Price and Quantity Effects of Monetary Policy Actions and Statements in an Emerging Economy [a]

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Abstract

This paper studies the effects of monetary policy actions and statements on the exchange rate, the yield curve and portfolio flows in a representative emerging economy. I use a new dataset of intraday changes in asset prices around monetary policy announcements in Mexico to identify exogenous monetary policy surprises. I show that unanticipated changes in both the policy rate and statements significantly impact asset prices and portfolio flows. Therefore, even though the policy rate has not been constrained by the effective lower bound, the central bank has the ability to alter policy rate expectations via statements, influencing long-term bond yields and portfolio flows but not the currency; the exchange rate only reacts to surprises in the current policy rate. Moreover, the response of asset prices and portfolio flows is asymmetric. For instance, the exchange rate does not respond to target easing surprises, while bond yields respond more to them than to target tightening surprises.

Keywords: Monetary policy surprises, high-frequency data, event study, yield curve, exchange rate, portfolio flows.

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1 Introduction

Even though the implementation of monetary policy in advanced countries changed dramatically after the global financial crisis, emerging markets continued to follow a conventional approach because they have not been constrained by the effective lower bound. Nevertheless, the study of the effects of monetary policy on emerging financial markets have not kept up to date with the recent advancements in the literature for advanced countries. This is relevant for two reasons. First, understanding the transmission of monetary policy to financial markets is key in how central banks indirectly influence the spending decisions of households and firms. Second, emerging markets play an increasingly important role in the global economy.

This paper studies whether and how asset prices and portfolio flows respond to monetary policy in a representative emerging economy, with an emphasis on both policy rate decisions and information provided via policy statements. The statements are intended to convey information that influences expectations about future monetary policy decisions. Thus, if financial markets do not respond to that information, then central banks in emerging countries have less room to operate relative to their counterparts in advanced countries, even if they are not constrained by the effective lower bound.

I investigate these questions using an event study methodology with high-frequency data around monetary policy announcements in Mexico from 2011 to 2019 to systematically measure surprises in policy decisions. By now, event studies with high-frequency data are a well-established approach in macro-finance to overcome endogeneity concerns. Monetary policy is intrinsically endogenous, it reacts to different macroeconomic circumstances, and so quantifying its effects is challenging. Event studies overcome this by isolating the surprise component of policy decisions.[1] To identify monetary policy surprises, I construct a new dataset with intraday changes in swap rates linked to an interbank interest rate that closely follows the policy rate.

This paper has two major conclusions. First, monetary policy statements do influence policy rate expectations in an emerging economy. Asset *prices* in Mexico and portfolio

[1] Nakamura and Steinsson (2018) review approaches to measure the effects of monetary policy.

flows between Mexico and the U.S. respond not only to policy rate surprises but to new information about its future path communicated via statements. The evidence for advanced countries also indicates that monetary policy has more than one dimension; financial markets react to different types of information conveyed by central banks. In an influential paper, Gürkaynak, Sack, and Swanson (2005) show that asset prices in the U.S. responded to two factors in a period preceding the financial crisis, namely surprises in the current value of the policy rate ('target' factor) and its likely path in the future ('path' factor). This shows that central banks in advanced countries were able to deliver path surprises even without being constrained by the effective lower bound.[2] Once central banks make use of unconventional monetary policy tools (e.g. forward guidance, quantitative easing), financial markets respond to additional factors (Swanson, 2018).[3]

The results in this paper therefore imply that the multidimensionality of monetary policy is not exclusive to advanced countries. In addition to changes in the policy rate, central banks in emerging markets also have the ability to influence expectations via statements. For instance, medium- and long-term yields not only respond more to the path than to the target factor, the effect of the path factor on the yield curve is larger in Mexico relative to the U.S. path factor effect on the U.S. yield curve reported in the literature. Meanwhile, the evidence for portfolio flows shows that investors are more willing to hold local assets following an easing surprise in the target factor, it also supports a portfolio rebalancing channel for local investors from local to foreign bonds in response to an easing surprise in the path factor.

Second, the response of asset prices and portfolio flows to the target factor is asymmetric. The currency only responds to policy rate tightenings but not to easings, it appreciates by more than 150 basis points following a surprise tightening of 25 basis points. Bond yields meanwhile respond more to policy rate easings than tightenings, especially longer-term bonds. Moreover, the asymmetric responses of asset prices and portfolio flows to target surprises are likely related. For instance, portfolio inflows into

[2] When the constraint is binding, forward guidance about the policy rate is more explicit than under a conventional policy regime (Kuttner, 2018).

[3] Altavilla, Brugnolini, Gürkaynak, Motto, and Ragusa (2019) also report that monetary policy in the eurozone has multiple dimensions.

local debt increase following a target easing, which conforms with the larger response of the yield curve and likely contributes to offset an otherwise depreciation of the currency. The evidence suggests that investors expect target easings to last longer, while target tightenings are considered to be transitory.

This paper contributes to understand the extent to which the efforts by central banks in emerging markets to reduce policy uncertainty have been effective. The influence of central bank communications on financial markets in developed countries is well documented (Blinder, Ehrmann, Fratzscher, De Haan, and Jansen, 2008), but there is less evidence of their effects on emerging markets. Content analysis has been used to classify those communications (Su, Ahmad, and Wood, 2019), but it is prone to subjectivity.

This paper also contributes to the literature by studying the effects of *local* monetary policy in emerging markets on the portfolio flows they face. Event studies have investigated the spillover effects of (conventional and unconventional) monetary policy in advanced countries on asset prices and portfolio flows to emerging markets. The effect of U.S. monetary policy surprises is significant, especially for local-currency sovereign yields (Bowman, Londono, and Sapriza, 2015). In particular, stock prices respond more to U.S. target surprises, exchange rates and long-term yields respond more to U.S. path surprises, and short-term yields respond to both surprises (Hausman and Wongswan, 2011). Regarding portfolio flows, the literature has documented significant inflows into financial assets in emerging markets after the global financial crisis (Fratzscher, Lo Duca, and Straub, 2018), but it is likely due to allocations of new savings (a wealth effect) rather than a reallocation toward assets in those countries since portfolio flows did not surge disproportionately to emerging markets in response to unconventional monetary policies in advanced countries (Curcuru, Rosenblum, and Scotti, 2015).

The rest of the paper is structured as follows. The next section describes how to measure monetary policy surprises. Section 3 tests the number of monetary policy dimensions. Sections 4 and 5 respectively examine the reaction of asset prices and portfolio flows to the monetary policy factors; their asymmetric response is studied in section 6. The last section concludes.

2 Identification of Monetary Policy Surprises

The Bank of Mexico, also known as Banxico, conducts monetary policy in Mexico. Solís (2020) reviews relevant institutional developments for the monetary policy of Banxico.

This paper uses swap rates to measure surprises in monetary policy decisions. The swaps market in Mexico references an interbank interest rate denominated in local currency that closely follows the policy rate, the 28-day interbank interest rate or TIIE28D.[4] The TIIE28D is calculated by Banxico once a day and is the benchmark rate for banking loans in Mexico. The 3-month swap for the TIIE28D is the main local derivative.

This paper considers a broader sense of monetary policy surprises, not only surprises in the policy rate. Banxico—like other central banks—communicates information about its monetary policy outlook via statements. This information might influence market expectations about future policy actions. Unlike in many advanced countries after the global financial crisis, the policy rate in Mexico has never been constrained by the effective lower bound. As a consequence, Banxico's monetary policy statements include information about future policy actions within a year out at most, it does not need to commit to a predetermined path for the policy rate for longer periods.[5] Accordingly, the analysis considers swaps with maturities up to one year.

Monetary policy surprises in this paper are obtained as the difference in swap rates around windows containing policy announcements. Intraday differences from 10 minutes before to 20 minutes after each announcement are calculated for 3- 6- and 9-month as well as 1-year swap rates.[6] The intraday change in the 3-month swap rate is a good measure of the surprise in the policy rate (Solís, 2020). Intraday differences over the same windows are also calculated for the exchange rate (expressed in pesos per dollar) and for yields of bonds issued by the Mexican government with maturities of 2, 5, 10 and 30 years.[7]

[4]The average difference between the TIIE28D and the overnight policy rate is around 30 basis points.

[5]This agree with Gürkaynak et al. (2005) for the U.S. before the Great Recession. Swanson (2018) argues that maturities of more than one year out should be considered if the central bank makes use of unconventional monetary policy tools when the policy rate is constrained by the effective lower bound.

[6]When no data is available at any of those times, the next available quote is used to compute the changes. In extreme cases, in which there are no quotes in wider windows for a day, the open and close quotes are used to compute the differences. This only happens on a few days for some swaps.

[7]In robustness checks, wider 50-minute windows were used, starting 20 minutes before and ending 30 minutes after each monetary policy announcement. All the results discussed below using tight 30-minute

All the information for the analysis is obtained from Bloomberg. The information to calculate the intraday differences for the swap rates and the exchange rate is available since 2011, since December 2014 for the 5-year yield and since 2013 for the other yields.

3 Monetary Policy Dimensions

This section shows that two factors in monetary policy decisions move asset prices. It then discusses a structural interpretation for those factors.

The matrix rank test developed by Cragg and Donald (1997) is used to assess the number of factors influencing asset prices. Let X be a $T \times n$ matrix of asset price changes around monetary policy announcements with T observations and n asset prices. Let X have a factor structure given by:

$$X = F\Lambda + \zeta \tag{1}$$

where F is a $T \times k$ matrix with k unobserved factors, Λ is a $k \times n$ matrix of factor loadings and ζ is white noise. For a given number of variables n, the Cragg–Donald test assesses the null hypothesis that k_0 factors ($k_0 < n$) can explain most of the variability observed in the data. The test minimizes the distance between the covariance matrix of the observed data and that obtained from all the possible models with k_0 factors. The test is a Wald statistic with an asymptotic χ^2 distribution with $(n - k_0)(n - k_0 + 1)/2 - n$ degrees of freedom. Inference based on this test requires that $(n - k_0)(n - k_0 + 1)/2 > n$.[8]

Table 1 reports the results of the rank test. In addition to conducting it for the exchange rate and bond yields, the test is also performed for swap rates up to one year because they help to give a structural interpretation to the estimated factors. Since $n = 5$ for the exchange rate and the yield curve and $n = 4$ for swaps, k_0 can be at most 2 and 1, respectively, to satisfy the requirements of the test. To check robustness to the data frequency and the sample period, the test is also performed using daily—instead of intraday—changes in asset prices.[9]

windows remain using wider 50-minute windows.

[8] See Cragg and Donald (1997) and the appendix in Gürkaynak et al. (2005) for further details.

[9] The daily differences for all the assets are calculated as the one-day change in the price around the announcements. Daily changes for all asset prices are calculated since 2004, except for the 30-year yield

[Insert Table 1 here.]

The null hypothesis of no factors is strongly rejected in all cases, asset prices in Mexico respond at least to policy rate surprises (Solís, 2020). The most interesting tests, however, involve the null hypotheses of one and two factors, $k_0 = 1, 2$.

The results for the exchange rate and the yield curve have salient implications. The null hypothesis of one factor is rejected at the 5% significance level, but the null of two factors cannot be rejected even at the 10% level. This means that asset prices in Mexico react to more than just unanticipated changes in the policy rate. This finding does not depend on the frequency of the data nor the sample period.[10] The multidimensionality of monetary policy in advanced countries (Gürkaynak et al., 2005; Swanson, 2018; Altavilla et al., 2019) is therefore also observed in emerging markets.

The outcome for swaps go along with the results for the exchange rate and the yield curve. The null of one factor is also rejected at the 5% significance level, regardless of the data frequency. This is exploited below to facilitate the interpretation of the two factors.

3.1 Estimation

The factors F, as well as their loadings Λ, in equation (1) are estimated by applying principal components to the matrix of asset price changes X. The two factors will be the first two principal components of X. These factors are orthogonal to each other and are linear combinations of the variables included in X, but they do not have a practical interpretation, which is needed to understand the responses of asset prices.

Instead of using the exchange rate and the yield curve, X includes swaps with maturities up to one year. The factors, F_1 and F_2, thus obtained are normalized to have unit standard deviation and then rotated to give them a structural interpretation.

Let U be a 2×2 rotation matrix for F such that

$$Z = FU \tag{2}$$

which starts in October 2006.

[10] Since daily data goes back to 2004, the asset price response can be characterized by two factors even before the adoption of the overnight policy rate in 2008.

where Z denotes the rotated factors. Four restrictions are imposed on U to uniquely identify it and being able to give an interpretation to the factors. The rotated factors, Z_1 and Z_2, are also required to be orthogonal to each other and to have unit variance. The final restriction is set so that only Z_1 mirrors the change in the 3-month swap rate, i.e. the policy rate surprise, thus the loading of the 3-month swap rate on Z_2 is zero.[11]

To further ease the interpretation, and compare the magnitudes of the factors, Z_1 and Z_2 are rescaled so that Z_1 moves one-to-one with the change in the 3-month swap rate and Z_2 affects the 1-year swap rate in the same magnitude as Z_1 does. The rescaling is done using data since 2013, when intraday data for bond yields starts to be available.[12]

3.2 Interpretation

To give a structural interpretation to the factors, they are associated with particular aspects of monetary policy announcements. By definition, the first factor, Z_1, moves with surprises in the 3-month swap rate, and the second factor, Z_2, is aligned with surprises in the 1-year swap rate that are unrelated to changes in the 3-month swap rate. Accordingly, Z_1 can be associated with surprises in the *current* policy rate, while Z_2 can be related to surprises in the *expected* path of the policy rate. In this sense, and following Gürkaynak et al. (2005), Z_1 and Z_2 are referred to as the 'target' and 'path' factors (or surprises), respectively. The evidence presented below supports this interpretation.[13]

Figure 1 compares the estimated target and path factors for relevant dates over the sample period. Even if there is no change in the policy rate, there can still be target surprises if market participants expected a change. For instance, on April 27, 2012, the average rate from survey expectations was lower than the existing level indicating that some market participants expected a cut in the rate. Banxico, however, left the policy rate unchanged, which was interpreted as a tightening target surprise as the figure shows.

[11] The loadings on Z_1 and Z_2 for all four swaps can be expressed in terms of the parameters in U and the factor loadings Λ. To see this, substitute F from equation (2) into (1). The last restriction, however, only uses the two loadings in Λ for the 3-month swap. See the appendix in Gürkaynak et al. (2005).

[12] The rescaling does not affect the starting date of the factors, the first observation starts in 2011.

[13] The path factor can intuitively be seen as the residual of a regression of the change in the 1-year swap on the change in the 3-month swap; that is, the part of the change in the 1-year swap orthogonal to changes in the 3-month swap. The correlation between the two measures is 0.9925.

[Insert Figure 1 here.]

Two dates are worth reviewing because of the contrast between the factors. According to the figure, the announcements on September 6, 2013, and June 6, 2014, contained large easing surprises for the target but not for the path factor. A closer look at the statements for those dates supports this interpretation. Contrary to survey expectations of no change in the monetary policy stance for September 6, 2013, Banxico announced a 25 basis point cut in the policy rate but indicating that with 'the lower policy rate, the monetary stance is in line with inflation converging to the target'. Similarly, while survey expectations indicated no policy change on June 6, 2014, Banxico cut the policy rate by 50 basis points adding that 'no further reductions in the policy rate are expected in the foreseeable future'. In both decisions the policy rate was reduced, but the statements portrayed them as one-off cuts by signaling that no further movements in the rate were to be expected. That is, they were both target but not path surprises.

Table 2 summarizes the statements on announcement days in which, according to figure 1, their content communicated important information about the future path of the policy rate. The announcements on June 2017 and August 2019 suggested loose financial conditions ahead, the rest of the statements meanwhile signaled a tighter monetary stance going forward. The announcements on March and October 2013, January 2015 and June 2017 are noteworthy because of their explicit reference to the future path of the rate.

[Insert Table 2 here.]

As a final example of the association of the path factor with monetary policy statements, consider the tightening cycle that started in mid-2016 due to rising inflation risks. The 2016 U.S. presidential election generated uncertainty about the bilateral relation of the two countries. Between early-November 2016 and mid-January 2017, the peso depreciated by more than 14%. In addition, the minimum wage was raised and gasoline subsidies ended in early-2017. By mid-2017, inflation had risen for 10 consecutive months.

On June and September 2016, Banxico raised its policy rate by 50 basis points, more than had been expected. These increases were followed by 6 consecutive tightenings,

three of 50 basis points followed by three of 25 basis points.[14] In the statement for the last hike on June 2017, Banxico indicated that it expected inflation to peak in the near future in addition to what is reported in table 2. This statement is relevant because the hike was mostly anticipated by the market, so there was essentially no target surprise, but the wording suggested the end of the tightening cycle, which can be interpreted as an easing surprise in the path factor—the closest to a 'pure' path surprise in the sample.

These examples support the association of the path factor with surprises about the future path of the policy rate communicated via statements. Nevertheless, it is noteworthy to point out that the magnitude of the path surprises is lower than that of target surprises. The largest path shocks in Mexico are also lower compared to the largest equivalent shocks for the U.S. reported in Gürkaynak et al. (2005), table 4. There are two potential explanations for this. First, international developments play a relevant role in monetary policy considerations of small open economies, and Mexico is no exception; as such, it might be harder to commit to a future path of the policy rate for extended periods due to high uncertainty abroad. Second, and most importantly, the possibility of reaching the effective lower bound has not been an issue in Mexico, and so the need of Banxico to rely on path surprises has been low.

Figure 2 shows that the estimation of the factors is not sensitive to the sample size, the sample period and/or data frequency. The figure compares the time series of the target and path factors obtained from intraday and daily data since 2011 as well as with daily data since 2004. The correlations between the former and the latter are 0.98 for the target factor and 0.74 for the path factor.

[Insert Figure 2 here.]

4 The Effects of Monetary Policy on Asset Prices

The previous section showed that two factors capture the response of asset prices to monetary policy surprises. This section reports the response of the exchange rate and

[14] The beginning of the tightening cycle might be dated as of November 2016 according to table 2.

the yield curve to those factors.

The following model is used to measure the effects of the two monetary policy factors on the exchange rate and the yield curve:

$$\Delta y_t = \beta_0 + \beta_1 Target_t + \beta_2 Path_t + \varepsilon_t \tag{3}$$

where Δy_t is the change in asset prices. Whenever interest rates are used, the differences are calculated directly using quotes before and after the announcements; for the exchange rate, 100 times log differences are used to approximate the percentage change (or return) over the window. The changes are expressed in basis points. $Target_t$ and $Path_t$ are the two factors obtained as described in section 3.2, positive values indicate tightenings and negative values easings. Finally, the error term ε_t captures variations in the dependent variable unrelated to shocks in the policy rate.

Table 3 verifies the relationship of the 3-month and 1-year swap rates with the two factors. As expected, by how the factors are defined, changes in the 3-month swap rate move (one-to-one) only with the target factor, while the path factor has considerable explanatory power for changes in the 1-year swap rate.

[Insert Table 3 here.]

Table 4 reports the responses of the exchange rate and the yield curve to the factors. For the yield curve, the estimated coefficients for the target factor are very similar to the ones reported by Solís (2020) for the policy rate surprise. Furthermore, medium- and long-term yields—those more relevant to spending decisions—respond more to the path than to the target factor. In addition, by comparing the R^2 statistics of the regressions with one and two factors, the path factor explains 60, 20 and 40% of the variability for the 5- 10- and 30-year yields, respectively. Finally, compared to the results in Gürkaynak et al. (2005), the responses of the 2- 5- and 10-year yields to both factors are stronger in Mexico than in the U.S.[15]

[Insert Table 4 here.]

[15] Approximately, a 25 basis point increase in the target factor in Mexico vs the U.S. respectively rises those yields by 17 vs 12, 7 vs 7, 11 vs 3 basis points; while a 10 basis point increase in the path factor rises them by 5 vs 4, 7 vs 4, 6 vs 3 basis points.

The relevance of the path factor for medium- and long-term yields further supports its association with monetary policy statements. Information about the future path of the policy rate is expected to have relatively more weight on the middle to long end of the yield curve. By providing guidance about the future path of the policy rate, statements might be revealing central bank's information about the future course of output and inflation; for instance, a positive path surprise might suggest that the central bank sees greater inflation ahead than previously expected. If so, this information would lead to revisions in private forecasts. de Mendonça and de Deus (2019) show that private forecasters in emerging markets indeed update their expectations based on central bank forecasts.

For the exchange rate, it is interesting that it only responds to the target but not to the path factor. This seems puzzling since rational and forward-looking investors would respond to changes in the expected path of the policy rate. In fact, the currencies of advanced countries respond more strongly to the path than to the target factor (**?**Ferrari et al., 2017). The lack of response to the path factor, however, seems characteristic of the Mexican peso. When assessed against the U.S. monetary policy factors, other emerging market currencies mainly respond to the U.S. path factor, while the Mexican peso only reacts to the target factor (Hausman and Wongswan, 2011).

There are two potential explanations for the lack of response of the currency to the path factor. First, although the peso operates under a flexible regime, Banxico intervenes in the foreign exchange market to provide liquidity and to promote orderly conditions (García-Verdú and Zerecero, 2013). A side effect of interventions might be to mute the response of the currency to the path factor. Consistent with this, Hausman and Wongswan (2011) find that a country with a more flexible exchange rate regime responds more to the path surprise.

An alternative explanation involves the information channel discussed above, according to which the path factor has different effects on the currency that offset each other. For instance, a tightening path surprise suggesting a higher policy rate in the future would appreciate the currency but, at the same time, if it signals higher future inflation, it would depreciate it. Gürkaynak et al. (2005) provide a similar explanation for the lack

of reaction of the stock market to the path factor.

4.1 Persistence

In addition to the initial reaction of asset prices, monetary policymakers are also interested in the persistence of the response. One way to address this issue, and assess the robustness of the results, is to re-estimate equation (3) but with the change in the dependent variable calculated over subsequent days after a monetary policy announcement.[16] Since this exercise involves daily frequencies, it is only done for the yield curve.[17]

Figure 3 shows the persistence of yields to the target and path factors. The figure confirms the importance of path surprises for the yield curve. The response to the target factor is relatively more stable, whereas the effect of the path factor is larger and more than doubles after a few days for all yields. In fact, there seems to be some kind of learning to the path surprise by market participants in the days following a monetary policy decision. This is consistent with Gürkaynak et al. (2005), who also argue that financial markets may take some time to digest the implications of path surprises.

[Insert Figure 3 here.]

5 The Effects of Monetary Policy on Portfolio Flows

The previous section analyzed the responses of asset *prices* to the target and path factors. Given the influence that developments in international financial markets have on emerging markets (Curcuru et al., 2015; Fratzscher et al., 2018), this section studies the response of portfolio *flows* to the two factors.

One challenge in analyzing the effect of monetary policy surprises on international financial flows is the frequency of the data. Cross-border capital flows can be classified broadly as (bond and equity) portfolio flows, foreign direct investment, and banking

[16] There is no overlap between the asset price changes and the announcements because the latter are always more than ten days—the maximum days used in the figure—apart from each other.

[17] The currencies of emerging markets do not respond to policy rate surprises when daily data is used (Kohlscheen, 2014), the response can only be seen with intraday data (Solís, 2020). Unreported results confirm that neither factor has explanatory power for the daily changes in the currency.

flows.[18] Capital flows are available quarterly, the same frequency of the balance of payments accounts from which they are obtained. For portfolio flows, however, there are other sources providing them at a higher frequency.

For some emerging markets, including Mexico, portfolio flows from and to the U.S. are among the most relevant ones. The U.S. Treasury International Capital (TIC) system is a database of cross-border securities transactions involving a U.S. counterparty, it is used as an input to calculate the balance of payments data for the U.S. The TIC data contains disaggregated portfolio flows by country.[19] For Mexico, inflows represent sales of securities by Mexican to U.S. investors, and outflows constitute purchases by Mexican from U.S. investors. There are six categories reported for both inflows and outflows: (1) U.S. Treasury bonds and notes,[20] (2) U.S. government agency bonds,[21] (3) U.S. corporate bonds, (4) U.S. corporate stocks, (5) non-U.S. bonds, (6) non-U.S. stocks. U.S. corporate bonds and stocks are excluded from the analysis because the rest of the categories are arguably more relevant to emerging markets. For ease of interpretation, non-U.S. bonds and stocks are treated as local (or Mexican) securities.

The TIC data is available monthly. The sample of portfolio flows between Mexico and the U.S. starts in January 2011 and ends in November 2019. Table 5 contains summary statistics for the different categories of flows. Transactions involving Mexican bonds and Treasury-issued securities stand out as the most significant ones followed by transactions on Mexican stocks and U.S. agency bonds.

[Insert Table 5 here.]

For each inflow and outflow category, the following model is used to analyze the effects of the target and path factors on portfolio flows:

$$w_t = \beta_0 + \beta_1 Target_t + \beta_2 Path_t + \sum_{j=1}^{p} \alpha_j w_{t-j} + \nu_t \tag{4}$$

[18] Some classifications include international reserves as another category.

[19] EPFR collects weekly and daily flows data from mutual funds and exchange-traded funds but it is not as comprehensive as the balance of payments data and is not publicly available.

[20] Notes have maturities between 2 and 10 years, while bonds have maturities between 10 and 30 years.

[21] Unlike U.S. Treasury issued securities, bonds issued by U.S. government agencies are not guaranteed and are thus subject to liquidity and default risks.

where w_t denotes the respective portfolio flow, and the lags w_{t-j} up to order p capture the persistence in flow data; the lag order for each flow category is selected using the BIC. The rest is similar to equation (3).

Two considerations are appropriate since equation (4) uses monthly data. First, $Target_t$ and $Path_t$ are equal to the estimated value of each factor—identified from intra-day data—if there was a monetary policy announcement in the respective month and zero otherwise. Second, when interpreting the coefficients it is important to keep in mind the potential for endogeneity in so far as the central bank reacts to information on portfolio flows not available to market participants.[22]

Table 6 shows that, even after controlling for the persistence in the series, two categories of portfolio flows do respond to target or path surprises. First, a policy rate tightening reduces net inflows into Mexican stocks since U.S. investors are less willing to hold risky local assets. Chen, Mancini-Griffoli, and Sahay (2014) similarly find that tightening surprises in the U.S. are associated with reductions in portfolio flows into equities, while bond flows remain insignificant.

[Insert Table 6 here.]

Second, inflows into U.S. agency bonds decline following an easing surprise in the future path of the policy rate. This can be better understood from the perspective of Mexican investors. According to the results in section 4, after a negative realization of the path factor, the yields on risk-free Mexican bonds will decline giving rise to a portfolio rebalancing channel for local investors from local to foreign bonds, including U.S. agency bonds. Mexican investors will therefore sell less agency bonds to U.S. investors following an easing path surprise, reducing inflows into that category.

Target and path factors are thus not only relevant for asset prices but also for portfolio flows.[23] This is in line with the findings in Chen et al. (2014) and Curcuru et al. (2015) who study the effects of monetary policy in advanced countries on capital flows to emerging markets.

[22] Banxico has indeed access to restricted daily data on debt and equity flows (Hernandez Vega, 2018).
[23] The results are very similar when the factors are identified from daily data.

6 The Asymmetric Effects of Monetary Policy

The analysis so far has considered symmetric responses of asset prices and portfolio flows to tightenings and easings. This section shows that they are actually asymmetric.

Ferrari et al. (2017) find that the currencies of advanced countries respond symmetrically to monetary tightenings and easings. When studying the effects of monetary policy in advanced countries on portfolio flows, however, Curcuru et al. (2015) note that it is necessary to distinguish between tightenings and easings to better characterize the flow response to policy decisions. This section extends their analysis to test whether there are asymmetric responses to monetary policy more generally.

The following model is estimated to explore the potential asymmetric response of asset prices and portfolio flows to the monetary policy factors:

$$y_t = \beta_0 + \beta_1 Target_t \mathbb{1}\left(Target_t > 0\right) + \beta_2 Target_t \mathbb{1}\left(Target_t < 0\right) + \beta_3 Path_t \mathbb{1}\left(Path_t > 0\right) + \beta_4 Path_t \mathbb{1}\left(Path_t < 0\right) + \varepsilon_t \quad (5)$$

where y_t is the intraday change in an asset price or a portfolio flow. This approach distinguishes between target tightenings ($Target_t > 0$) and easings ($Target_t < 0$) as well as path tightenings ($Path_t > 0$) and easings ($Path_t < 0$). Note that a negative value for the easing coefficients implies an increase in the dependent variable. The factors are obtained from intraday data, as explained in section 3.2. Tables 7 and 8 report the results for asset prices and portfolio flows, respectively.

[Insert Table 7 here.]

[Insert Table 8 here.]

The responses to monetary policy are indeed asymmetric. For asset prices, the null hypothesis of the equality of the coefficients for the target factor is rejected in all cases, while the equivalent hypothesis for the path factor is only rejected for the yield curve. Further, by comparing the R^2 statistics in tables 4 and 7, the explanatory power of the model increases up to 20% for the long end of the curve and by more than 60% for the exchange rate. Similarly, some categories of portfolio flows also respond asymmetrically

to target and path surprises.[24]

The outcome for asset prices in table 7 is striking compared to the symmetric framework in table 4, especially for target surprises. The currency only responds to target tightenings but not easings. A 25 basis point target tightening appreciates the currency by more than 150 basis points, at least 100 basis points larger than when the response is restricted to be symmetric. A target easing, however, does not depreciate the currency. This differs from the symmetric response of the currencies in advanced countries (Ferrari et al., 2017). Bond yields, on the contrary, respond more to target easings than tightenings, plus the effect is larger than under a symmetric approach.[25]

Regarding path surprises, the currency continues to be insensitive to them. For bond yields, although they react differently to path tightenings than easings, the asymmetry is not as pronounced as with target surprises. Indeed, the yield curve exhibits a more symmetric response to path surprises in the days following a monetary policy decision, as discussed below (see section 6.1).

Table 8, although consistent with table 6, better characterizes the reaction of portfolio flows. In fact, the response of certain portfolio flows can only be seen by distinguishing tightenings from easings, in line with Curcuru et al. (2015).[26] In particular, local investors are more willing to sell local bonds to U.S. investors after a target easing, and less willing to sell them Treasuries following a target tightening.[27] In addition, the effect of path surprises on U.S. agency bonds is still in line with a portfolio rebalancing channel for local investors but now only due to path easings.

A closer look at tables 7 and 8 suggests a link between the asymmetric responses of asset prices and portfolio flows to target surprises, strong enough to be detected at the lower frequency of the flows, or at least consistent with each other. For instance, the increase in flows into local debt—40% of portfolio inflows—following a target easing

[24] These results hold if equation (5) is estimated by robust regression to avoid excessive influence of outliers, or if the whole sample is split into samples before and after 2016.

[25] For instance, following a 25 basis point target easing 2-, 5-, 10- and 30-year yields respectively decline by 19, 18, 14 and 11 basis points compared to 17, 7, 11, 8 under a symmetric response.

[26] Also, the magnitude of the flow categories who previously responded to the factors is now larger.

[27] In the first case, since the coefficient of local debt for a target easing ($Target_t < 0$) is negative, inflows increase. In the second case, the coefficient of Treasuries for a target tightening ($Target_t > 0$) is negative and so, inflows decrease.

is consistent with the larger response of the yield curve to target easings, and might also offset an otherwise depreciation of the currency. On the other hand, even though the appreciation of the exchange rate following a target tightening does not seem to be related to portfolio flows with U.S. entities,[28] it is likely that it lasts not long enough to be observed at the monthly frequency.

6.1 Persistence

The evidence on the asymmetric responses of asset prices and portfolio flows to target surprises aligns with the notion that local investors operate with international counterparties to adjust to local monetary policy shocks. More data, including portfolio flows with a higher frequency and debt portfolio flows disaggregated by maturity, would help to better characterize the mechanisms driving the asymmetry. Meanwhile, the persistence of the asymmetric response of the yield curve in the days following monetary policy announcements can provide useful insights.[29]

Figures 4 and 5 show the persistence of the asymmetric responses to the target and path factors, respectively.

[Insert Figure 4 here.]

[Insert Figure 5 here.]

For target surprises, figure 4 shows that the response of all yields can still be seen in the days following a target easing, they all decline. In contrast, only short- and medium-term yields respond in the days following a target tightening. These results parallel those in table 7.

The lack of reaction of medium- and long-term yields to target tightenings conforms with how market participants assess target surprises. Expectations about the policy rate in the future are an important component of long-term yields. If investors expect target easings to last longer, while target tightenings to be more transitory, medium-

[28] Recall that portfolio flows involving non-U.S. investors—relevant players in the foreign exchange market—are not captured by the TIC data.

[29] The analysis focuses on the yield curve because daily exchange rate returns are noisy (Solís, 2020), and portfolio flows have monthly frequency.

and long-term yields would decline following target easings but not target tightenings. The availability of data on debt portfolio flows disaggregated by maturity would help to validate this. For instance, if the increase in local debt inflows from the U.S. following a target easing (reported in table 8) happens to be concentrated in longer-term bonds, it would be in line with investors expecting target easings to last longer. From this perspective, if investors consider target easings somewhat equivalent to path (easing) surprises, it would be consistent with the lack of response of the currency to target easings, given that it is insensitive to path surprises (see tables 4 and 7).

The yield curve response to path surprises, unlike target surprises, is more symmetric. According to table 7, the yield curve responds to both path tightenings and easings, although relatively more to tightenings. Figure 5 shows that all yields respond more or less symmetrically in the days following a path surprise. Path surprises in the sample are also evenly distributed between easings and tightenings. Finally, as indicated before, the responses exhibit some kind of learning by market participants to path surprises.

7 Concluding Remarks

This paper uses a new dataset to provide evidence of the effects of monetary policy on asset prices and portfolio flows in an emerging economy. The evidence in this paper indicates that surprises in the policy rate *and* about its future path are relevant for both asset prices and portfolio flows. Multidimensionality is thus a feature of monetary policy in advanced as well as emerging countries.

The results in the paper support the view that central banks in emerging markets can influence market expectations about the future path of the policy rate via statements, and thus longer-term interest rates, which ultimately transmit to the broader economy. Therefore, they would still have room to conduct monetary policy in case their policy rate were to be constrained by the effective lower bound.

Given the importance of statements documented here, emerging markets should consider best practices in monetary policy communications, including brief, clear and concise

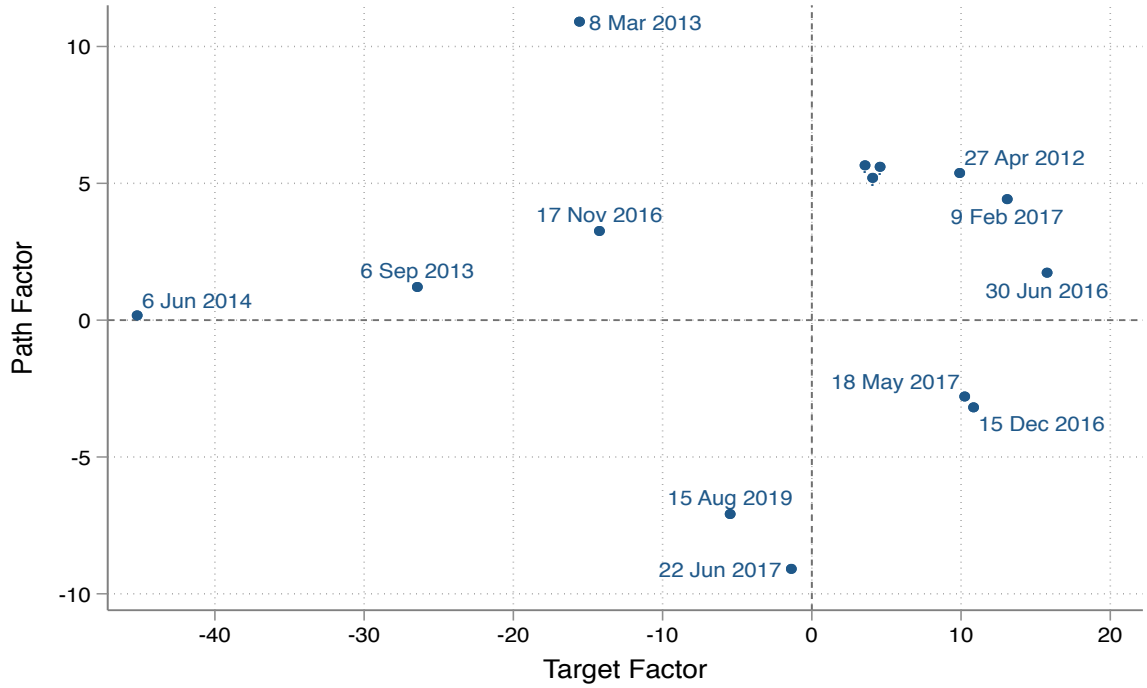
language without compromising the main message. References to non-monetary policy issues (e.g. structural reforms) in statements should be assessed on a case-by-case basis.

The results in the paper can be extended in several directions. It would be interesting to study the interaction of target and path surprises with different macroprudential policies, including capital controls. This is salient for emerging markets given the evidence on the importance of capital flows for their economies and the effects of the two factors on portfolio flows documented here.

The asymmetric response of asset prices and portfolio flows merit further research to better understand the mechanisms behind it and to assess whether it is an emerging markets phenomenon. It also raises the question of whether the macroeconomic effects of monetary policy surprises are also asymmetric. In any case, it invites further discussion among policymakers. Central banks would benefit by preparing in advance to situations in which the asymmetry limits their effects. For instance, in case a depreciation is needed where the currency only responds to policy rate tightenings.

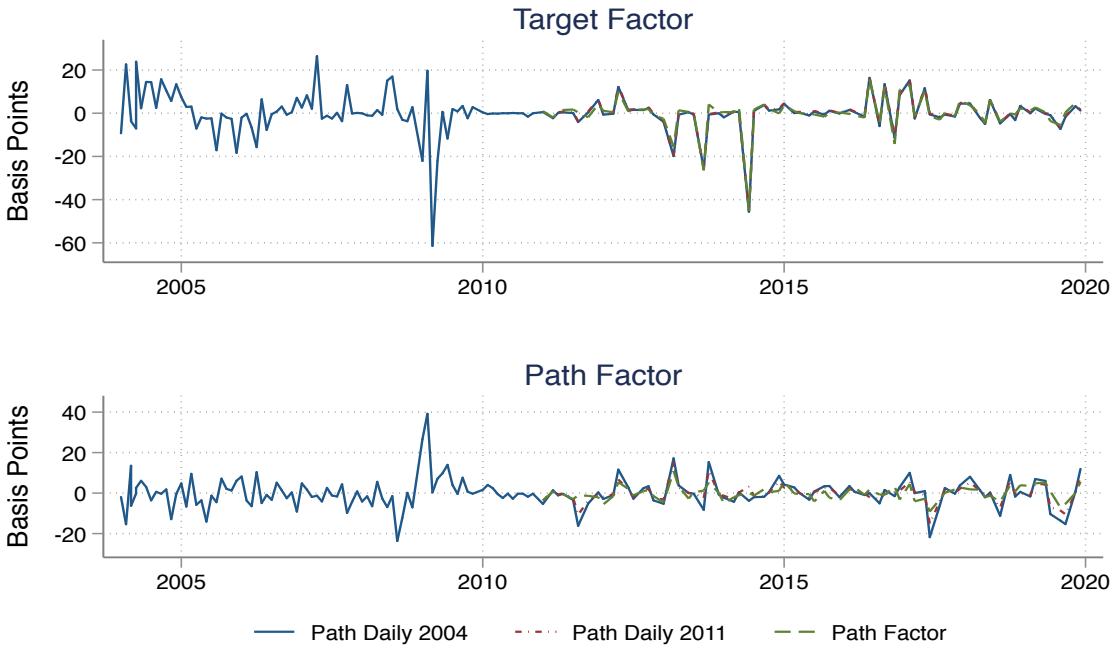
Finally, in addition to quantifying the effects of policy statements, it is interesting to understand why and how monetary policy influences long-term yields via statements. The literature for advanced countries has indeed moved on in this direction. Besides providing information about the outlook of monetary policy, statements may reveal information about other macroeconomic variables, which might have effects working in opposite directions.

Figure 1. Monetary Policy Dimensions



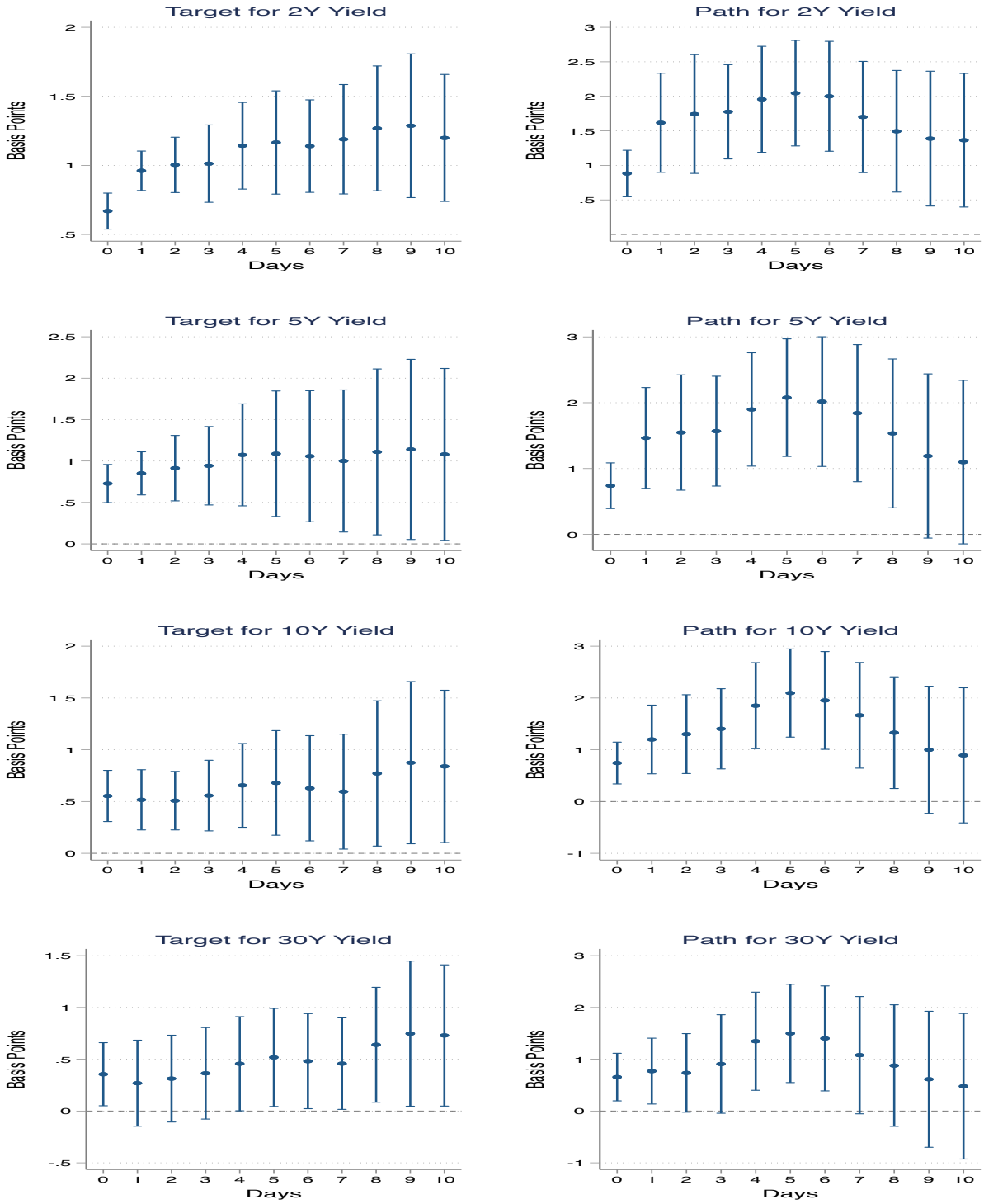
Notes: This figure plots the largest estimated target and path factors obtained from intraday data, as explained in the main text. The sample is all regular monetary policy announcements from January 2011 to December 2019. The dates of the three unlabeled dots in the first quadrant are 25 Oct 2013 (bottom), 29 Jan 2015 (left) and 19 Dec 2019 (right).

Figure 2. Monetary Policy Surprises in Mexico: Intraday and Daily Data



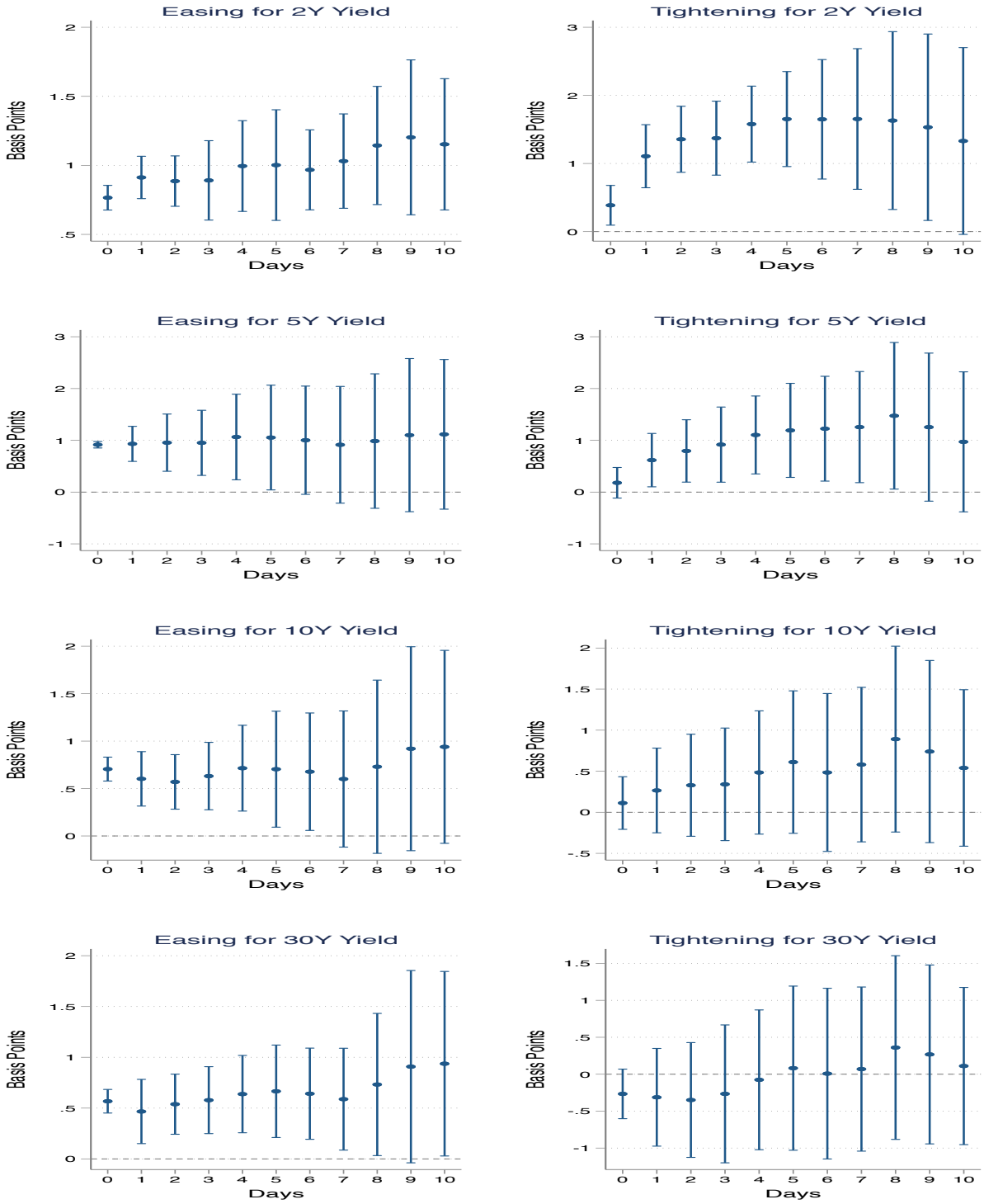
Notes: This figure compares the evolution of the target and path factors obtained with intraday and daily data. The solid lines are obtained with daily data from 2004 to 2019. The dash-dotted lines are obtained with daily data from 2011 to 2019. The dashed lines are obtained with intraday data from 2011 to 2019.

Figure 3. Persistence of the Yield Curve Response to the Target and Path Factors over Subsequent Days



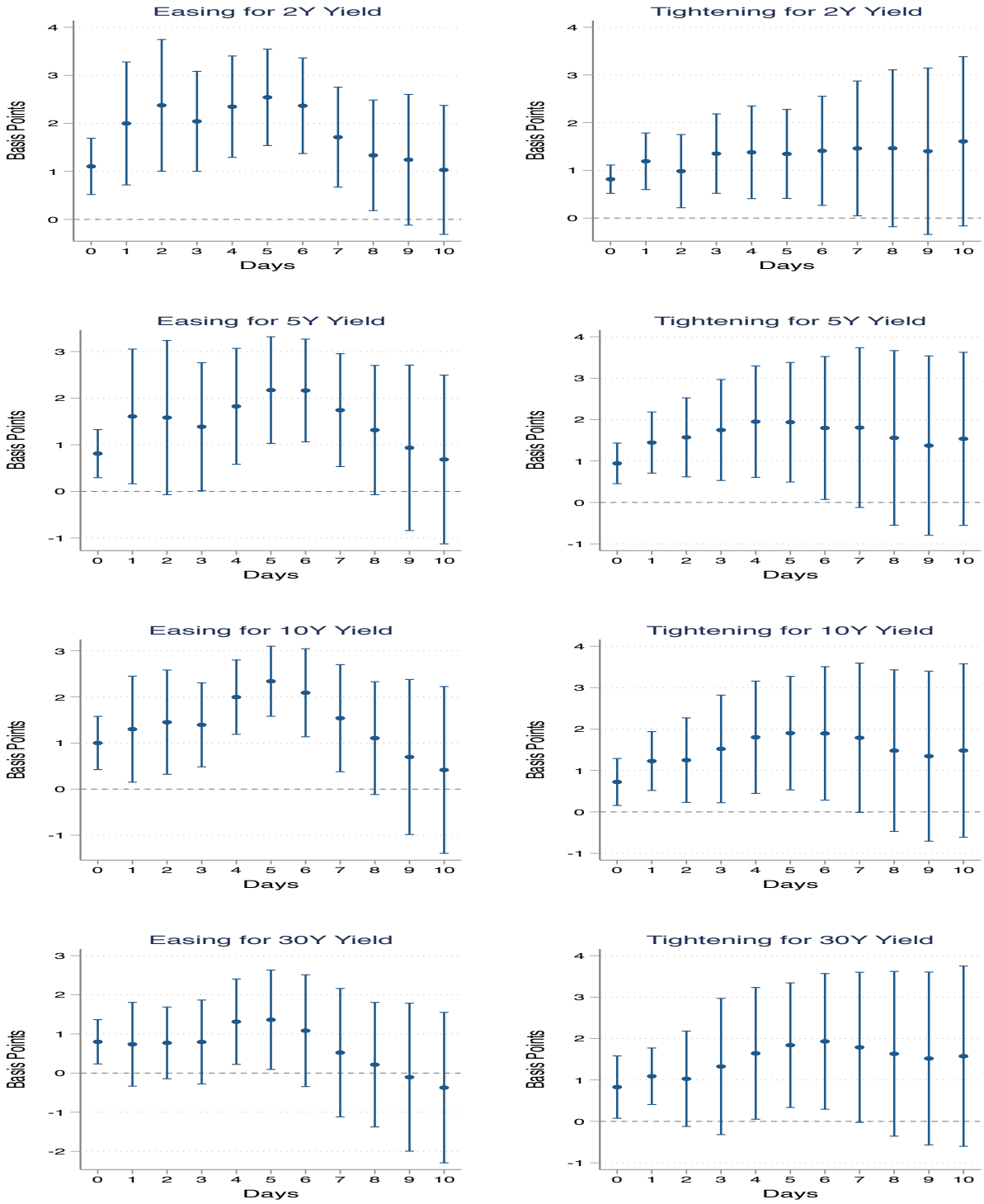
Notes: This figure plots the coefficient estimates and 95% confidence intervals for the target (left column) and path (right column) factors obtained from equation (3) for yield changes from close of day $t-1$ to day $t+k$, where t is a day with a monetary policy announcement and $k = 0, 1, \ldots, 10$. The factors are obtained from intraday data, as explain in the main text. The sample is all regular monetary policy announcements from January 2011 to December 2019.

Figure 4. Persistence of the Asymmetric Response of the Yield Curve to the Target Factor over Subsequent Days



Notes: This figure plots the coefficient estimates and 95% confidence intervals for easings (left column) and tightenings (right column) in the target factor obtained from equation (5) for yield changes from close of day $t-1$ to day $t+k$, where t is a day with a monetary policy announcement and $k = 0, 1, \ldots, 10$. The factors are obtained from intraday data, as explain in the main text. The sample is all regular monetary policy announcements from January 2011 to December 2019.

Figure 5. Persistence of the Asymmetric Response of the Yield Curve to the Path Factor over Subsequent Days



Notes: This figure plots the coefficient estimates and 95% confidence intervals for easings (left column) and tightenings (right column) in the path factor obtained from equation (5) for yield changes from close of day $t-1$ to day $t+k$, where t is a day with a monetary policy announcement and $k = 0, 1, \ldots, 10$. The factors are obtained from intraday data, as explain in the main text. The sample is all regular monetary policy announcements from January 2011 to December 2019.

Table 1. Tests of the Number of Factors in Monetary Policy Surprises

	Frequency	$H_0 : k = k_0$	Wald Statistic	Degrees of Freedom	p-value	Observations
Exchange Rate & Yield Curve	Intraday	0	36.55	10	0.000	41
		1	11.62	5	0.040	41
		2	0.04	1	0.851	41
	Daily	0	35.24	10	0.000	120
		1	14.60	5	0.012	120
		2	0.01	1	0.933	120
Swaps	Intraday	0	26.47	6	0.000	72
		1	7.47	2	0.024	72
	Daily	0	25.57	6	0.000	155
		1	9.49	2	0.009	155

Notes: This table reports the results from the Cragg–Donald test. H_0 is the null hypothesis of $k = k_0$ factors against the alternative of $k > k_0$ factors, where $k_0 = 0, 1, 2$. The sample is all regular monetary policy announcements until December 2019, the starting date varies based on data availability: for the exchange rate and the yield curve with intraday data is December 2014 (due to the 5-year yield) and with daily data is October 2006 (due to the 30-year yield); for swaps with intraday data is January 2011 and with daily data is January 2004. The yield curve includes 2- 5- 10- and 30-year bonds. Swaps include 3- 6- 9-month and 1-year swaps.

Table 2. Summary of Statements in Selected Dates

Date	Description
27-Apr-2012	Statement indicates that the balance of risks for economic growth has improved.
08-Mar-2013	Statement makes clear that the 50 basis point reduction in the policy rate 'does not represent the beginning of an easing cycle'.
25-Oct-2013	Statement highlights that 'no further cuts in the policy rate are appropriate in the foreseeable future'.
29-Jan-2015	Statement notes the recent depreciation of the peso is an upward risk to inflation; the Board will monitor U.S. monetary policy and exchange rate dynamics 'to be able to take the necessary measures'.
17-Nov-2016	Statement announces that the balance of risks for inflation has deteriorated and removes 'this increment in the policy rate is not the beginning of a tightening cycle' from the previous statement.
09-Feb-2017	Statement highlights the effects of the tightenings in 2016 and 'the ones required in 2017' to counteract inflationary pressures.
22-Jun-2017	Statement drops reference to do 'the necessary tightenings ahead' from the previous statement; the balance of risks for inflation has shifted from moderately deteriorated to neutral.
15-Aug-2019	Statement notes that the negative output gap increased more than expected.
19-Dec-2019	Statement notes that headline and core inflation for 2020 might be 'slightly higher' than previously expected due to a recent increase in minimum wages.

Table 3. The Response of Swap Rates to the Target and Path Factors

	3M-Swap				1Y-Swap			
	Intraday		Daily		Intraday		Daily	
Intraday Target Factor	0.999***	0.999***			0.983***	0.983***		
	(0.008)	(0.008)			(0.046)	(0.013)		
Intraday Path Factor		0.000				1.050***		
		(0.022)				(0.038)		
Daily Target Factor			1.001***	1.001***			0.942***	0.942***
			(0.007)	(0.007)			(0.065)	(0.011)
Daily Path Factor				0.000				0.816***
				(0.011)				(0.019)
Constant	-0.480***	-0.480***	-0.083	-0.083	-0.286	-0.286***	0.062	0.062
	(0.061)	(0.062)	(0.061)	(0.061)	(0.435)	(0.104)	(0.501)	(0.115)
Observations	72	72	155	155	72	72	155	155
R-squared	0.996	0.996	0.994	0.994	0.819	0.990	0.691	0.984

Notes: For the 3-month swap rate, the table shows the coefficient estimates in regressions of intraday and daily changes in the 3-month swap rate on the target and path factors obtained from intraday and daily data, as explained in the main text. Similarly for the 1-year swap rate. Daily changes are calculated around monetary policy announcements; intraday changes are calculated starting 10 minutes before to 20 minutes after a monetary policy announcement. The sample is all regular monetary policy announcements until December 2019, with intraday data the sample starts in January 2011 and with daily data it starts in January 2004. All variables are expressed in basis points. Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Table 4. The Response of Asset Prices to the Target and Path Factors: Intraday Data

	FX		2Y-Yield		5Y-Yield		10Y-Yield		30Y-Yield	
Target Factor	-1.89**	-1.89**	0.67***	0.68***	0.35***	0.27***	0.42***	0.42***	0.30***	0.30***
	(0.77)	(0.78)	(0.09)	(0.08)	(0.10)	(0.09)	(0.09)	(0.08)	(0.08)	(0.07)
Path Factor		-0.14		0.48***		0.69***		0.56***		0.59***
		(1.19)		(0.09)		(0.16)		(0.12)		(0.12)
Observations	72	72	56	56	41	41	56	56	56	56
R-squared	0.20	0.20	0.80	0.86	0.24	0.60	0.53	0.69	0.35	0.59

Notes: The first column for each dependent variable shows the coefficient estimates in regressions of intraday yield changes or returns (FX) on the target factor, the second column adds the path factor as a regressor. The target and path factors are obtained from intraday data, as explained in the main text. Intraday changes are calculated starting 10 minutes before to 20 minutes after a monetary policy announcement. The sample for the exchange rate is all regular monetary policy announcements from January 2011 to December 2019; for 2- 10- and 30-year yields, from January 2013 to December 2019; and for 5-year yields, from December 2014 to December 2019. All variables are expressed in basis points. All regressions include a constant. Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Table 5. Summary Statistics for Portfolios Flows Between Mexico and the U.S.

	Mean	Standard Deviation	Minimum	Maximum	Observations
Inflows: T-Bonds, T-notes	3.80	3.15	0.19	17.23	107
Inflows: U.S. Agency Bonds	1.64	1.07	0.08	7.97	107
Inflows: Non-U.S. Bonds	5.26	2.34	1.52	14.17	107
Inflows: Non-U.S. Stocks	2.63	0.74	1.43	5.12	107
Outflows: T-Bonds, T-notes	3.83	2.90	0.10	18.29	107
Outflows: U.S. Agency Bonds	1.50	0.64	0.36	3.76	107
Outflows: Non-U.S. Bonds	4.39	2.09	1.12	10.70	107
Outflows: Non-U.S. Stocks	2.69	0.74	1.47	4.95	107

Notes: All amounts are expressed in billions of U.S. dollars. The sample period is January 2011 to November 2019. Inflows are sales of securities by Mexican to U.S. investors. Outflows are purchases of securities by Mexican from U.S. investors.

Table 6. The Response of Portfolio Flows to Target and Path Factors

	Inflows				Outflows			
	T-Bonds T-Notes	Agency Bonds	Non-U.S. Bonds	Non-U.S. Stocks	T-Bonds T-Notes	Agency Bonds	Non-U.S. Bonds	Non-U.S. Stocks
Target Factor	-0.048	0.010	-0.047	-0.019***	-0.007	0.011	-0.017	-0.013**
	(0.055)	(0.018)	(0.035)	(0.005)	(0.028)	(0.008)	(0.033)	(0.006)
Path Factor	0.088	0.070**	0.097	-0.003	0.169	0.008	0.028	0.001
	(0.162)	(0.035)	(0.102)	(0.015)	(0.112)	(0.021)	(0.064)	(0.015)
Lags	0	1	1	3	0	3	3	3
Observations	107	107	107	107	107	107	107	107
R-squared	0.016	0.228	0.125	0.601	0.026	0.225	0.255	0.589

Notes: This table shows the coefficient estimates in regressions of different categories of portfolio inflows and outflows on the target and path factors obtained from intraday data, as explained in the main text. Inflows are sales of securities by Mexican to U.S. investors. Outflows are purchases of securities by Mexican from U.S. investors. All flows are expressed in billions of U.S. dollars. The factors are equal to the estimated value if there was a monetary policy announcement in the respective month and zero otherwise. The lag order for each flow category is selected using the Bayesian information criterion. The sample period is January 2011 to November 2019. All regressions include a constant. Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Table 7. The Asymmetric Response of Asset Prices to Monetary Policy Surprises

	FX		2Y-Yield		5Y-Yield		10Y-Yield		30Y-Yield	
Target*$\mathbb{1}$(Target < 0)	-0.45	-0.44	0.74***	0.79***	0.76**	0.73***	0.50***	0.55***	0.39***	0.43***
	(0.40)	(0.39)	(0.08)	(0.04)	(0.29)	(0.13)	(0.07)	(0.03)	(0.06)	(0.03)
Target*$\mathbb{1}$(Target > 0)	-6.11***	-6.12***	0.47***	0.33***	0.18***	0.08	0.15	0.02	-0.01	-0.11
	(1.14)	(1.32)	(0.08)	(0.05)	(0.06)	(0.05)	(0.09)	(0.08)	(0.10)	(0.09)
Path*$\mathbb{1}$(Path < 0)		1.29		0.29**		0.59***		0.47***		0.61***
		(1.31)		(0.11)		(0.20)		(0.17)		(0.20)
Path*$\mathbb{1}$(Path > 0)		0.61		0.79***		0.80***		0.80***		0.73***
		(1.90)		(0.12)		(0.19)		(0.15)		(0.11)
H_0 : Target Equality	0	0.00	0.02	0	0.06	0.00	0.00	0	0.00	0
H_0 : Path Equality		0.55		0		0		0		0
Observations	72	72	56	56	41	41	56	56	56	56
R-squared	0.50	0.51	0.82	0.91	0.36	0.72	0.60	0.80	0.46	0.74

Notes: The first column for each dependent variable shows the coefficient estimates in regressions of intraday yield changes or returns (FX) on the target factor interacted with a dummy variable indicating its sign. The second column adds the interaction of the path factor with a dummy variable indicating its sign as regressors. The target and path factors are identified from intraday data, as explain in the main text. The sample is all regular monetary policy announcements from January 2011 to December 2019. H_0 rows report the p-value for the null hypothesis that the two coefficients for each factor are equal. All variables are expressed in basis points. No constant is included in the regressions. Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

Table 8. The Asymmetric Response of Portfolio Flows to Monetary Policy Surprises

	Inflows				Outflows			
	T-Bonds T-Notes	Agency Bonds	Non-U.S. Bonds	Non-U.S. Stocks	T-Bonds T-Notes	Agency Bonds	Non-U.S. Bonds	Non-U.S. Stocks
Target*$\mathbb{1}$(Target < 0)	0.010	-0.001	-0.079**	-0.023***	0.011	0.008	-0.020	-0.022***
	(0.031)	(0.008)	(0.030)	(0.004)	(0.039)	(0.010)	(0.041)	(0.004)
Target*$\mathbb{1}$(Target > 0)	-0.216***	0.042	0.049	-0.005	-0.058	0.021	-0.007	0.011
	(0.073)	(0.062)	(0.070)	(0.012)	(0.051)	(0.016)	(0.092)	(0.012)
Path*$\mathbb{1}$(Path < 0)	-0.184	0.108**	-0.068	-0.014	0.041	-0.040	-0.030	-0.004
	(0.184)	(0.050)	(0.158)	(0.021)	(0.124)	(0.031)	(0.098)	(0.024)
Path*$\mathbb{1}$(Path > 0)	0.436*	0.017	0.212	0.002	0.320	0.050	0.081	-0.006
	(0.253)	(0.044)	(0.163)	(0.025)	(0.214)	(0.039)	(0.135)	(0.025)
Lags	0	1	1	3	0	3	3	3
H_0 : Target Equality	0.005	0.506	0.107	0.140	0.334	0.498	0.906	0.016
H_0 : Path Equality	0.192	0.071	0.433	0.805	0.260	0.262	0.829	0.951
Observations	107	107	107	107	107	107	107	107
R-squared	0.071	0.241	0.166	0.605	0.036	0.252	0.258	0.600

Notes: The table shows the coefficient estimates in regressions of different categories of inflows and outflows on the target and path factors interacted with a dummy variable indicating their signs. The target and path factors are identified from intraday data, as explain in the main text. Inflows are sales of securities by Mexican to U.S. investors. Outflows are purchases of securities by Mexican from U.S. investors. All flows are expressed in billions of U.S. dollars. The factors are equal to the estimated value if there was a monetary policy announcement in the respective month and zero otherwise. The lag order for each flow category is selected using the Bayesian information criterion. H_0 rows report the p-value for the null hypothesis that the two coefficients for each factor are equal. The sample period is January 2011 to November 2019. All regressions include a constant. Robust standard errors are shown in parentheses. *, **, *** asterisks respectively indicate significance at the 10%, 5% and 1% level.

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