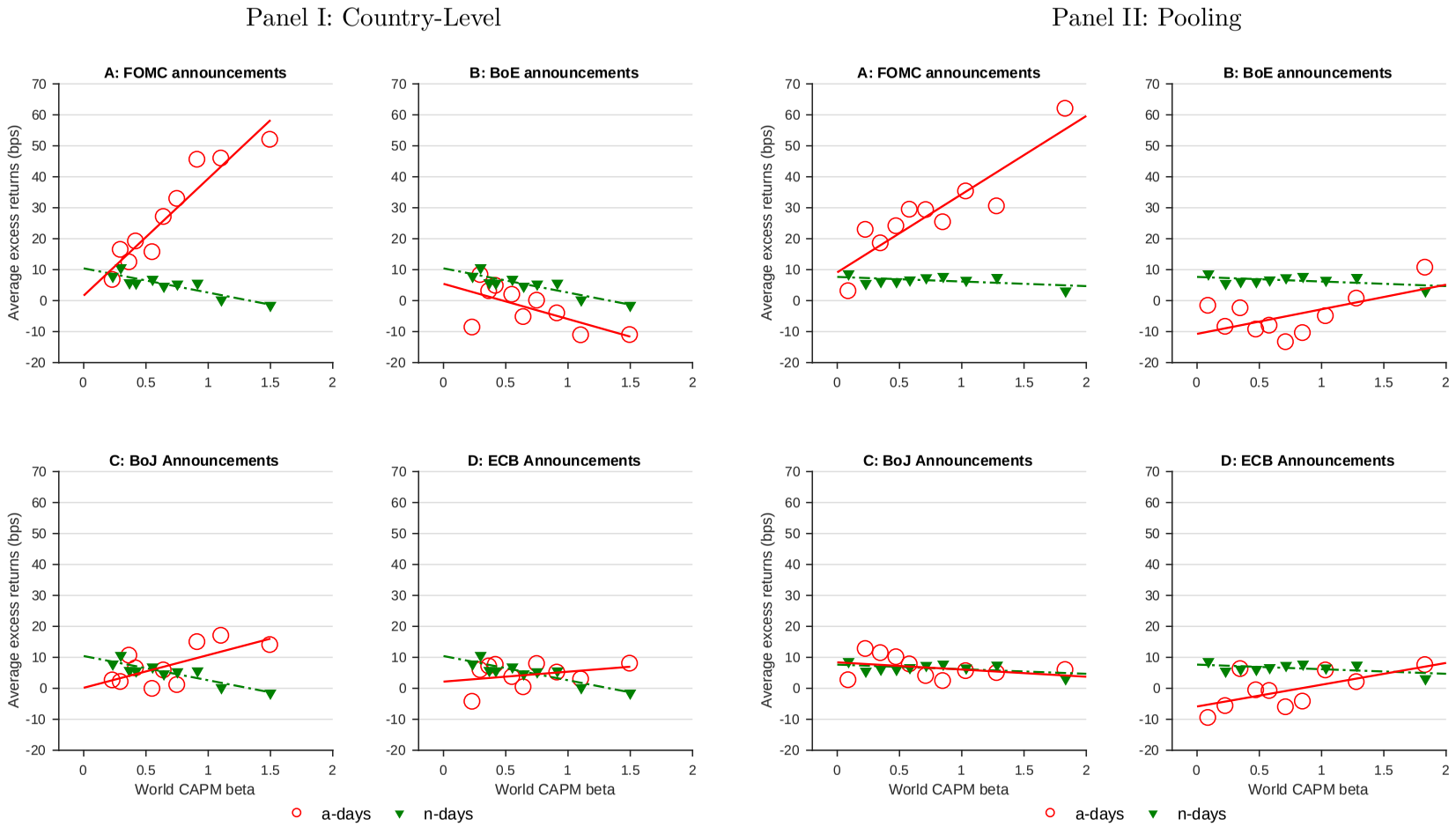
Table B.1
World CAPM-Beta Sorted Portfolios: Average Betas and Average Portfolio Shares

This table reports average betas (Panel I) and average portfolio shares (Panel II) for ten value-weighted World CAPM beta-sorted portfolios consisting of stocks from four countries (Germany, Japan, the United Kingdom, and the United States). World market betas are estimated using rolling windows of 250 trading days. Stocks are sorted into ten portfolios - from low (Portfolio 1) to high (Portfolio 10) - according to their estimated betas. Portfolios in Panel *a* (Panel *b*) are constructed by sorting and value-weighting stocks at country-level (by pooling and value-weighting all stocks, regardless of the country origin). U.S. stock returns are from the CRSP database. Non-U.S. stock returns are from the Worldscope database (Datastream) and are converted into U.S. dollars using spot rates from Thomson-Reuters. The sample period is January 1998 to December 2016.

Country	Portfolios									
	Low	2	3	4	5	6	7	8	9	High
	Panel I: Average betas									
a) Country-Level:										
United States	-0.12	0.24	0.45	0.62	0.78	0.92	1.08	1.28	1.56	2.20
United Kingdom	-0.03	0.19	0.28	0.36	0.46	0.56	0.69	0.84	1.04	1.56
Japan	-0.15	0.06	0.16	0.25	0.34	0.43	0.53	0.63	0.78	1.09
Germany	-0.27	0.11	0.22	0.32	0.44	0.57	0.74	0.95	1.24	1.84
b) Pooling:										
All	-0.19	0.10	0.25	0.39	0.53	0.68	0.85	1.04	1.31	1.95
	Panel II: Portfolio share (%)									
a) Country-Level:										
United States	55.08	55.06	55.03	55.10	55.11	55.19	55.13	55.10	55.02	54.99
United Kingdom	9.83	9.80	9.78	9.75	9.75	9.72	9.75	9.77	9.81	9.84
Japan	28.75	28.83	28.88	28.86	28.83	28.82	28.82	28.82	28.82	28.80
Germany	6.35	6.31	6.31	6.29	6.30	6.27	6.30	6.31	6.34	6.37
b) Pooling:										
United States	38.09	36.98	35.73	38.63	45.74	56.62	66.38	73.31	77.85	82.99
United Kingdom	7.29	10.99	12.99	13.51	12.74	11.00	9.37	7.74	6.58	5.28
Japan	46.78	45.75	44.60	40.71	34.18	25.82	18.80	14.12	10.31	5.93
Germany	7.83	6.27	6.68	7.15	7.34	6.55	5.46	4.83	5.26	5.80

Figure B.1
World CAPM Beta-Sorted Portfolios and Major Central Bank Announcements

This figure plots average two-day excess returns in basis points (bps) against full-sample world market betas for ten value-weighted beta-sorted portfolios consisting of stocks from four countries (Germany, Japan, the United Kingdom, and the United States). The x-axis reports full-sample world market betas. The y-axis reports average two-day portfolio excess returns computed separately for announcement days (a-days, red circles) and non-announcement days (n-days, green triangles). For each set of days, the implied OLS estimates of the security market line is also plotted. Announcements are scheduled interest rate decisions in the United States (Panel A), the United Kingdom (Panel B), Japan (Panel C), and the Euro Area (Panel D). World market betas are estimated using rolling windows of 250 trading days. Portfolios in Panel I are constructed by sorting and value-weighting stocks at country-level, and then building ten global portfolios by averaging the four cross-sections of ten country-level sorted portfolios. Global portfolios in Panel II are constructed by pooling and value-weighting all stocks, regardless of the country origin. A-day returns are computed over two-day windows spanning the announcement day and the previous trading day in Panel C, and the announcement day and the next trading day in all other panels. U.S. stock returns are from the CRSP database. Non-U.S. stock returns are from the Worldscope database (Datastream) and are converted into U.S. dollars using spot rates from Thomson-Reuters. Delisted/dead companies are included. The sample period is January 1998 to December 2016.



C Additional Evidence on Announcement Premia

Table C.1

Breakdown of Two-Day Average Excess Returns Around Major Scheduled Monetary Policy Meetings

This table decomposes two-day average excess returns around major central bank announcement days (a-days) into one-day average excess returns (a-day^1 and a-day^2, respectively). Announcement days are the calendar days when interest rate decisions taken by the Federal Reserve (Panel I), the Bank of England (BoE, Panel II), the Bank of Japan (BoJ, Panel III), and the European Central Bank (ECB, Panel IV) are scheduled for release. Two-day windows are defined in Table A.2. The last column of each panel recovers the two-day average excess return as defined in the main text. Excess returns are expressed in basis points. Countries are grouped into four geographical areas. *t*-statistics are in square brackets. Test assets are Datastream Global Equity indices denominated in U.S. dollars. The sample period is January 1998 (January 1999 for ECB) to December 2016.

Country	I: FOMC			II: BoE			III: BoJ			IV: ECB		
	a-day^1	a-day^2	Two-day	a-day^1	a-day^2	Two-day	a-day^1	a-day^2	Two-day	a-day^1	a-day^2	Two-day
						A: Europe						
Austria	29.47	15.91	45.38	2.19	6.79	8.99	9.68	-4.03	5.65	4.98	-0.55	4.43
	[2.95]	[1.11]		[0.26]	[0.70]		[1.17]	[-0.51]		[0.65]	[-0.06]	
Belgium	29.88	5.34	35.22	0.44	5.13	5.57	3.82	8.24	12.06	18.61	1.60	20.21
	[2.64]	[0.40]		[0.05]	[0.52]		[0.47]	[1.03]		[2.42]	[0.17]	
Denmark	39.12	14.54	53.66	-7.34	-5.64	-12.98	6.03	1.10	7.13	10.87	2.47	13.34
	[3.30]	[1.10]		[-0.89]	[-0.60]		[0.67]	[0.14]		[1.32]	[0.27]	
Finland	56.26	2.71	58.97	-17.69	9.14	-8.55	35.92	5.90	41.82	0.82	26.04	26.85
	[4.32]	[0.15]		[-1.57]	[0.62]		[3.09]	[0.54]		[0.06]	[1.49]	
France	49.04	-3.59	45.44	-8.40	-1.73	-10.13	9.80	3.17	12.97	6.35	-5.72	0.63
	[4.22]	[-0.25]		[-0.97]	[-0.16]		[1.08]	[0.40]		[0.76]	[-0.55]	
Germany	36.71	-0.44	36.28	-3.42	-4.97	-8.39	15.65	1.28	16.93	7.36	-5.30	2.06
	[4.05]	[-0.03]		[-0.40]	[-0.49]		[1.77]	[0.15]		[0.88]	[-0.53]	
Greece	13.18	27.62	40.80	5.96	1.85	7.81	3.79	19.38	23.17	-5.49	6.47	0.98
	[0.70]	[1.63]		[0.44]	[0.13]		[0.29]	[1.62]		[-0.41]	[0.52]	
Ireland	35.45	13.54	49.00	0.09	4.62	4.71	6.44	9.98	16.42	5.84	5.38	11.22
	[2.61]	[0.90]		[0.01]	[0.44]		[0.70]	[1.06]		[0.62]	[0.56]	
Italy	45.18	-1.25	43.93	-5.05	0.63	-4.42	3.85	5.61	9.46	12.19	-7.04	5.15
	[3.62]	[-0.08]		[-0.54]	[0.05]		[0.40]	[0.65]		[1.41]	[-0.66]	
Netherlands	39.12	5.27	44.39	-8.76	-1.57	-10.33	6.29	2.82	9.12	8.51	-7.91	0.60
	[3.59]	[0.39]		[-1.07]	[-0.15]		[0.69]	[0.36]		[1.10]	[-0.80]	
Norway	27.08	13.13	40.21	-7.39	-4.12	-11.51	7.03	3.35	10.38	4.34	-1.38	2.96
	[2.00]	[0.71]		[-0.66]	[-0.32]		[0.61]	[0.35]		[0.39]	[-0.11]	
Poland	28.57	13.82	42.39	-18.48	4.68	-13.80	3.76	10.37	14.13	-1.20	22.23	21.03
	[1.80]	[0.78]		[-1.61]	[0.35]		[0.30]	[0.99]		[-0.12]	[1.71]	
Portugal	29.47	1.17	30.64	-2.53	12.78	10.25	-2.28	12.77	10.49	-1.11	-0.08	-1.19
	[2.66]	[0.08]		[-0.28]	[1.23]		[-0.26]	[1.67]		[-0.13]	[-0.01]	
Spain	46.56	-9.08	37.48	-6.85	0.30	-6.55	17.15	0.58	17.73	10.13	-1.05	9.09
	[4.03]	[-0.59]		[-0.76]	[0.02]		[1.91]	[0.07]		[1.17]	[-0.10]	
Sweden	63.82	-0.66	63.15	-7.48	-9.75	-17.23	22.59	-0.74	21.85	1.24	0.95	2.18
	[4.75]	[-0.04]		[-0.65]	[-0.74]		[2.05]	[-0.07]		[0.10]	[0.08]	
Switzerland	29.14	11.24	40.38	-1.34	-7.55	-8.89	5.30	-1.60	3.70	8.47	-0.69	7.78
	[3.24]	[1.01]		[-0.20]	[-0.99]		[0.72]	[-0.24]		[1.46]	[-0.09]	
United Kingdom	40.10	4.39	44.49	-8.26	-0.46	-8.72	6.72	3.03	9.75	3.47	2.20	5.67
	[3.34]	[0.35]		[-1.03]	[-0.05]		[0.80]	[0.44]		[0.46]	[0.25]	

[continued]

Country	I: FOMC			II: BoE			III: BoJ			IV: ECB		
	a-day[1]	a-day[2]	Two-day	a-day[1]	a-day[2]	Two-day	a-day[1]	a-day[2]	Two-day	a-day[1]	a-day[2]	Two-day
B: North America												
Canada	9.01	35.31	44.33	-6.15	3.20	-2.95	0.30	11.82	12.12	6.89	3.71	10.60
	[0.85]	[3.16]		[-0.80]	[0.39]		[0.03]	[1.60]		[0.86]	[0.44]	
United States	13.57	34.84	48.41	-2.72	-0.23	-2.95	2.60	1.72	4.32	9.75	0.16	9.91
	[1.14]	[3.51]		[-0.37]	[-0.03]		[0.34]	[0.23]		[1.26]	[0.02]	
C: Asia Pacific												
Australia	16.40	23.80	40.19	12.46	-10.26	2.21	17.98	4.49	22.47	14.71	6.06	20.77
	[1.47]	[1.68]		[1.33]	[-1.18]		[2.19]	[0.49]		[1.65]	[0.69]	
Hong Kong	6.92	20.20	27.12	-8.24	5.99	-2.25	4.57	6.34	10.91	11.23	17.71	28.94
	[0.72]	[1.54]		[-0.86]	[0.65]		[0.54]	[0.70]		[1.19]	[1.88]	
Japan	4.86	35.54	40.40	-5.24	-14.00	-19.24	9.46	-1.75	7.71	2.49	0.89	3.38
	[0.42]	[2.46]		[-0.56]	[-1.94]		[1.08]	[-0.20]		[0.27]	[0.10]	
New Zealand	14.86	12.07	26.93	9.92	-2.97	6.95	22.46	8.75	31.21	6.82	11.27	18.09
	[1.48]	[0.95]		[1.29]	[-0.42]		[3.32]	[1.27]		[0.98]	[1.44]	
Singapore	24.84	15.97	40.81	7.69	4.70	12.39	14.39	6.34	20.74	7.75	10.09	17.84
	[2.75]	[1.30]		[0.89]	[0.67]		[2.07]	[0.85]		[0.97]	[1.48]	
D: Emerging												
Argentina	0.71	23.88	24.60	6.55	-2.82	3.73	-6.70	-0.32	-7.03	4.15	-1.04	4.15
	[0.05]	[1.84]		[0.67]	[-0.23]		[-0.47]	[-0.03]		[0.40]	[-0.11]	
Brazil	-6.90	49.75	42.85	-21.51	15.32	-6.19	21.72	2.05	23.77	9.81	17.53	9.81
	[-0.34]	[3.36]		[-1.76]	[1.08]		[1.69]	[0.17]		[0.70]	[1.34]	
Chile	-9.39	12.60	3.21	-2.52	16.27	13.75	0.54	6.27	6.80	6.51	17.53	24.04
	[-0.99]	[1.41]		[-0.36]	[2.00]		[0.07]	[0.95]		[1.01]	[2.43]	
China	7.02	5.25	12.28	-5.19	7.63	2.44	7.96	10.81	18.77	6.05	29.57	35.62
	[0.53]	[0.29]		[-0.42]	[0.72]		[0.72]	[0.90]		[0.55]	[2.72]	
Indonesia	10.88	66.36	77.23	12.94	22.54	35.48	31.51	6.30	37.81	17.93	26.02	43.95
	[0.82]	[3.41]		[0.62]	[1.84]		[2.14]	[0.43]		[1.42]	[2.29]	
Malaysia	3.72	46.90	50.63	3.19	3.83	7.02	11.26	-9.47	1.80	8.07	6.25	14.31
	[0.47]	[3.16]		[0.40]	[0.51]		[0.81]	[-1.12]		[1.24]	[1.03]	
Mexico	5.38	35.33	40.71	-14.45	-2.04	-16.49	13.51	-9.59	3.92	19.92	8.15	28.06
	[0.44]	[3.35]		[-1.55]	[-0.19]		[1.40]	[-1.04]		[2.03]	[0.82]	
Philippines	8.76	41.25	50.01	6.56	8.66	15.22	8.93	5.82	14.75	6.44	20.89	27.34
	[0.91]	[3.46]		[0.74]	[1.02]		[0.98]	[0.57]		[0.81]	[2.37]	
South Africa	31.49	36.67	68.15	-9.94	3.45	-6.49	6.92	7.35	14.26	-7.26	1.58	-5.68
	[2.31]	[2.01]		[-0.89]	[0.27]		[0.62]	[0.79]		[-0.69]	[0.14]	
South Korea	30.01	57.11	87.11	1.48	5.06	6.54	13.34	5.49	18.83	-5.87	4.68	-1.19
	[1.86]	[2.37]		[0.09]	[0.38]		[1.10]	[0.42]		[-0.39]	[0.36]	
Taiwan	18.43	22.07	40.51	-2.77	2.75	-0.02	-2.58	-7.14	-9.73	-0.24	20.87	20.63
	[1.60]	[1.46]		[-0.26]	[0.32]		[-0.28]	[-0.72]		[-0.02]	[2.13]	
Thailand	-3.81	26.94	23.13	21.70	11.16	32.86	17.87	10.40	28.27	5.02	7.70	12.73
	[-0.25]	[1.70]		[1.87]	[1.14]		[1.36]	[0.83]		[0.44]	[0.78]	
Turkey	57.67	42.96	100.62	-25.34	9.96	-15.38	25.38	-2.00	23.38	36.45	14.96	51.41
	[2.85]	[1.68]		[-1.46]	[0.51]		[1.51]	[-0.13]		[2.03]	[0.72]	
Venezuela	4.23	2.31	6.53	8.38	7.61	15.99	-8.82	21.73	12.92	1.57	5.42	6.99
	[0.25]	[0.17]		[0.51]	[0.51]		[-0.58]	[1.75]		[0.15]	[0.40]	

Figure C.1

Breakdown of Two-Day Excess Returns Around Major Central Bank a-days

This chart decomposes two-day average excess returns around major central bank announcement days into average domestic excess returns earned on the day prior to the announcement (green bar) and average domestic excess returns earned on the announcement day (a-day, yellow bar). The a-day is the calendar day when interest rate decisions taken by the Federal Reserve (FOMC), the Bank of England (BoE), the European Central Bank (ECB), and the Bank of Japan (BoJ) are scheduled for release in the United States, the United Kingdom, Germany, and Japan, respectively. Excess returns are expressed in basis points. Error bars are 95% confidence intervals. Test assets are Datastream Global Equity indices denominated in U.S. dollars. The sample period is January 1998 (January 1999 for ECB) to December 2016.

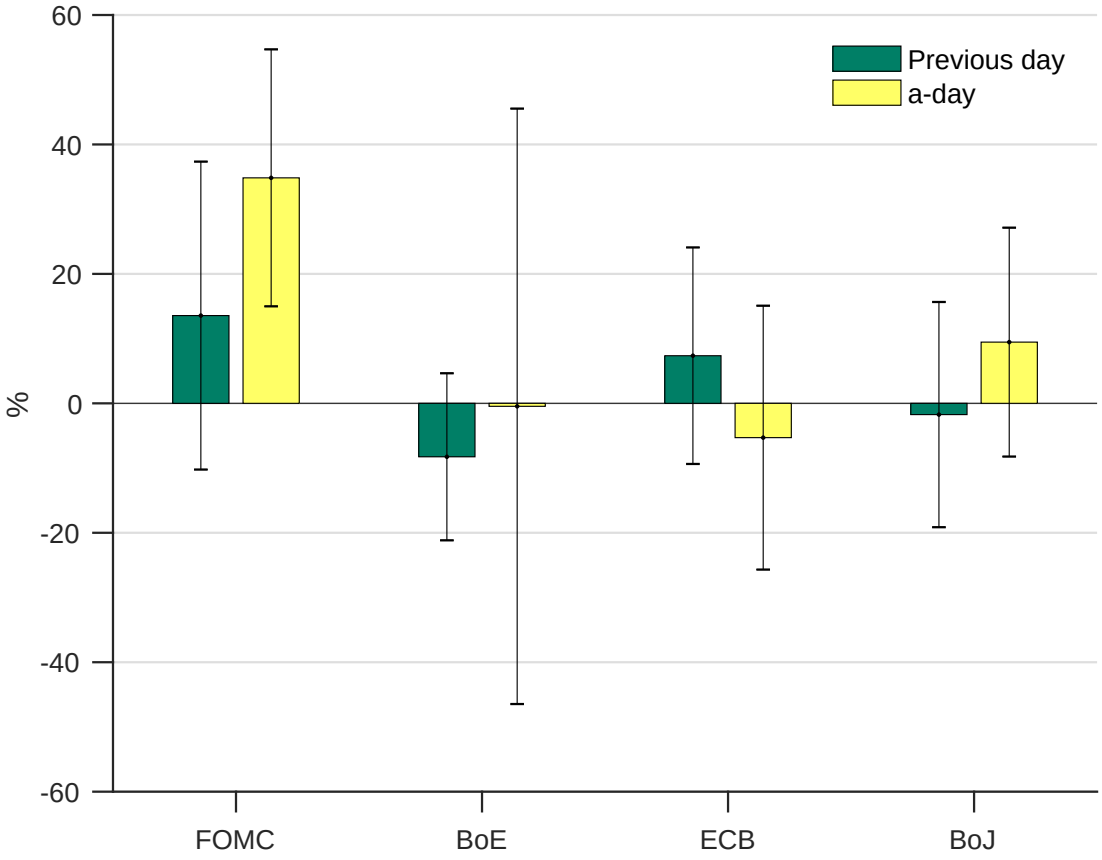


Table C.2

Announcement Premia Across Countries: FOMC (1978-2016)

This table reports average two-day excess returns (μ, in basis points) on announcement days (a-days), the number of a-days in each sample (N^a), and the average two-day excess return difference between announcement and non-announcement days (μ^a-μ^n) for 38 global markets. Announcement days are those trading days when FOMC interest rate decisions are scheduled for release. Non-announcement days are those trading days with no announcements by any major central bank. a-day returns are computed over a two-day window spanning the FOMC meeting day and either the following or the previous trading day (see Table $A.2$ for details). Equity series are Datastream Global Country total return indices. The daily risk-free rate is obtained from Kenneth French's website. Returns are denominated in U.S. dollars. The sample period is January 1978 to December 2016, but data coverage varies across countries. Countries are grouped into four geographical areas. t-statistics are in square brackets.

Country	μ^a	N^a	μ^a-μ^n	Country	μ^a	N^a	μ^a-μ^n
A: Europe				C: Asia-Pacific			
Austria	29.48	321	25.47	Australia	21.61	321	15.84
	[2.59]		[2.16]		[1.92]		[1.35]
Belgium	26.14	321	20.92	Hong Kong	30.31	321	23.28
	[2.54]		[1.97]		[2.49]		[1.82]
Denmark	34.95	321	27.89	Japan	30.52	321	27.21
	[3.20]		[2.47]		[2.83]		[2.43]
Finland	47.69	231	48.39	New Zealand	29.21	232	28.81
	[2.81]		[2.80]		[2.20]		[2.13]
France	32.78	321	25.48	Singapore	31.04	321	28.07
	[2.86]		[2.14]		[3.00]		[2.59]
Germany	29.48	321	25.50	D: Emerging			
	[2.90]		[2.41]	Argentina	32.77	188	32.48
Greece	33.44	216	36.31		[1.73]		[1.69]
	[1.61]		[1.71]	Brazil	49.64	181	50.07
Ireland	22.85	321	16.96		[2.00]		[2.00]
	[1.73]		[1.25]	Chile	15.10	221	11.91
Italy	57.55	321	54.29		[1.28]		[0.99]
	[4.33]		[3.95]	China	10.26	188	9.43
Netherlands	37.74	321	31.67		[0.49]		[0.45]
	[3.65]		[2.96]	Indonesia	68.88	214	73.76
Norway	17.51	299	10.61		[3.47]		[3.61]
	[1.18]		[0.69]	Malaysia	45.86	248	43.44
Poland	27.35	183	30.81		[3.59]		[3.30]
	[1.18]		[1.31]	Mexico	69.89	222	67.26
Portugal	24.67	216	27.04		[4.01]		[3.80]
	[1.66]		[1.80]	Philippines	47.67	225	49.30
Spain	36.27	239	34.92		[3.33]		[3.36]
	[2.36]		[2.23]	South Africa	39.52	321	32.34
Sweden	41.44	280	35.37		[2.73]		[2.16]
	[2.69]		[2.24]	South Korea	76.45	235	77.53
Switzerland	26.59	321	20.87		[3.66]		[3.64]
	[2.97]		[2.25]	Taiwan	3.67	230	3.16
United Kingdom	36.68	321	31.49		[0.21]		[0.18]
	[3.51]		[2.91]	Thailand	25.24	240	21.53
B: North America					[1.42]		[1.19]
Canada	28.27	321	24.40	Turkey	62.77	221	59.91
	[3.11]		[2.58]		[2.32]		[2.17]
United States	35.73	321	31.22	Venezuela	7.20	216	-3.13
	[4.43]		[3.70]		[0.32]		[-0.13]

Table C.3
FOMC Announcement Premia and CAPM Alphas for Global Banks

This table shows average two-day excess returns (μ, in basis points) on FOMC announcement days (a-days) for major international banks (μ^a), as well as the average difference between realized returns and returns predicted by the (domestic) CAPM (α^a). Column 2 defines the domestic market for each bank. Column 5 reports the average two-day excess return around FOMC days for the domestic stock market (μ^a_{Mkt}). a-day returns are computed over a two-day window spanning the FOMC meeting day and either the following or the previous trading day (see Table A.2 for details). International banks are ranked by market capitalization as of the end of 2016. The full ranking and details are available at www.relbanks.com. Returns are from Datastream and are converted into U.S. dollars. The sample period is January 1998 to December 2016. *t*-statistics (*t-stat*) are in brackets.

Bank	Country	μ^a	*t-stat*	μ^a_{Mkt}	α^a	*t-stat*
JPMorgan Chase	USA	92.78	[3.43]	44.78	19.96	[1.09]
Wells Fargo	USA	101.30	[2.96]	44.78	39.56	[1.34]
Bank of America	USA	57.50	[1.78]	44.78	-16.42	[-0.62]
HSBC Holdings	U.K.	47.71	[1.98]	40.86	-2.98	[-0.22]
Citigroup	USA	78.69	[2.21]	44.78	-3.63	[-0.14]
Commonwealth Bank	Australia	39.76	[1.70]	36.56	-2.76	[-0.19]
Royal Bank of Canada	Canada	51.50	[2.74]	40.70	8.61	[0.67]
Goldman Sachs	USA	90.53	[3.06]	41.38	19.80	[0.97]
Toronto Dominion Bank	Canada	60.63	[3.16]	40.70	16.45	[1.08]
Mitsubishi UFJ	Japan	66.39	[2.32]	38.47	9.29	[0.54]
BNP Paribas	France	96.49	[2.77]	41.81	29.34	[1.18]
Banco Santander	Spain	34.00	[1.08]	33.84	-16.89	[-1.29]
Morgan Stanley	USA	76.55	[2.02]	44.78	-26.33	[-0.97]
Westpac	Australia	43.33	[1.89]	36.56	1.09	[0.07]
Itau Unibanco	Brazil	33.56	[1.11]	39.22	-16.90	[-0.87]
Bank of Nova Scotia	Canada	54.83	[2.74]	40.70	10.64	[0.74]
UBS	Switzerland	45.65	[1.27]	36.74	-13.58	[-0.58]
Australia and New Zealand Banking Group	Australia	27.33	[1.18]	36.56	-16.59	[-1.16]
National Australia Bank	Australia	47.25	[1.80]	36.56	5.44	[0.33]
Lloyds Banking Group	U.K.	104.55	[2.39]	40.86	36.70	[1.03]
Banco Bradesco	Brazil	53.90	[1.37]	39.22	-0.46	[-0.02]
Sumitomo Mitsui Group	Japan	75.56	[2.25]	36.77	21.82	[0.88]
Bank of Montreal	Canada	54.26	[2.80]	40.70	14.66	[1.01]
Barclays	U.K.	74.60	[1.97]	40.86	-3.11	[-0.12]
Nordea Bank	Sweden	61.55	[1.85]	59.52	-5.17	[-0.24]
Bank of NY Mellon	USA	76.18	[2.46]	44.78	12.59	[0.61]
Mizuho Financial Group	Japan	60.39	[1.64]	37.62	-2.28	[-0.08]
Societe Generale	France	53.20	[1.46]	38.24	-8.73	[-0.37]
Intesa Sanpaolo	Italy	40.05	[1.07]	40.30	-22.90	[-1.10]
Canadian Imperial Bank of Commerce	Canada	94.18	[4.41]	40.70	50.00	[3.49]
Credit Suisse Group	Switzerland	60.27	[1.95]	36.74	-2.10	[-0.10]
Standard Chartered	U.K.	129.07	[3.25]	40.86	61.62	[2.45]
Deutsche Bank	Germany	64.21	[1.92]	32.64	20.66	[0.72]
Unicredit	Italy	51.14	[1.29]	40.30	-10.25	[-0.46]

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