Policy Guidance and the International Transmission of Macro News: Evidence from Investment Funds

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This paper contends that U.S. macroeconomic releases are an important 'global' factor driving cross-border flows and that their effect depends on the guidance provided by the U.S. Federal Reserve (Fed). I source data on allocations into investment funds and study the response of U.S. investors to domestic employment news, focusing on the post-Crisis period. I show that, when the Fed complemented its zero-rate policy with calendar-based forward guidance, monetary policy expectations were insensitive to macro releases and investors responded to positive employment news by re-balancing their portfolios toward faster growing and riskier countries. On the other hand, as the Fed progressively changed guidance to signal that it was ready to withdraw policy accommodation, investors perceived the same positive news to bring forward the moment of policy normalization and reacted by reducing their foreign market exposures. Countries with better institutions experienced less outflows, while those with a more open capital account fared worse. These findings highlight an important role of central bank guidance in determining how investors shift capital across countries in response to shocks. They also provide novel evidence of investors risk-taking abroad, following positive shocks at home, during periods of accommodative monetary policy.

Keywords: Cross-border flows, Macroeconomic news, Federal Reserve, Forward guidance, Investment Funds

JEL Codes: E44, E58, F33

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1. Introduction

How do financial market investors change their international portfolios in response to new information about the state of the U.S. economy? Does their response depend on how they expect the U.S. Federal Reserve (Fed) to adjust monetary policy? We know little about the effects of U.S. macroeconomic releases on cross-border flows. This is surprising since U.S. news inform on the health of the world largest economy and carry implications for monetary policy in the center country of the international monetary system. This double information content complicates a prediction about the effects of news on cross-border flows. On the one hand, in a highly interconnected world, the release of macroeconomic data indicating strong U.S. growth should increase confidence about the state of the global economy, therefore inducing higher cross-border investments. On the other hand, the same data might lead investors to expect the Fed to tighten monetary policy to prevent the economy from overheating, thus depressing risk appetite, with negative effects on flows. This paper sheds light on these issues by estimating how investors adjust their portfolios in response to U.S. labor market releases, allowing their reaction to varying across different Fed's policy guidance regimes.

Considering different Fed's guidance regimes is instrumental to disentangle the effects of news deriving from their real economy information content from those stemming from their implications for future monetary policy. When the Great Financial Crisis (GFC) struck, the Fed reduced the short-term policy rate to zero and embraced quantitative easing (QE) to further lower longer-term market rates. Additionally, it communicated that its zero-interest-rate-policy (ZIRP) would have lasted for a period of at least two years, which greatly diminished the importance attached by investors to news in their assessment of future policy. Hence, focusing on this guidance regime enables isolating the effects of U.S. news on flows that originate from their real economy information content. On the other hand, as the economy gradually improved, the Fed communicated that it was becoming ready to end QE and the ZIRP. This change in guidance increased the relevance of macro releases in shaping investors' expectations of future policy and it allows assessing the importance of the monetary policy information content of news. In this paper, I find that whether news are perceived to carry implications for future policy or not determines the sign of their effect on cross-border flows. When the Fed signaled low rates for at least two years, investors responded to positive news by re-balancing their portfolios towards foreign markets. When instead the Fed hinted at forthcoming policy normalization, investors reacted to the same positive news by decreasing their foreign market exposures.

To carry out the analysis, I focus on one specific release: the net change in non-farm payroll (NFP) employment. A vast literature has shown NFP news to be among the most important releases for financial markets worldwide. Nonetheless, to my knowledge, nobody has studied their effects on either investors' portfolio decisions or cross-border flows. For identification purposes, I only consider the unexpected — surprise — component of NFP news, which I measure using Bloomberg's data on economic analysts' expectations. To gauge investors' behavior, I source micro data provided by Emerging Portfolio Fund Research (EPFR) on purchases of shares (flows) in over 10,000 bond and equity investment funds domiciled in the U.S. The main advantage of this dataset is that, being at the weekly frequency, it permits identifying relatively well the impact of NFP employment news, which are released every month. Among the funds covered, some invest only in the U.S., while others exclusively in foreign countries. By using data on the latter, I obtain a measure of gross cross-border portfolio flows from the U.S. to foreign countries. I then rely on the local projection method (Jordà, 2005) to trace out the dynamic (4-week) response of investors to employment news. I focus on the March/2009 to May/2018 period and start by estimating the average — unconditional

— response over the entire sample. In a second stage, I allow the response to differing across four distinct Fed's policy regimes, which I identify through a narrative analysis.

The results from the unconditional analysis indicate that, on average, investors responded to positive employment news by selling funds' shares. This result, which holds for both funds investing in the U.S. and those investing in foreign countries, suggests that expectations of tighter monetary policy dominated the positive effects of good news stemming from increased confidence about the state of the economy. However, results from the conditional analysis point to highly heterogeneous responses, which depend on the Fed's guidance. When the Fed communicated that the ZIRP would have lasted at least for a two-to-three-year period (calendar-based guidance regime), a one standard deviation positive surprise in employment news induced positive flows, worth about 0.17 percent of assets, into funds investing in foreign countries. The same surprise had no effects on funds investing in the U.S. When instead the Fed signaled that it was becoming ready to withdraw policy accommodation (normalization guidance regime), a one standard deviation surprise led to outflows worth -0.14 and -0.27 percent of assets from funds investing in, respectively, the U.S. and foreign countries.

In a second step, I explore potential transmission channels and consider the role of monetary policy expectations (proxied by the 6-month federal funds future rate), the U.S. stock market and expected volatility (proxied by the VIX). I find that, during the calendar-based regime, policy expectations were insensitive to economic releases. Absent implications for monetary policy, positive news decreased volatility, as agents gained confidence about the state of the economy, and bolstered the stock market. I show that these dynamics completely explain the effects of news on flows, thus pointing to increased wealth and higher risk appetite as the main drivers of the re-balancing abroad observed following positive news. Confirming this intuition, inflows were larger in funds investing in Emerging and Frontier Markets. These results uncover a novel channel through which investors increased risk-taking abroad during periods of accommodative monetary policy. On the other hand, during the normalization guidance regime, positive news induced investors to expect tighter monetary policy going forward. In turn, this increased volatility and depressed the stock market. Accounting for these dynamics explains about half of the negative response of flows to news.

I then consider some extensions to these core results. First, I analyze the behavior of investors in exchange-traded funds (ETFs). Differently from traditional mutual funds (MFs), ETFs can be traded continuously throughout the day on secondary markets. This characteristic generally makes ETFs more liquid than MFs and might attract shorter-term oriented investors. Backing this intuition, I find that ETFs' investors are more sensitive to news than MFs'. Second, I use data on funds not domiciled in the U.S. to analyze the behavior of foreign (non-US) investors. These responded similarly to domestic investors, thus indicating that U.S. employment news can be considered as a global 'push' factor driving cross-border flows.

I also explore the presence of cross-country heterogeneity and relate the response of country flows to news to a host of macroeconomic, financial, and structural characteristics. This analysis suggests that inflows following positive news during the calendar-based regime were larger in countries with higher growth rates and lower credit ratings, pointing again to a risk-taking channel of news in periods of accommodative policy. Instead, outflows during the normalization regime were smaller in countries that had better institutions and were more integrated in the global economy. Countries with higher levels of stock market capitalization and a more open capital account tended to experience more outflows. These results suggest that expectations of U.S. monetary policy

tightening lead investors to liquidate their positions fast by selling assets in more liquid markets rather than fleeing countries with worse fundamentals.

This paper relates and contributes to several strands of the capital flows literature. Fischer (2015) and Koepke (2018) document the expected level of the U.S. policy rate to have adverse effects on investment fund flows to Emerging and Frontier Markets. Li *et al.* (2018) study episodes of fund flow surges and find that these depend on global factors, including U.S. equity returns and the VIX index.[1] These studies focus on either the VIX, the expected federal funds rate or the stock market price to explain flows. By investigating the effects of U.S. employment news, which are an underlying factor driving those other commonly studied variables, my analysis goes one layer beyond these earlier contributions. Only Fratzscher (2012) and Puy (2016) touch upon the role of macroeconomic news, but neither of them relates their effect to monetary policy or study the effect of U.S. employment news in isolation.[2]

A growing literature studies the role of different financial intermediaries in the international transmission of shocks. Cetorelli and Goldberg (2011); Bruno and Shin (2014); Miranda-Agrippino and Rey (2015) and Correa *et al.* (2015) highlight the importance of global banks. More recently, the focus has shifted on global investment funds. Cerutti *et al.* (2015) find that countries relying more on international funds as a source of external funding are more sensitive to global push factors. Converse *et al.* (2018) study the response of flows towards Emerging Markets to changes in global risk aversion and find that flows through ETFs respond more than those through MFs. My analysis further generalizes this result by showing that ETFs' investors respond more than MFs' not only to the VIX but also to news.

Another strand of the literature studies the drivers of country heterogeneity in the response of flows to global push factors. Puy (2016) emphasizes political instability as a factor increasing a country's sensitivity to shocks in center countries. That is in line to Fratzscher (2012), who finds that countries with better institutions experienced smaller outflows during the GFC. Instead, by focusing on asset prices rather than capital flows, Eichengreen and Gupta (2015) and Aizenman *et al.* (2016) find that countries with more liquid financial markets were hit the most following QE exit announcements by Fed officials. My result that outflows following positive news in the normalization regime concentrated in countries with a more open capital account, higher capitalized stock markets, and weaker institutions confirm the findings of these earlier contributions. On the other hand, to the best of my knowledge, this paper is the first to formally document that, in periods of accommodative monetary policy, riskier countries received more inflows following positive shocks in the U.S.

A vast literature finds that U.S. macroeconomic news affect domestic and foreign interest rates as well as stock market prices and exchange rates (Andersen *et al.*, 2003, 2007; Faust *et al.*, 2007), and that their effects can be time-varying (Boyd *et al.*, 2005; Beber and Brandt, 2009; Goldberg and Grisse, 2013). I contribute to this literature by studying the quantity versus the price effects of news. Finally, the role of the Fed in shaping investors' responses to news highlighted here is consistent

[1] Although they do not focus on investment fund flows, the role of financial market volatility as a global push factor driving flows to EMs is also emphasized in Forbes and Warnock (2012); Nier *et al.* (2014); Ahmed and Zlate (2014); and Miranda-Agrippino and Rey (2015), among others.

[2] Fratzscher (2012) considers the 2006-2010 sample and constructs a measure of U.S. macroeconomic surprises that combines ten major releases. He finds positive news to have increased flows during the GFC and decreased them in the rest of the sample. Puy (2016) bundles together major releases from each of the G10 economies and finds positive surprise to have increased flows in the 2001-2011 sample. As they batch together several news likely to have different implications for financial markets, these approaches do not allow to carry out an analysis of the channels through which news impact flows.

with recent studies showing that the Fed's forward guidance (i) improved agents' understanding of the central bank's reaction function (Femia *et al.*, 2013; Engen *et al.*, 2015), (ii) stabilized the expected path of future policy rates (Swanson, 2017), and (iii) dampened the sensitivity of market interest rates to news (Feroli *et al.*, 2017).

The rest of the paper is structured as follows: Section 2 discusses the identification of the Fed's guidance regimes and draws some implications for the empirical analysis. Section 3 illustrates the dataset and methodology. Section 4 presents the core results, explores the transmission channels and considers some extensions. Section 5 studies determinants of country heterogeneity. Section 6 concludes.

2. Policy Guidance Regimes

This section reviews the Fed's communication during the 2009-2018 period, it identifies four policy guidance regimes and concludes by drawing implications for the empirical analysis.

2.1. Fed Communication in the Post-Crisis Period

In the immediate aftermath of the GFC, the Federal Open Market Committee (FOMC; the Fed's governing body) lowered the target range for the federal funds rate (its policy rate) to 0-0.25 percentage points and introduced 'open-ended' forward guidance. Precisely, it stated that "*economic conditions [were] likely to warrant exceptionally low levels of the federal funds rate for some time*" (FOMC, 2008). This sentence was modified in March 2009, as the FOMC replaced the expression some time with "*an extended period*" (FOMC, 2009). The Fed reiterated this statement until July 2011.

In the summer of 2011, the Fed provided a calendar date for the likely duration of the ZIRP, as it stated that "*economic conditions [... were] likely to warrant exceptionally low levels for the federal funds rate at least through mid-2013*" (FOMC, 2011). The exact wording was then modified two times in order to keep indicating a low policy rate for about two years. In September 2012 the Fed also announced a third phase of QE and committed to buying securities worth about $40 billion each month for an indeterminate period, thus reinforcing its calendar-based guidance.[3] In December 2012, the FOMC removed the 'calendar-based' guidance introduced in the summer of 2011 and introduced 'threshold-based' guidance. Specifically, it indicated that the ZIRP would have been appropriate at least until the unemployment rate had remained above 6.5 percentage points, which was 1.4 points lower than the actual unemployment rate at that time. It also announced an expansion of QE, worth an additional $45 billion of monthly purchases.

In May 2013 the Fed's guidance began to change. As economic conditions continued to improve, the FOMC stated that it was "*prepared to increase or reduce the pace of its purchases to maintain appropriate policy accommodation*" (FOMC, 2013b). That set the stage for the key 'taper tantrum' speech given later in the month by Ben Bernanke, the then Fed's chairman, who declared that the Fed "*could take a step down in [the] pace of [bond] purchase*" (Bernanke, 2013). The FOMC finally

[3] In November 2008, the Fed announced the purchase of $600 billion in agency mortgage-backed securities (MBS) and agency debt. That constituted the first round of QE (QE1). QE1 was expanded on 18 March 2009 to include additional purchases of $750 billion in agency MBS and agency debt, as well as $300 billion in U.S. government bonds. QE1 ended in March 2010. In November 2010, the Fed announced a second round of QE (QE2), worth $600 billion of longer-dated Treasury purchases.

began to scale down QE in January 2014. At the same time, the FOMC changed its guidance in order to signal that any increase in the policy rate would have only happened after the complete end of QE. First, it stated the intention to maintain the ZIRP "*for a considerable time*" after the end of QE (FOMC, 2014). When bond purchases were completely halted (October 2014), it stated that it would have been "*patient*" in beginning to normalize the policy rate (FOMC, 2015b). In April 2015, it spelled out some conditions for when it would have been "*appropriate*" to raise the federal funds rate. Crucially, these included a reference to "*further improvement in the labor market*" (FOMC, 2015a). The Fed increased the policy rate for the first time in December 2015. It then hiked it six more times in the period until May 2018.

2.2. Policy Guidance Regimes

Based on the narrative described in the previous subsection, I dub the time span from March 2009 until the introduction of calendar-based guidance (August 2011) as the open-ended guidance regime. I then divide the period until the first rate hike of December 2015 in two regimes, a calendar-based and a normalization guidance regime. Given that the Fed hinted to policy normalization for the first time in the taper tantrum speech (May 2013), I use that as cutoff.[4] Finally, I define the period following the first rate hike as the post-liftoff period. The rationale for distinguishing between the normalization and the post-liftoff regime is that, during the former, policy guidance was about both balance sheet and policy rate normalization, while in the latter the focus was exclusively on the policy rate.

To recap, I identify the following four regimes:

A. the open-ended guidance regime (March/18/2009 to August/8/2011)
B. the calendar-based guidance regime (August/9/2011 to May/22/2013)
C. the normalization guidance regime (May/23/2013 to December/15/2015)
D. the post-liftoff regime (December/16/2015 to May/30/2018)

Figure 1 plots the level of the federal funds rate (black line) as well as its 6- and 12-month ahead expected values (respectively dark and light gray lines) during the different regimes. The spread between the actual federal funds rate and the 12-month-ahead expectation was almost null in the calendar-based regime, indicating that investors were not anticipating any interest rate increase for at least one year during that period. That is different from the open-ended guidance regime where the spread, although declining, was still substantial. Following Bernanke's taper tantrum, first the 12-month ahead and then also the 6-month ahead future rates started to increase relative to the actual rate, as expectations of higher rates began building up.

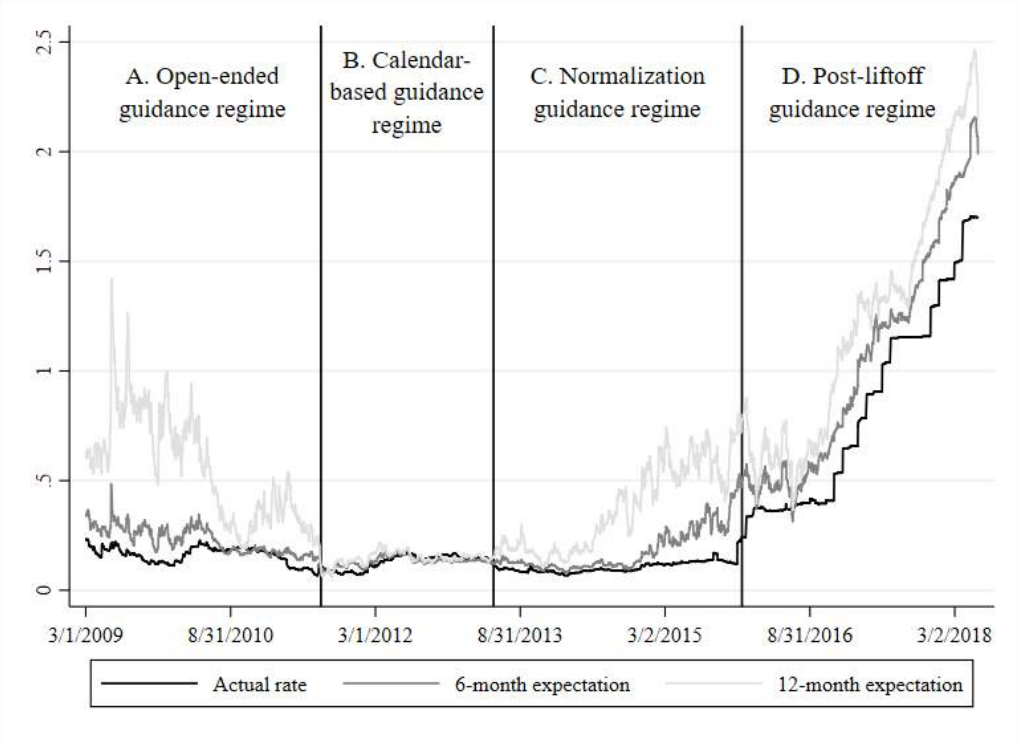
2.3. Implications for the Analysis

Here, I briefly discuss why policy guidance might influence how investors change their international portfolios in response to macroeconomic news. First, note that since the U.S. is the largest economy in the world, U.S. news can affect confidence about the state of the global economy. In this light, positive news could lead to more investments in both the U.S. and foreign countries.[5] Counterbalancing this aspect, the same positive news might also lead to expectations of future tighter

[4] In a sensitivity analysis I also consider the introduction of threshold-based guidance (December 2012) and the beginning of QE tapering (January 2014) as alternative cutoff dates.

[5] Similarly, negative news would cause outflows. For simplicity, in the rest of the paper, I will refer to positive news assuming that negative ones have opposite effects. In a sensitivity analysis, I will allow for asymmetric effects.

Figure 1: Evolution of the actual and expected future federal funds rates during different policy guidance regimes



Notes: the figure shows the federal funds rate as well as its 6-month and 12-month ahead expected future rate during the March 2009 to May 2018 period. Vertical solid lines denote key Fed's guidance changes. The first, second and third leftmost vertical lines denote the introduction of calendar-based forward guidance (August/9/2011), the taper tantrum (May/22/2013) and the first policy rate liftoff (December/13/2015) respectively. The windows denoted by A, B, C and D respectively indicate the open-ended guidance, calendar-based guidance, normalization guidance, and post-liftoff regimes.
Sources: Thomson Reuters Datastream

monetary policy. That would make borrowing costs higher, with adverse effects on investments. I define this as the policy channel of news. Crucially, the strength of this channel depends on the guidance adopted by the Fed. As an example, note that the 12-month ahead expectation of the Fed's policy rate was substantially flat — and closely matched the actual rate — during the calendar-based guidance regime. This suggests that the policy guidance provided by the Fed made monetary policy expectations insensitive to news, practically shutting down the policy channel. On the other hand, expectations likely became sensitive to news following the taper tantrum speech — as the Fed put great emphasis on incoming data to decide the timing of policy normalization — thus increasing the importance of the policy channel.

There are also other channels through which news might impact investors' decisions. For instance, news might affect uncertainty and financial market volatility (Forni *et al.*, 2017) and, through them, flows (Forbes and Warnock, 2012). News can also affect the stock market (Boyd *et al.*, 2005), thus leading to changes in wealth, which in turn is a determinant of investors' behavior (Raddatz and Schmukler, 2012). However, the direction of these channels is not clear *a priori* and might depend on the strength of the policy channel itself. In the absence of future implications for policy, good news should decrease uncertainty and boost the stock market, thus leading to higher investments. However, these dynamics could be dampened or even reversed if news did have implications for future policy. This is because expectations of tighter (looser) monetary policy usually have negative (positive) effects on the stock market and *vice versa* on uncertainty.

To recap, positive news should lead to higher investments when the policy channel is shut. These effects could be due to either higher confidence in the state of the (world) economy, lower financial market uncertainty, increased wealth or a combination of these factors. The effects of news when the policy channel is active are more ambiguous. Positive news could have a negative impact on investments if expectations of tighter policy — and therefore of higher borrowing costs — dominated the other channels. They might also have extra adverse effects if expectations of tighter policy also led to higher uncertainty and/or depressed the stock market. In the rest of the paper, I test whether investors' responses to news changed following the adoption of different Fed's guidance regimes and explore changes in policy expectations, uncertainty and financial wealth as potential transmission channels.

3. Dataset and Methodology

3.1. Employment News

To study the response of flows to U.S. macroeconomic news, I focus on one specific announcement: the net change in non-farm payroll (NFP) employment, which is released the first Friday of every month by the Bureau of Labor Statistics. As the Fed has the objective of maximum employment in its mandate, the NFP release provides direct information on how far the Fed is from reaching the employment-related part of its mandate and is revealing about the likelihood of future changes in monetary policy. The importance of NFP employment figures is epitomized by a famous quote of former FOMC's Chairman Alan Greenspan: "*Everything we've looked at suggests that it's the payroll data which are the series which you have to follow*" (2004). The fact that the Fed places great importance on labor market data is confirmed by the several references made to the state of the labor market as a factor to decide the timing of policy normalization (FOMC, 2013a, 2015a).

NFP releases are relevant also for other reasons. First, the NFP series moves very close to the overall economy. Thus, its importance goes beyond the labor market, and indeed it is one of the key indicators used by the National Bureau of Economic Research to determine whether the economy is in an expansion or a recession. Second, as they are released just after the end of the month, NFP releases are very timely. As shown in Gilbert *et al.* (2017), this property is crucial to determine the financial market relevance of a macroeconomic announcement. These authors find that NFP data explain about 25 percent of the variation in U.S. government bond yields in days in which they are released, whereas other macroeconomic news barely have any effect. The importance of NFP is also confirmed in earlier studies (Faust *et al.*, 2007; Beber and Brandt, 2009; Swanson and Williams, 2014).

Since market participants form expectations about upcoming macroeconomic releases, I follow standard practice in the literature and identify their unexpected — 'surprise' — component.[6] I collect data on the median response to a Bloomberg's survey asking economic analysts about their expectation and construct the following variable:

$$news_t = \frac{r_t - median(E_i[r_t])}{\sigma_S} \tag{1}$$

[6] See Gürkaynak *et al.* (2005); Boyd *et al.* (2005); Beber and Brandt (2009) and Swanson and Williams (2014) among others.

where r_t is the actual value of the NFP release; $E_i[r_t]$ is the value of the release expected by analyst i; and σ_S the unconditional standard deviation of the surprise component $r_t - median(E_i[r_t])$.

Figure A1 in Appendix A shows that the NFP news variable behaves as white noise, suggesting that it effectively captures the unanticipated component of the release. I formally verify that this is the case by regressing $news_t$ on $median(E_i[r_t])$. The result from this simple test indicates that the forecast error is orthogonal to the analysts' information set.[7] A potential concern is instead that macroeconomic releases might have less impact when analysts' disagreement is higher (Pericoli and Veronesi, 2015). I therefore collect information on the standard deviation of the analysts' expectations for a sensitivity analysis.

To run some robustness checks, I also collect data on other U.S. as well as foreign macro releases from major Advanced Economies and construct respective surprise variables in a the same way to what done for the NFP series. Table A1 in Appendix A contains a list of all the macroeconomic news considered, together with relevant descriptive statistics and data sources.

3.2. Investment Fund Flows

To measure cross-border flows, I rely on investment funds data compiled by EPFR. I focus on investment funds because they have become increasingly important in financial markets. Overall, they managed more than $49 trillion in assets at the end of 2017, with their share in all worldwide debt and equity markets having risen from 16 to 23 percent between 2010 and 2017 (ICI, 2018). Moreover, the data provided by EPFR are available at high frequencies — daily, weekly and monthly — thus allowing to identify the effect of macroeconomic news, which are released on a daily basis. I opt for data at the weekly frequency, as these cover more funds than data at the daily frequency.[8] The funds reporting to EPFR at the weekly frequency had a total of $15 trillion of assets at the end of 2017, or about 30.6 percent of the industry's total. The coverage of funds domiciled in the U.S. is more extensive, with their assets being about 42.5 of the total. As I explain below, these funds are the main focus of the analysis.

The two main variables of interests are flows ($F_{i,t}$) and assets under management ($A_{i,t}$). The former gauges investors' total purchases in shares of fund i at time t, while the latter measures fund i's assets at the beginning of time t. Both are expressed in U.S. dollar ($). I also collect data on funds' return, meaning the period-on-period percent change in net asset value (NAV), excluding changes due to new flows. The panel is unbalanced, with funds entering and leaving the sample as they are established or liquidated.

The sample comprises over 30,000 funds. I divide them into two categories depending on whether or not they are legally domiciled in the U.S. I then further distinguish funds based on their investment mandate and categorize them as (i) non-US-focused, (ii) global, and (iii) US-focused. The former only invest in countries other than the U.S. Global funds can invest in any country in the world, while US-focused funds only invest the U.S. The main focus is on non-US-focused funds that are legally domiciled in the U.S. The reason for this is that investments into these funds are a good measure of cross-border flows from the U.S. to foreign countries. Data on global and US-focused funds domiciled in the U.S. are used to draw comparisons. I only consider funds not domiciled in the U.S. for an extension.

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[7] In practice, I estimate the following regression: $news_t = \alpha + \beta median(E_i[r_t]) + \varepsilon_t$. The F-test statistics is 1.27, thus not rejecting the null hypothesis that $\alpha = \beta = 0$.

[8] The week is defined as to start on Thursday at the beginning of the U.S. trading day.

I screen the data similarly to Fratzscher (2012) and Converse *et al.* (2018). I exclude funds that have a life of less than one year and those with less than $10 million of assets on average. I also censor observations with abnormal jumps, which I define as having flows, in absolute value, larger than one-third of assets.[9] After cleaning, I have a panel of 10,864 funds domiciled in the U.S. Table 1 below provides basic descriptive statistics.

Table 1: Fund composition — funds domiciled in the U.S.

Investment focus	# funds	% equity	% ETFs	Assets	
				mean	s.d.
Non-US	1,875	88.5	24.0	797.5	3,035.7
Global	1,135	75.0	14.8	618.2	1,931.9
U.S.	7,911	61.9	12.0	899.4	3,689.9
Total	10,864	67.8	14.3	854.1	3,447.7

Notes: rows denoted by "Non-US", "Global", and "U.S." report statistics for funds investing, respectively, outside the U.S., in any country in the world, and in the U.S. Columns denoted "# funds", "% equity", and "% ETFs" report, respectively, the number of funds used in the analysis, the percentage share of equity funds and the percentage share of exchange-traded funds (ETFs). Columns denoted by "mean" and "s.d." report the mean and standard deviation of funds' assets (calculated based on each fund average assets over the sample period).
Sources: EPFR and own calculations.

A common feature across the different categories of funds is the high standard deviation of assets, pointing to important heterogeneities in size. Another shared characteristic is the more substantial presence of (i) funds investing in equity rather than bonds and (ii) mutual funds (MFs) relative to exchange-traded funds (ETFs). I will investigate these characteristics in some extensions.

3.3. Other Variables

To explore potential channels through which macroeconomic releases may impact flows, I collect additional data on the VIX (a measure of expected financial market volatility), the U.S. stock market price index, and the 6-month ahead expected federal fund future rate. All series are retrieved from Thomson Reuters Datastream.

I also source country-level data on cross-border flows from the U.S. to foreign countries happening through investments funds. These data are provided by EPFR, which compile them aggregating information from a subset of funds that report their country weights. Assets under management by such funds sum up to about 20 percent of the overall U.S. industry. After dropping countries which are not covered throughout the period and for which assets managed by reporting funds are less than $10 million on average, I have a balanced panel of 73 countries. Tables A2 and A3 in Appendix A list the countries covered and provide basic descriptive statistics. I will use these country-level data to explore potential cross-country heterogeneity in the response of flows to news. That would not be possible using fund-level data as funds typically invest in multiple countries.

To investigate determinants of cross-country heterogeneity, I collect data on several country characteristics. These are (i) traditional macroeconomic variables, such as the GDP growth rate, inflation and the budget balance, (ii) variables related to a country's external position, such as the debt held by foreigners, the current account balance, foreign reserves and the net international investment position, (iii) institutional characteristics, such as the degree of the capital account openness and a variable capturing perceptions about the rule of law, (iv) variables measuring a country's link with the U.S., such as the sum of imports and exports to/from the U.S. and the

[9] This corresponds to windsorizing less than the top and bottom percentiles of observations.

sum of bilateral portfolio assets and liabilities with the U.S., and (v) other variables capturing a country's openness to trade (measured as the sum of imports and exports as a share of GDP), the level of financial development (measured by the stock market capitalization as a share of GDP), and credit risk (measured by the inverse of the government risk rating). A list of all variables considered, their source, and country coverage is provided in Table A4 in Appendix A.

3.4. Econometric Framework

For the econometric analysis, I rely on the local projections method. This was first proposed by Jordà (2005) and it has been recently used in Auerbach and Gorodnichenko (2012), Jordà and Taylor (2016), Romer and Romer (2017) and Ramey and Zubairy (2018) as a flexible alternative to autoregressive distributed lag specifications. Its main advantages are that it does not impose a dynamic structure on the response to be estimated and it is better suited to analyze nonlinearities.

For the analysis of the effects of news on financial variables, the local projection method is similar to the event study approach, but it allows to explore dynamic effects in a rather compact format. In practice, it entails regressing the cumulative flows over the $t+k$ horizon onto the NFP news variable at time t. I focus on a 4-week window, including the week of the release and the following three.

I first estimate the average effect of NFP news on fund flows over the entire sample considered (March 2009 to May 2018), only allowing the effect to be different across funds depending on their investment focus (that is, U.S., non-US and global). In practice, for each $k = 0, .., 3$, I estimate the following equation:

$$\frac{\sum_{j=0}^{k} F_{i,t+j}}{A_{i,t}} = \sum_{F} \beta_k^f d_i^f * news_t + C_k I_i + D_k Z_{i,t} + \gamma_i + \varepsilon_{i,t} \tag{2}$$

where subscripts i and t denote fund and time respectively; the subscript k denotes the horizon considered; the subscript f denotes the funds' investment focus (that is, $f = US, nUS, GL$ for US-focused, non-US-focused and global funds respectively); $F_{i,t}$ denotes investors' allocations into fund i at time t (in \$); $A_{i,t}$ is the volume of assets under management by fund i at beginning of period t (in \$); d_i^f are three dummy variables each taking value 1 for funds' with the same investment focus ($f = US, nUS, GL$). $news_t$ is the NFP variable, taking value equal to the standardized surprise component in weeks in which there is a release and 0 otherwise; I_i is a vector containing investment-focus-specific intercepts; $Z_{i,t}$ is a vector comprising twelve lagged values of one-period flows and net asset value changes, both in percentage of fund's assets; C_k and D_k are two coefficient vectors; γ_i are investment fund fixed effects; and $\varepsilon_{i,t}$ is the error term, assumed to be uncorrelated with the regressors.

The β_k^fs are the coefficients of interest. They measure the cumulative response over the $t+k$ horizon of flows into funds with investment focus f to a one standard deviation NFP surprise at time t. I perform the estimation through OLS, with fund-clustered standard errors. To show the results, I plot impulse response functions (IRFs). These are constructed using the $\hat{\beta}_k^f$ for the point estimate at each horizon $t+k$ and their respective standard errors to derive 90 percent confidence bands.

In a second step I augment Equation 2 to allow the effects of news to vary across the different guidance regimes and estimate the following specification:

$$\frac{\sum_{j=0}^{k} F_{i,t+j}}{A_{i,t}} = \sum_{R,F} \beta_k^{r,f} d_t^r * d_i^f * news_t + C_k I_{i,t} + D_k Z_{i,t} + \gamma_i + \varepsilon_{i,t} \quad (3)$$

where the superscript r denotes the Fed's guidance regime (that is, $r = A, B, C, D$ for the open-ended, the calendar-based, the normalization, and the post-liftoff regime respectively); d_t^r are four dummy variables each taking value 1 during a different Fed's guidance regime; $I_{i,t}$ is a vector with regime- and investment-focus-specific intercepts; and the rest of the notation is as above. The estimation again relies on OLS with fund-clustered standard errors. I obtain IRFs plotting the estimated $\hat{\beta}_k^{r,f}$ and their respective standard errors.

4. Core Results

4.1. Unconditional Responses

Figure 2 shows the average response, during the March/2009 to May/2018 period, of fund flows to a one standard deviation positive surprise in U.S. employment releases, measured in percentage of funds' assets. Panels A. B. and C. contain IRFs for, respectively, funds investing in the U.S., funds investing in non-US countries and global funds. Blue solid and red dotted lines report the point estimate and 90% confidence bands respectively. Since Equation 2 assumes symmetry, responses to a one standard deviation negative surprise are merely the opposite of those represented in Figure 2. In commenting the results, I will refer to positive news for simplicity. In a sensitivity analysis, I will also allow for asymmetric effects.

Positive news typically had adverse and persistent effects on fund flows. The 1-week — impact — response was about -0.02 percent for both non-US- and US-focused funds, but outflows accelerated in the following weeks. The increase in outflows was stronger for non-US-focused funds. The 4-week response was about -0.11 and -0.06 percent for non-US- and US-focused funds respectively. A Wald test for equal coefficients informs that this difference is statistically significant. The behavior of global funds' investors was similar to that of non-US-focused funds. In the rest of the paper, I will only discuss results for non-US- and US-focused funds.

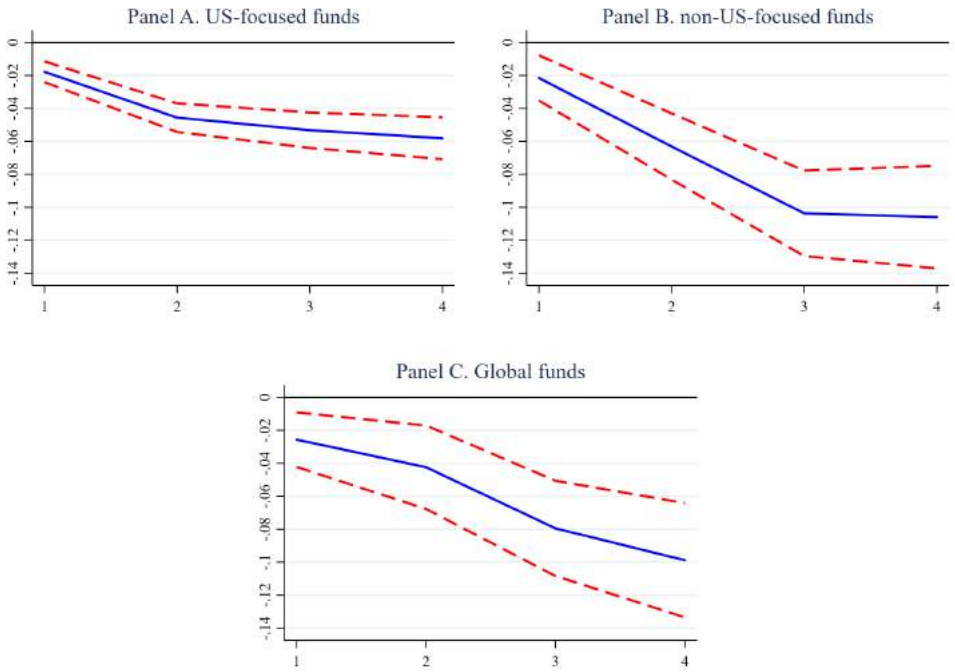
The negative response of flows suggests that the policy channel was generally dominant relative to the confidence channel discussed in Section 2, as this would have led to a positive response. The fact that also US-focused funds experienced outflows excludes the possibility that the negative reaction of flows into non-US-focused funds was due to a re-balancing towards U.S. assets due to improved growth prospects and a higher growth differential.

Before proceeding, I check that the estimates do not suffer from omitted variable bias and do not depend on NFP releases that are surrounded by high uncertainty (Pericoli and Veronesi, 2015). These robustness checks are discussed more in detail Appendix B.

4.2. Regime-specific Responses

Figure 3 below shows fund flow responses to a one standard deviation positive surprise in U.S. employment releases during the different Fed's policy guidance regimes identified in Section 2.2. These new IRFs are obtained using estimates from Equation 3. Each panel reports results for a

Figure 2: Fund flows average responses to employment releases



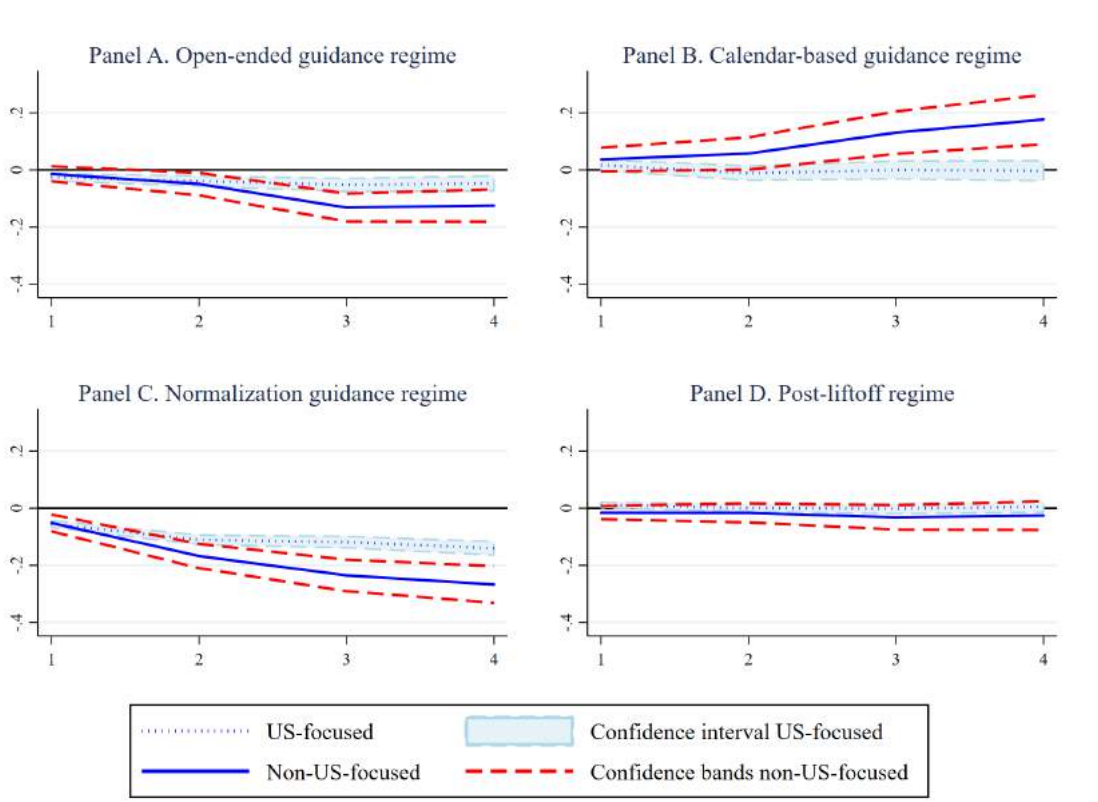
Notes: the Figure shows the response of fund flows to U.S. employment releases. The y-axis denotes the cumulative response to a one standard deviation surprise in the NFP data release, measured as a percentage of initial assets. The x-axis denotes the horizon of the response (in weeks), with 1 being the week of the announcement. Coefficients are obtained estimating the β_k^f coefficients from Equation 2.
Sources: Bloomberg, EPFR and own calculations.

different regime. Blue solid and red dotted lines report the point estimate and 90% confidence bands respectively for funds investing outside the U.S. Blue dotted lines and shaded areas report the point estimate and confidence interval for flows into funds investing in the U.S. Figure C1 in Appendix C shows responses of flows into global funds.

The estimates suggest that the Fed has an important role in shaping the response of flows to news. During the open-ended guidance regime — characterized by a promise to keep the policy rate at zero for an undefined period — both US- and non-US-focused funds experienced outflows following positive news, indicating that the policy channel was still dominant. In the calendar-based guidance regime — when the Fed pledged to maintain its ZIRP for at least two years — positive news did not have any effect on flows to US-focused funds, while they incited inflows into non-US-focused funds (the difference is statistically significant). These different effects suggest that positive news did not lead to higher investment abroad due to increased confidence about the state of the economy, as that should have also incited flows into US-focused funds. Instead, the re-balancing toward foreign assets might have been due to an increase in appetite for risk. When the Fed hinted at policy normalization, positive news led to outflows from both US- and non-US-focused funds, suggesting that investors considered better than expected employment data to anticipate the moment of policy normalization. Lastly, employment news did not have any effect on flows during the post-liftoff period. That might be because the positive impact of good news counterbalanced the negative implications stemming from higher interest rates.[10]

[10] The results are robust to using a different lag structure and, as expected since the surprise series behaves as white noise, also to including forward surprises *à la* Teulings and Zubanov (2014).

Figure 3: Fund flows responses to employment releases during different policy guidance regimes



Notes: the Figure shows the response of fund flows to U.S. employment releases during different Fed's guidance regimes. The y-axis denotes the cumulative response to a one standard deviation surprise in the NFP data release, measured as a percentage of initial assets. The x-axis denotes the horizon of the response (in weeks), with 1 being the week of the announcement. Panels A, B, C and D report responses for respectively the March/2009 to August 2011, September/2011 to May/2013, June/2013 to December/2015 and January/2016 to May/2018 periods. Responses are obtained estimating the $\beta_k^{r,f}$ coefficients from Equation 3.
Sources: Bloomberg, EPFR and own calculations.

Flows into non-US-focused funds were more sensitive to news than those into US-focused funds during both the open-ended and normalization guidance regimes, with the 4-week response being about twice as large in absolute value. In both periods, the difference is statistically significant. For both types of funds, outflows were nearly twice as large during the normalization relative to the open-ended guidance regime (the difference is again statistically significant). That is as expected given that (i) the Fed's guidance was more hawkish during the normalization regime, and (ii) in that period positive news brought forward not only the moment of policy rate normalization but also the exit from QE.

In terms of magnitude, inflows to non-US-focused funds following a one standard deviation surprise were equal to 0.17 percent over the 4-week horizon during the calendar-based regime. Outflows from non-US-focused funds during the normalization regime were -0.27 percent on average over the 4-week horizon, while those from US-focused funds were -0.14.[11]

[11] Extending the horizon further, I find that positive (negative) flows into non-US-focused funds during the calendar-based (normalization) regime lasted well beyond the 4-week horizon, with the response stabilizing at respectively about 0.56 (-0.47) percent in the tenth (eight) week (see Figure C2 in Appendix C).

In Appendix D, I assess how the results reported in Figure 3 depend on the exact date chosen to distinguish between the calendar-based and normalization regimes. The baseline results are derived using the day of Bernanke's taper tantrum as the cutoff (May/22/2013). When I experiment with two alternatives, the introduction of threshold-based guidance (December/12/2012), and the official announcement of QE tapering (December/8/2013), I obtain similar estimates (Table D1).

4.3. Transmission Channels

In this section, I investigate the potential channels through which news affect fund flows. Building on the discussion of Section 2.3, I consider monetary policy expectations, financial market uncertainty, and wealth. I measure these using, respectively, the 6-month ahead expected federal funds rate, the U.S. stock market expected volatility index (VIX) and the U.S. stock market price. I formally test whether these variables can explain the response of fund flows to news by augmenting Equation 3 as follows:

$$\frac{\sum_{j=0}^{k} F_{i,t+j}}{A_{i,t}} = \sum_{R,F} \beta_k^{r,f} d_t^r * d_i^f * news_t + \sum_{j=0}^{k} \sum_{R,F} \gamma_k^{r,f} d_t^r * d_i^f * y_{t+j} + C_k I_{i,t} + D_k Z_{i,t} + \gamma_i + \varepsilon_{i,t} \quad (4)$$

where y_t is either the level of the 6-month ahead expected fed funds rate, the growth rate of the VIX, or the growth rate of the stock market price. I use growth rates for the latter two since they display a trend in each of the regime considered.

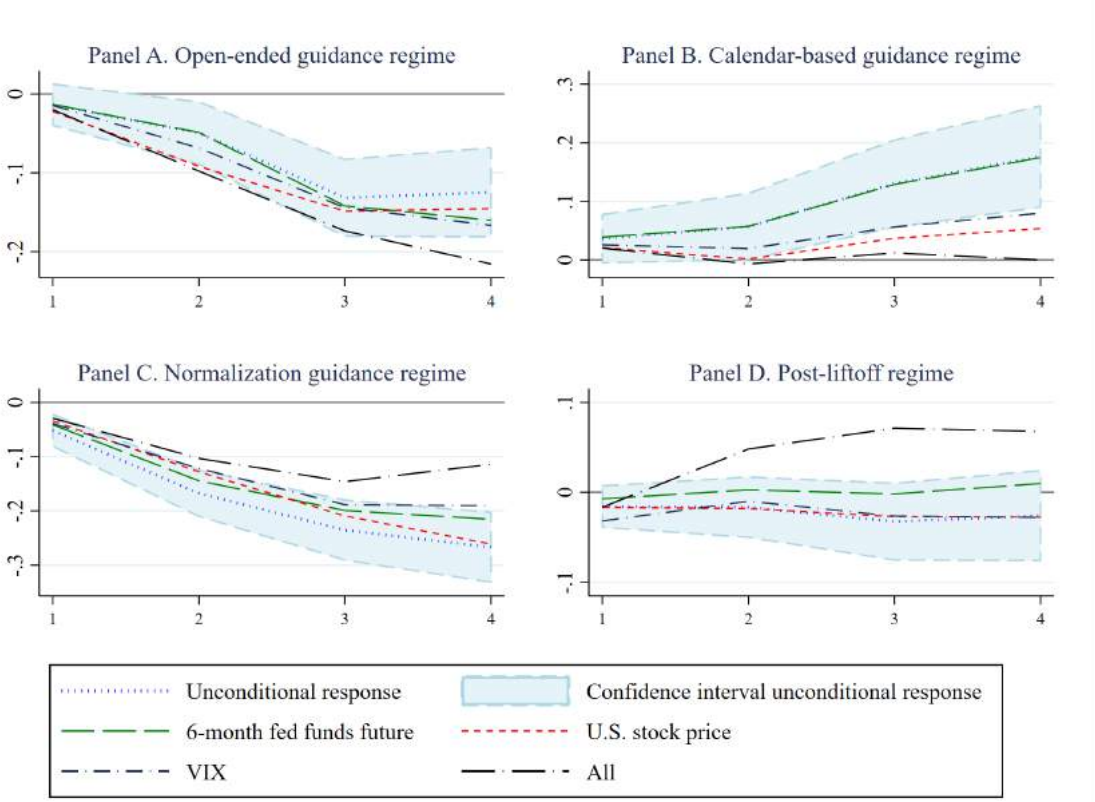
The rationale behind Equation 4 is to estimate the response of fund flows to news conditioning on the same level of, in turn, the expected policy rate, volatility, and financial wealth. By doing so, I shut down each of these potential transmission channels and assess how the baseline results are affected. I also estimate a specification in which the three variables enter the regression jointly.

Figure 4 below shows the new IRFs for non-US-focused funds. Figures E1 and E2 in Appendix E consider US-focused and global funds. Dashed green, dotted red and dashed black lines show responses when conditioning on, respectively, the expected fed funds future rate, the stock market price, and the VIX. Dot-dashed black lines report responses when these three variables enter the regression jointly. Baseline — unconditional — responses and their respective confidence intervals (estimated from Equation 3) are denoted respectively by blue dotted lines and shaded areas.

Panel B shows that conditioning for either the same stock market or VIX growth rate substantially weakens the effect of news on flows during the calendar-based regime. That suggests that good news had depressing effects on the VIX and a positive impact on the stock market. These dynamics then increased investors' risk appetite, thus leading to higher investments abroad. On the other hand, as expected, including the level of the expected policy rate does not change the estimate, which indicates that policy rate expectations were insensitive to news. When all variables enter the regression jointly, the estimated response is null, suggesting that inflows into non-US-focused funds following positive news were entirely due to positive wealth effects and higher risk appetite.

Responses shown in Panel C indicate that controlling for policy rate expectations and volatility each explains about 20 percent of the negative response of flows during the normalization guidance regime. When all the variables enter the regression jointly, the estimated 4-week response is less than half in absolute value. These results suggest that good news led investors to expect the moment of normalization to come earlier than anticipated. That increased risk aversion and added

Figure 4: Fund flow responses to employment releases conditioning on the expected fed funds future rate, the VIX and the stock market price



Notes: the Figure shows the response of fund flows to U.S. employment releases during different Fed's guidance regimes when controlling for the level of the 6-month ahead expected federal funds rate and the growth rate of the VIX volatility index as well as that of the stock market price. Panels A, B, C and D report responses for respectively the March/2009 to August 2011, September/2011 to May/2013, June/2013 to December/2015 and January/2016 to May/2018 periods. Responses are obtained estimating the $\beta_k^{r,f}$s coefficients from Equation 4.
Sources: Bloomberg, EPFR, Thomson Reuters Datastream and own calculations.

an extra negative, indirect, effect on flows to the more direct one stemming from higher expected rates. Panels A and D, instead, do not offer relevant insights for the open-ended guidance and post-liftoff regimes.

Next, I verify that the policy rate, the VIX and the stock market indeed responded to news in the way theorized above. I take advantage of the fact that these variables are available at the daily frequency and estimate 20-trading-day (equivalent to 4-week) responses as follows:

$$y_{t+k} - y_{t-1} = \sum_R \kappa_k^r d_t^r * news_t + C_k I_t + + D_k Z_t + \varepsilon_t \tag{5}$$

where y_t is either the 6-month federal funds future rate, the log of the U.S. stock price, or the log of the VIX; t denotes time (in days); I_t is a vector containing regime-specific intercepts; Z_t is a vector containing lags of the first difference of y_t; ε_t is an error term, assumed to be uncorrelated with the regressors; and the rest of the notation is as in Equation 3.[12]

[12] The results are obtained including five lags, but they are robust to different lag specifications.

I perform the estimation through OLS, with heteroskedasticity robust standard errors. Results are reported as IRFs. These are derived using the estimated $\hat{\kappa}_k^r$s coefficients and the respective standard errors and shown in Figures E3 and E4 in Appendix E. Figure E3 confirms that the effect of employment releases on monetary policy expectations does depend on the Fed's guidance. During the calendar-based guidance, news had no effects on the 6-month ahead expected federal funds rate. During the other regimes, positive news had similar positive effects at impact, but the response tended to last longer during the normalization and post-liftoff regimes.

Turning to the VIX and the stock market price, the former significantly decreased at impact, while the latter significantly increased during the calendar-based regime. Both effects are persistent over longer horizons. These responses indicate that — absent any effect on monetary policy expectations — positive employment news decreased uncertainty and boosted the stock market, which in turn led to higher investments abroad. During the normalization regime, neither variable reacted at impact. However, the VIX (stock market) progressively increased (decreased) in the days following the release. To rationalize this result, consider that investors expected positive news not only to lead to a higher policy rate but also a faster exit from QE. As QE had contributed to boost the stock market and decrease volatility (Bekaert *et al.*, 2013), the prospect of tapering reversed these effects.[13] The results for the post-liftoff regime support this intuition. As the Fed had already tapered QE and ended its ZIRP, positive news still led to expectations of a higher policy rate, but they did not weaken the stock market nor increased volatility.

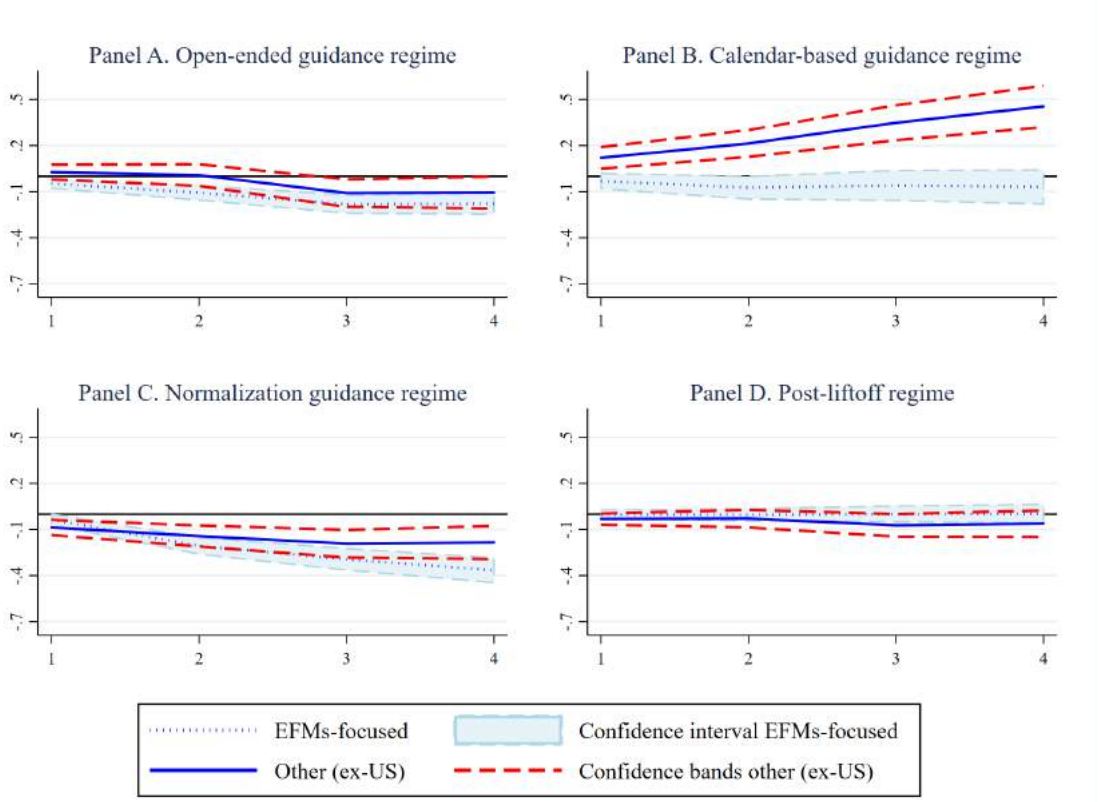
To further verify that increased risk appetite drove the response of investors to news during the calendar-based regime, I restrict the sample to funds investing outside the U.S. (non-US-focused funds) and further distinguish between funds investing in Emerging and Frontier Markets (EFMs) and other funds.[14] I expect the effect observed during the calendar-based regime to be stronger for funds investing in EFMs, as these are normally perceived to be riskier. I then estimate a specification similar to Equation 3, in which the d_i^f dummies distinguish between EFMs-focused and other funds. Figure 5 below reports the new IRFs. Strikingly, the 4-week response of flows into EFMs-focused reached 0.47 percent in the calendar-based regime, while that of other funds was null. This result confirms the importance of the risk appetite channel during the calendar-based regime. Instead, flows during the other regimes do not present major differences among the different types of funds.

A potential concern is that the positive coefficient estimated for the calendar-based regime might capture flight-to-safety effects. That would be the case if U.S. investors repatriated capital home in response to negative news rather than investing more abroad following positive news. I estimate Equation 3 again, this time allowing for asymmetric responses in the sign of the NFP variable. In the interest of space, I only show the new IRFs for non-US-focused funds. These are plotted in Figure E5 in Appendix E and clearly show that positive news had positive effects on flows, while negative news had almost no impact. Also worth noting, the effect of positive and negative news was equal, in absolute value, during the normalization regime. That indicates that the expected timing of policy normalization was very data-dependent: positive news brought it forward as much as negative news postponed it.

[13] Importantly, the fed funds future rate reacted at impact, while the stock price and the VIX only with some lag. That suggests that news had effects on the latter variables through changes in monetary policy expectations.

[14] These two sub-categories are relatively similar in terms of composition. EFMs-focused funds were 753, while the others were 1,121. Respectively 79.3 and 94.5 percent of EFMs-focused and other funds invested in equity assets, while the share of exchange-traded funds was 25.5 among the former and 22.9 percent among the latter.

Figure 5: Emerging and Frontier Markets (EFMs) vs. other non-US-focused funds



Notes: the Figure shows the response of flows to U.S. employment releases, distinguishing between funds investing only in Emerging and Frontier Markets (EFMs-focused) and other funds (other, ex-US). Responses are obtained estimating the $\beta_k^{r,f}$ coefficients from Equation 3 on the restricted sample of non-US-focused funds and with the d_i^f dummies used to distinguish between EFMs-focused and other funds. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

4.4. Extensions

Next, I carry out some extensions to the core results presented above. First, I show that flows into exchange-traded funds (ETFs) are generally more sensitive to employment releases than those into mutual funds (MFs). This finding is explained by the fact that ETFs can be more easily used to pursue short-term investment strategies. Second, I examine the behavior of non-US investors and show that these respond to U.S. news in a similar way to U.S. investors. The main difference concerns the normalization regime, in which non-US investors reacted to positive news by pulling more money out of US- than non-US-focused funds. This result points to a home-bias in times of heightening financial market uncertainty: investors tend to reduce exposures to foreign markets more than to domestic markets when volatility increases. The rest of this section discusses these and other extensions more in detail.

Exchange-traded Funds

The assets under management by ETFs among non-US-focused funds rose from 30.73 percent at the beginning of the sample period to 49.31 at the end of the sample.[15] Two main features might have contributed to the rising popularity of ETFs. First, ETFs are generally more liquid since than MFs,

[15] Similarly, the share of assets managed by ETFs increased from 21.46 to 37.59 percent among US-focused and from 14.27 to 34.61 percent among global funds.

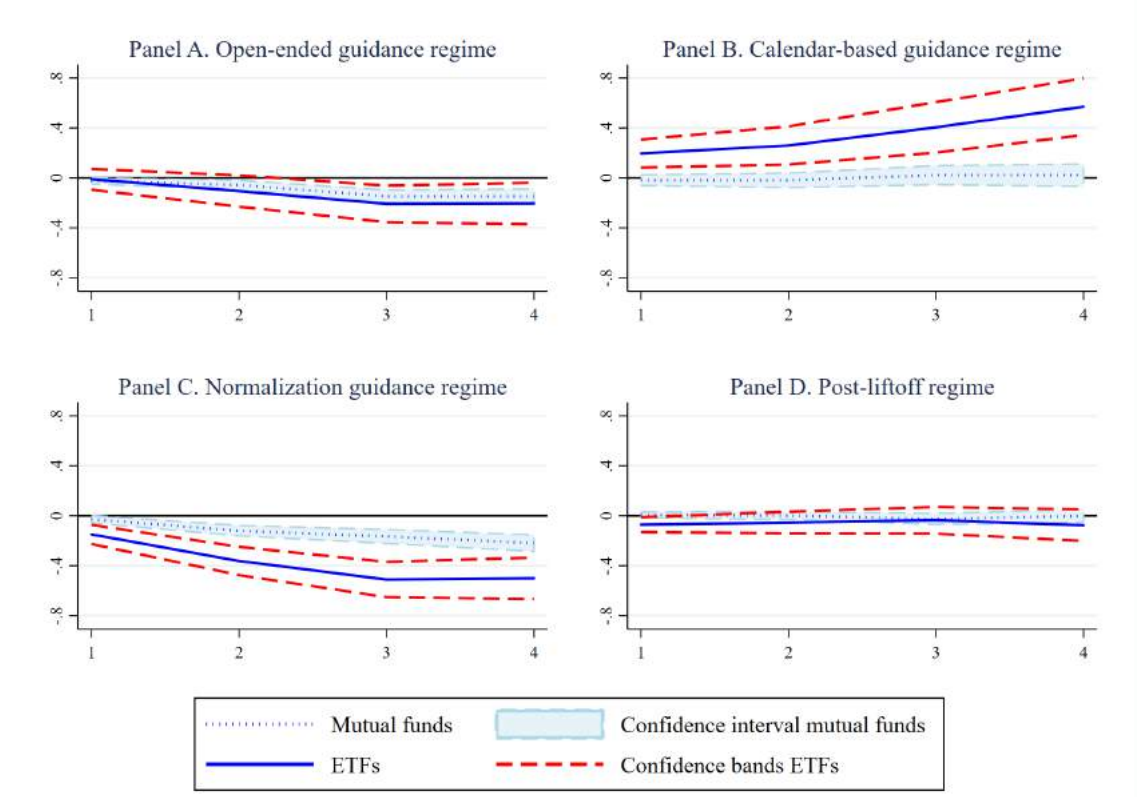
like stocks, they are traded continuously throughout the day on secondary markets. That is different from MFs, which trade exclusively on the primary market, and for which transactions only take place at the end of the trading day (with prices also being determined only then). Second, ETFs usually track an index, its inverse, or their multiples. Hence, investors can quickly gain exposure or bet against an overall market. Moreover, this passive nature also permits ETFs to charge lower fees relative to MFs, as managers do not actively select companies. These characteristics make ETFs likely to attract a different pool of investors, more short-term oriented and more reactive to changes in broader market sentiment, relative to MFs. Backing this intuition, 52 percent of ETF-holding U.S. households were willing to take substantial or above-average risks for substantial or above-average gains in 2017, compared to just 34 percent of MFs-holding households (ICI, 2018).

In what follows I test whether ETFs are more sensitive to news than MFs. To do so, I build on Equation 3 and estimate the following extended specification:

$$\frac{\sum_{j=0}^{k} F_{i,t+j}}{A_{i,t}} = \sum_{R,F,T} \beta_k^{r,f,t} d_t^r * d_i^f * d_i^t * news_t + C_k I_{i,t} + D_k Z_{i,t} + \gamma_i + \varepsilon_{i,t} \tag{6}$$

where d_i^t, with $t = E, M$, are two dummy variables taking value one for ETFs and MFs respectively; $I_{i,t}$ is a vector containing fund type-, Fed's regime- and investment-focus specific intercepts; and the rest of the notation is as in Equation 3. Figure 6 below shows the new IRFs for non-US-focused funds. Figures F1 and F2 in Appendix F refer to US-focused and global funds respectively.

Figure 6: Exchange-traded funds (ETFs) versus mutual funds (MFs)



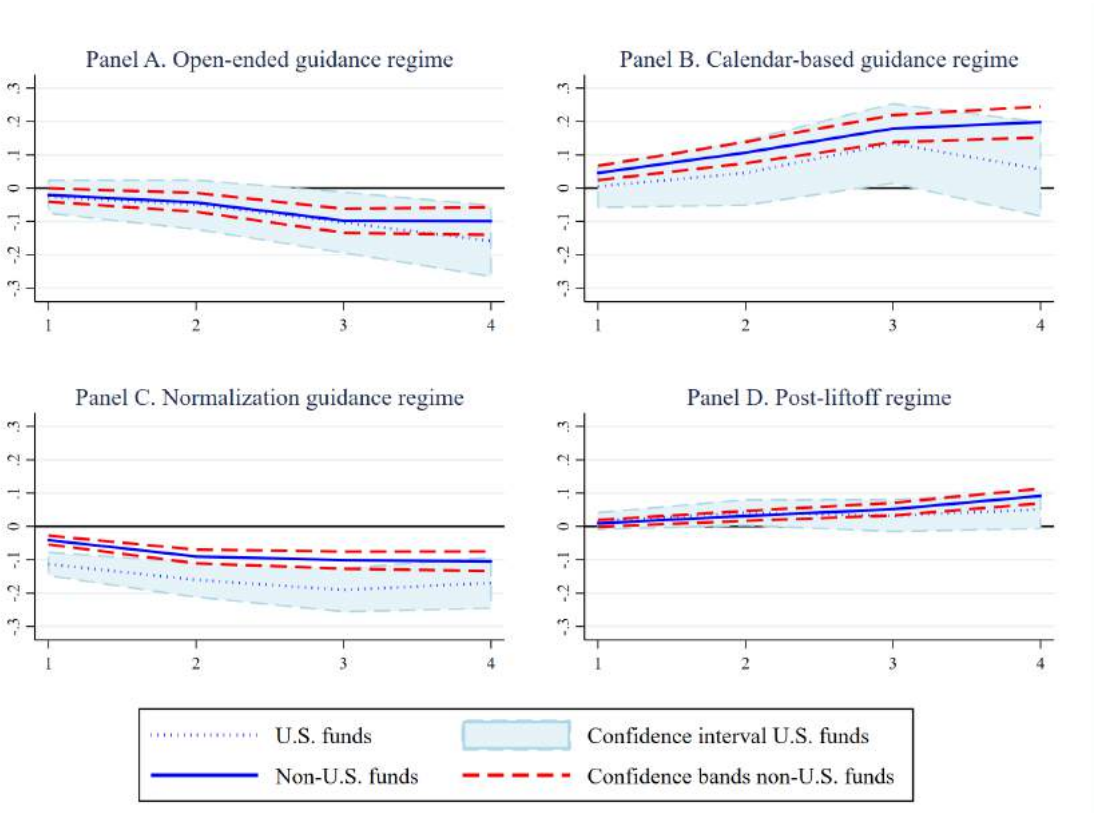
Notes: the Figure shows the response of fund flows to U.S. employment releases distinguishing between exchange-traded funds (ETFs) and mutual funds (MFs). The funds considered invest in non-US countries (non-US-focused funds). Responses are obtained estimating the $\beta_k^{r,f,g}$ coefficients from Equation 6. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

Flows to MFs were insensitive to employment releases during the calendar-based regime, whereas those to ETFs were significant already at impact and reached about 0.62 percent in the fourth week. During the normalization regime, both MFs and ETFs flows responded to news. However, the latter were more than twice as sensitive as MFs. Since, as shown in Section 4.3, the risk appetite channel was the most relevant during the calendar-based regime, and it was also important during the normalization regime, the IRFs presented here suggest that investors react to changes in risk appetite primarily through (dis-)investments into ETFs. This result, which survives in a richer specification including time fixed effects at the fund investment destination controlling for local pull factors (see Appendix F), is qualitatively in line to Converse *et al.* (2018), who find that ETFs respond more than mutual funds to changes in risk aversion.

The Response of Foreign (non-US) Investors

To the extent that news affect uncertainty, and uncertainty is a global factor driving cross-border flows, non-US investors might also react to U.S. news. I analyze their behavior using EPFR data on funds not domiciled in the U.S. Table G1 in Appendix G provides basic descriptive statistics on such funds. To derive IRFs, I simply estimate Equation 3 on the sample of funds not domiciled in the U.S. Figure 7 below shows the new estimates for non-US- and US-focused funds. Figure G1 in Appendix G reports estimates for global funds.

Figure 7: Response of flows to funds not domiciled in the U.S.



Notes: the Figure shows the response to U.S. employment releases of flows to funds not domiciled in the U.S. during different Fed's guidance regimes. Estimates are obtained from Equation 3, estimated on the sample of funds not domiciled in the U.S. For a definition of Panels A, B, C and D refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

During the calendar-based regime, positive surprises induced inflows into non-US-focused funds. When I distinguish between AEs- and EFMs-focused funds I again find this result to be driven by the former (results available upon requests). US-focused funds also experienced inflows, although

the estimated coefficients are not statistically significant. During the normalization guidance regime, positive surprises induced outflows. However, outflows from non-US-focused funds were much lower than in the case of funds domiciled in the U.S. (the 4-week response is estimated to be respectively -0.10 and -0.27 percent). Moreover, non-US investors withdrew more capital from US- than non-US-focused funds (the response is -0.17 percent among the former). That indicates that in time of increased risk-aversion investors tend to reduce exposure to foreign markets. Finally, during the post-liftoff regime positive surprises induced positive flows, suggesting that the interest rate channel might be less relevant for non-US investors.

Other Extensions

I also distinguish between (i) equity and bond funds, (ii) small and large funds, and (iii) institutional and retail investors.[16] To do so, I estimate three versions of Equation 6, changing the definition of the d_t^r dummies accordingly. I only consider funds domiciled in the U.S. In general, the different categories considered exhibit very few heterogeneities. In the interest of space, the new IRFs are reported in Figures H1 to H3 in Appendix H for non-US-focused funds only (results for US-focused and global funds are available upon request).

5. Country Flows and the Drivers of Contagion

In this section, I examine whether some countries are more sensitive to U.S. employment news than others and I investigate the factors potentially causing differential responses. This exercise is also useful to verify that investors' responses to news translate in actual cross-border flows. That is not given since a fund's country allocations depend on both investors' and the fund's manager. For instance, managers actively change funds' cash balances and, in global and regional funds, they also change country weights, thus bearing an influence on the final destination of funds' assets (Raddatz and Schmukler, 2012; Jotikasthira *et al.*, 2012).

Since typically funds invest in multiple countries, I use country-level data on cross-border flows from the U.S. to a sample of 73 Advanced, Emerging and Frontier Markets (see Section 3.3). I normalize country flows by the size of recipient countries' GDP. The latter is at the quarterly frequency and sourced from the International Monetary Fund. Since the number of funds reporting to EPFR tended to increase over the time, the magnitude of recorded flows relative to GDP might have artificially increased.[17] For this reason, I de-trend the variable measuring flows relative to GDP before carrying out the analysis.

I first estimate the following specification:

$$\frac{\sum_{j=0}^{k} F_{c,t+j}}{Y_{c,q}} = \sum_{R} \zeta_k^r d_t^r * news_t + C_k I_t + D_k Z_{c,t} + \gamma_c + \varepsilon_{c,t} \tag{7}$$

where $F_{c,t}$ are flows to country c at time t; $Y_{c,q}$ is country c's GDP in quarter q; $Z_{c,t}$ is a vector containing twelve lags of $F_{c,t}/Y_{c,q}$; γ_c are country fixed effects; and the rest of the notation is as in Equation 3.

[16] Small (large) funds are defined as having assets below (above) the mean. According to this definition, only funds above the 80th percentile of the asset distribution are large.

[17] This was not a concern for the analysis carried out in Sections 4 and 4.4 since there flows were normalized by funds' assets.

The estimation relies on OLS. Errors are clustered at the country level. As before, I show results through IRFs. In the interest of space, these are reported in Figure I1 in Appendix I. For each regime, the new estimates are qualitatively similar to those obtained using fund-level data, thus confirming that investors' responses to employment releases translate into cross-border flows.

On average, a one standard deviation positive surprise induced negative flows worth about -0.35 and -0.42 basis points of GDP in, respectively, the open-ended and normalization guidance regimes. During the calendar-based regime the average response was positive and equal to about 0.29 basis points. Flows to the average country were instead equal to -0.24 basis points during the post-liftoff regime (but they were not statistically significant in the second and third week). These estimates should be considered as conservative lower bounds since they are derived from a sub-sample of all U.S. investment funds, holding about 20 percent of industry assets.

A potential concern is that the GDP series is only available at the quarterly frequency, while flows are at the weekly frequency. That might generate abnormal jumps in the dependent variable at the turn of each quarter. I hence estimate a weekly GDP series through cubic spline interpolation and use this to normalize the EPFR's country flow variable. IRFs obtained using this alternative approach are very similar to the baseline. I also estimate Equation 7 using a country flow variable that is not de-trended and obtain results that are qualitatively in line to the baseline specification, although, as expected, they are quantitatively larger. Figure I2 in Appendix A show results from these two sensitivity analyses. Figure instead shows IRFs obtained following an alternative normalization approach, used in Fratzscher (2012); Puy (2016); Li *et al.* (2018) among others, of dividing flows by assets under management.[18] The results are again qualitatively similar to the baseline.

In what follows, I explore potential determinants of cross-country heterogeneity. I consider all the different macroeconomic, institutional, and other characteristics described in Section 3.3 (and listed in Table A4). For each characteristic, I compute country- and regime-specific values. Since these factors might depend on U.S. monetary policy and/or capital flows, I take the mean value in the two years preceding each regime to limit potential endogeneity biases arising from reverse causality. I define the variables computed in this way as $X^{h,r}_{c,t}$, where the superscripts h and r denote respectively country characteristics and guidance regimes. Since flows to countries with a larger presence of U.S. funds are likely to be more sensitive to news, I also construct a variable measuring the average assets held by U.S. funds as a share of GDP during each regime ($S^r_{c,t}$).

I then proceed estimating interaction models in which the NFP news variable enters as an interaction with both $S^r_{c,t}$ and $X^{h,r}_{c,t}$. In practice, I estimate the following specification:

$$\frac{\sum_{j=0}^{k} F_{c,t+j}}{Y_{c,q}} = \sum_{R}(\vartheta^{r,h}_{k} d^r_t * news_t * S^r_{c,t} + \sum_{H} \pi^{r,h}_{k} d^r_t * news_t * X^{h,r}_{c,t}) + C_k I_t + D_k Z_{c,t} + \gamma^r_c + \tau_t + \varepsilon_{c,t} \quad (8)$$

where γ^r_c and τ_t are regime-specific country fixed effects and time fixed effects respectively; and the rest of the notation is as in Equation 7.[19]

[18] This approach is suited to study the fickleness — rather than the macroeconomic relevance — of flows.

[19] The NFP surprise variable does not enter the regression on its own as it is absorbed by the time fixed effects. Regime-specific country fixed effects account for the variables $S^r_{c,t}$ and $X^{h,r}_{c,t}$ plus any other regime-invariant unobserved country characteristic.

Since some variables do not have full coverage, the sample shrinks to 58 countries. Table 2 below reports the results for the 4-week horizon (those for shorter horizons are available upon request). Bold numbers denote statistical significance at the 90 percent confidence level.

The variable capturing the presence of U.S. funds enter with the expected sign (positive during the calendar-based regime, and negative during the other ones) and it is always significant, meaning that countries where U.S. funds held more investments were generally more sensitive to news. A higher stock capitalization was associated with significantly more outflows following positive news during both the open-ended and normalization regimes. This result is in line with Eichengreen and Gupta (2015) and Aizenman *et al.* (2016). These authors study the impact of Bernanke's taper tantrum speech on a host of financial variables (but not capital flows) and find that the more liquid countries were the most affected. I also find that better institutions (as measured by the extent to which agents have confidence in and abide by the rules of society) were associated with less outflows following positive news during the open-ended and normalization regimes. That is in line with Fratzscher (2012), who find countries with good institutions to have experienced fewer outflows following the GFC.

The results for the calendar-based guidance regime are instead more novel and again confirm the importance of the risk-taking channel. The credit risk variable (constructed as the inverse of a country's sovereign risk rating) enters with a positive sign, and it is statistically significant in both specifications. Inflows were also larger in countries with higher growth and lower inflation.[20] The variable capturing financial linkages with the U.S. (measured as the sum of bilateral portfolio assets and liabilities with the U.S.) enters with a negative sign and it is significant. This suggests that when economic data did not have implications for future policy U.S. investors flocked to riskier countries and more 'remote' financial markets following positive news. Inflows were also larger in countries with stronger trade links with the U.S. (as measured by the sum of exports and imports to/from the U.S.). This latter result can be explained considering that these countries benefit more from higher U.S. growth.

Looking at the magnitude of the estimated coefficients, I note that credit risk and economic growth were the most important factors in determining the final destination of flows in the calendar-based regime. The differential effect of a one standard deviation positive surprise on inflows between countries around the 75th percentile of the credit risk distribution — such as Colombia and Egypt — and those around the 25th percentile — such as Slovenia and the United Arab Emirates — was about 1.62 basis points. Similarly, a country such as Mauritius, in the 75th percentile of the GDP growth rate distribution received on average inflows worth about 1.48 basis point of GDP more than a country such as Bulgaria, in the 25th percentile of the distribution. Turning to the normalization regime, the presence of U.S. funds and the quality of institutions were the two most relevant characteristics.

This section explored the presence of country heterogeneity in the sensitivity of flows to employment news. Overall, the results suggest that inflows following positive news in the calendar-based regime were concentrated in riskier and more remote countries. Whereas outflows during the normalization regime were larger in countries with more liquid financial markets and smaller in countries with better institutions.

[20] Note that the sign of the GDP growth rate and inflation is reversed during the normalization period (although the coefficients are much smaller). This indicates that negative flows following increased expectations of policy normalization were stronger in countries that had received more inflows in the earlier period, a finding that is similar to Eichengreen and Gupta (2015).

Table 2: Country characteristics and flow responses to employment releases

	Open-ended	Calendar-based	Normalization	Post-liftoff
U.S. funds assets	**-2.90**	**7.19**	**-7.25**	**-1.89**
Stock capitalization	**-0.67**	-0.71	**-0.70**	0.02
Trade openness	-0.17	-0.03	**0.40**	**-0.26**
KA opennes	-0.08	-0.08	**-0.13**	0.01
GDP growth	3.51	**14.16**	**-5.73**	-6.47
Budget balance	-0.37	-0.22	-1.00	-1.04
Inflation	-3.03	**-15.32**	**6.95**	3.75
External debt	0.01	0.06	-0.08	**-0.45**
NIIP	0.20	-0.03	-0.04	**-0.45**
CA balance	-0.10	1.19	-0.54	**4.03**
Reserves	0.89	0.91	0.77	0.17
Credit risk	0.33	**4.07**	-0.31	-0.35
Rule of law	**0.34**	0.41	**0.37**	0.00
U.S. financial links	-0.12	**-1.60**	0.30	0.27
U.S. trade links	0.91	**4.24**	**1.68**	0.39

Notes: the Table shows association between country characteristics and the 4-week response to employment releases of cross-border flows from the U.S. to foreign countries during the calendar-based guidance regime (September/2011 to May/2013). Estimates are obtained from Equation 8. The uppermost row denotes the Fed's guidance regime considered. The leftmost column lists the country characteristic considered. Rows denoted by "U.S. funds assets" report $\hat{\vartheta}_4^{r,h}$ coefficients, referring to the share of assets held by U.S. funds over recipient countries' GDP. All other rows report $\hat{\pi}_k^{r,h}$ coefficients. "Stock capitalization" is the value of the domestic stock market over GDP. "Trade openness" is the sum of imports and exports as share of GDP. "KA openness" is an index measuring the degree of capital account liberalization. "GDP growth" is the growth rate of local currency real GDP. "Budget balance" is government budget as share of GDP. "Inflation" is the growth rate in the consumer price index. "External debt" is debt held by foreigners as share of GDP. "NIIP" is the difference between domestic holdings of foreign assets and foreign holdings of domestic assets, as a share of GDP. "CA balance" is the current account balance as a share of GDP. "Foreign reserves" are foreign currency holdings as a share of GDP. "Credit risk" is the inverse of the sovereign credit rating. "Rule of law" is an index capturing perceptions about institutional quality. "U.S. financial links" is the sum of domestic holdings of U.S. portfolio securities and U.S. holdings of the country portfolio securities. "U.S. trade links" is the sum of imports from and exports to the U.S. as a share of GDP. Bold numbers indicate statistical significance at the 90 percent confidence level, based on clustered standard errors.
Sources: Bloomberg, EPFR, own calculations and others (listed in Table A4).

6. Conclusions

This paper investigated (ii) the impact of U.S. NFP employment releases on investors' portfolio decisions, and (ii) how such an impact depends on the policy guidance provided by the Fed. The analysis covered the post-GFC period and relied on investment funds data. The results can be summarized as follows: when the Federal Reserve issued calendar-based forward guidance to convey the idea of low rates for at least two years, positive news led investors to re-balance their portfolios towards Emerging and Frontier Markets economies. I explained this effect by showing that, during that period, employment releases did not affect monetary policy expectations. Instead, positive news boosted the domestic stock market and lowered risk aversion, thus leading investors to seek higher returns abroad. Conversely, when the Federal Reserve hinted at forthcoming normalization, good news increased the expected future policy rate, depressed equity prices, and increased risk aversion. These factors pushed investors to withdraw capital from both US-focused funds and funds investing in foreign countries.

In the second part of this paper, I considered some extensions to the core results summarized above. First, I focused on the role of ETFs and showed that these have an essential role in the international transmission of news. Flows in and out of ETFs accounted for the bulk of the observed responses. Given their rising popularity as an investment vehicle, the dynamics documented in this paper suggest that ETFs might have contributed to making the financial cycle more synchronized across countries.

In the last part of the paper, I used country flow data and explored potential drivers in the response of such flows to news. The analysis suggests that flows following positive shocks during the calendar-based regime were concentrated in countries with higher growth rates and worse sovereign credit ratings. Outflows during the normalization guidance regime were instead more substantial in countries with more developed financial markets and a more open capital account. Countries with better institutions experienced fewer outflows on average. These results point to the existence of a positive risk-taking channel of good news in periods of accommodative policy guidance. They also suggest that when financial market investors expect U.S. monetary policy to tighten, they tend to sell assets in more liquid markets rather than fleeing countries with worse macroeconomic fundamentals.

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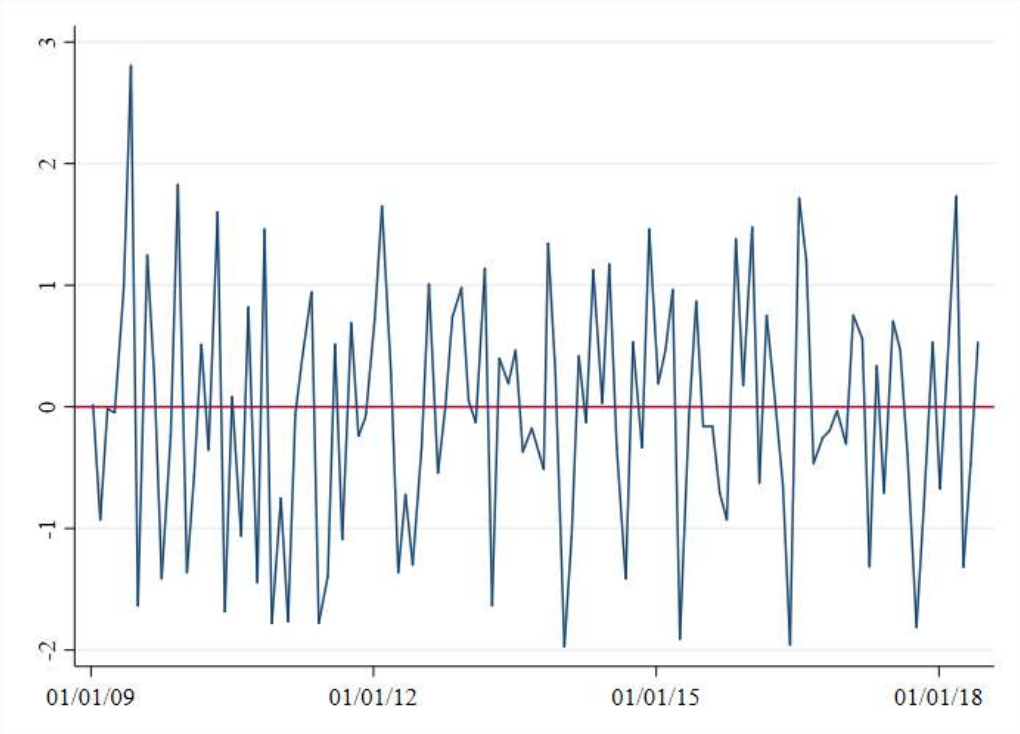
Appendix

A. Dataset

Figure A1: Non-farm payroll news series, March/2009 to May/2018



Notes: the Figure shows the standardized non-farm payroll surprise series. A surprise is defined as the difference between a macroeconomic news actual release and the median of analysts' forecast. To obtain a standardized measure, the surprise is divided by its standard deviation.
Sources: Bloomberg Professional Forecasters and own calculations.

Table A1: Macroeconomic news

		mean	s.d	min	max	source
US	Non-farm payroll	-2.5	62.4	-123.0	175.0	Bloomberg
	Core CPI (MoM %)	0.0	0.1	-0.3	0.1	Datastream
	Unemployment rate	0.0	0.1	-0.5	0.3	Boomberg
	Retail sales	0.0	0.4	-1.5	1.8	Datastream
	ISM pmi index	0.4	1.7	-4.7	3.5	Datastream
U.K.	Markit pmi	0.3	1.8	-3.8	4.3	Investing.com
	Policy rate	0.0	0.0	0.0	0.3	Boomberg
	Jobless claims change	-3.8	13.5	-42.9	53.7	Boomberg
	GPD (YoY %)	-0.1	0.2	-0.6	0.4	Boomberg
Japan	Retail trade	0.1	1.1	-2.6	2.8	Boomberg
	Industrial production	-0.4	1.4	-4.7	3.8	Boomberg
	CPI (YoY %)	0.0	0.1	-0.2	0.3	Boomberg
	Jobless rate	0.0	0.2	-0.5	0.3	Boomberg
Germany	Markit pmi	0.1	0.5	-1.1	3.1	Investing.com
	Unemployment change	-5.1	17.2	-62.5	38.9	Boomberg
	Ifo business climate	0.3	1.1	-2.5	4.7	Boomberg
	Zew current situation	1.3	6.5	-31.5	20.3	Boomberg
	Zew expectations	0.3	7.4	-19.2	27.8	Boomberg
Eurozone	GPD (YoY %)	0.0	0.1	-0.2	0.2	Boomberg
	CPI (YoY %)	0.0	0.0	-0.1	0.1	Boomberg
	Consumer confidence	0.0	0.9	-4.1	5.0	Boomberg
	Markit pmi	0.0	0.2	-0.7	0.5	Investing.com

Notes: the Table reports descriptive statistics of macroeconomic announcement used for the analysis. The leftmost column reports the country or currency union concerned. The second leftmost column lists the name of the releases. Column denoted by "mean" reports the mean surprise (with a surprise being defined as the difference between the actual release and median forecast). Column denoted by "s.d." reports the surprise standard deviation. Columns denoted by "min" and "max" report the minimum and maximum values of the surprise. All statistics refer to the period March 2009 to May 2018. Column "source" reports the source from which data on actual release and news forecast are taken.
Sources: Bloomberg Professional Forecasters, Thomson Reuters Datastream, Investing.com and own calculations.

Table A2: U.S. funds assets and other descriptive statistics by recipient country (1)

	Assets	% equity	% ETF	% GDP	% capitalization
Argentina	4.04	66.90	29.06	0.71	5.02
Australia	31.62	87.90	30.18	9.26	1.73
Austria	3.92	70.70	27.51	3.76	2.50
Bahrain	0.06	25.95	27.72	0.17	0.05
Belgium	9.01	79.65	28.06	7.27	2.12
Botswana	0.02	92.75	53.52	0.12	0.42
Brazil	50.93	88.18	44.64	9.19	4.94
Bulgaria	0.04	23.17	25.02	0.07	0.15
Canada	29.60	84.35	34.10	1.76	1.44
Chile	4.91	82.62	40.57	7.62	1.82
China	84.49	98.37	42.42	0.88	1.62
Colombia	3.12	41.86	31.92	0.95	0.85
Croatia	0.48	6.94	21.47	3.50	0.10
Cyprus	0.01	89.71	23.27	0.24	0.36
Czech Republic	1.35	88.34	34.11	0.64	3.47
Denmark	11.30	85.36	27.35	13.83	3.31
Dominican Republic	0.41	0.55	21.12	0.58	/
Ecuador	0.15	8.10	22.74	0.14	/
Egypt	1.55	89.98	39.85	0.56	2.88
El Salvador	0.22		22.39	0.98	/
Estonia	0.04	92.50	26.56	0.68	1.76
Finland	5.99	90.61	29.50	9.37	2.75
France	60.51	89.88	29.97	9.10	2.69
Germany	64.15	85.15	32.23	7.03	3.30
Ghana	0.31	25.87	22.64	0.71	0.65
Greece	1.41	89.22	34.51	2.47	2.31
Guatemala	0.11	13.91	25.28	0.18	/
Hong Kong SAR	25.74	97.95	35.17	35.95	1.38
Hungary	3.05	42.06	26.75	9.11	5.29
India	36.23	98.00	42.17	6.90	2.88
Indonesia	12.99	72.99	35.47	5.79	3.22
Ireland	7.39	75.03	25.29	10.73	7.31
Israel	6.62	93.96	27.80	9.03	4.48
Italy	20.08	65.11	27.14	3.93	2.13
Japan	127.41	89.37	34.00	2.51	2.60
Jordan	0.16	82.11	35.26	1.70	0.59
Kazakhstan	1.16	32.61	26.54	0.68	1.17

Notes: the Table provides information on the geographical distribution of assets of U.S. funds. The period considered goes from March 2009 to May 2018. The leftmost column reports the country of investment. The column denoted by "assets" reports the mean $ amount invested in the particular country (in billion). The column denoted by "% equity" reports the share of equity assets. The column denoted by "% ETF" reports the share of assets held by ETFs. The column denoted by "% of GDP" reports the value of assets in terms of the country's GDP. The column denoted by "% capitalization" reports the value of assets in terms of the country's stock market capitalization
Sources: Emerging Portfolio Fund Research, International Monetary Fund, Haver and own calculations.

Table A3: U.S. funds assets and other descriptive statistics by recipient country (2)

	Assets	% equity	% ETF	% GDP	% capitalization
Kenya	0.52	93.64	46.11	0.72	1.87
Korea	49.44	95.12	39.40	14.94	5.31
Lithuania	0.45	6.17	18.36	4.18	0.26
Malaysia	8.74	78.19	38.68	11.45	1.96
Mauritius	0.03	93.20	46.97	0.24	0.34
Mexico	22.33	71.47	36.57	1.91	3.91
Morocco	0.30	56.54	35.22	0.28	0.29
Netherlands	24.98	83.09	28.14	11.84	3.69
New Zealand	2.36	58.70	23.14	5.11	2.15
Nigeria	1.07	74.84	37.91	0.26	1.81
Norway	10.06	85.68	26.27	9.01	3.54
Panama	0.98	48.92	28.65	2.13	4.03
Peru	3.61	59.61	36.33	7.64	2.80
Philippines	4.82	77.70	35.94	7.04	2.05
Poland	6.32	49.31	28.38	1.24	2.25
Portugal	1.99	78.77	26.83	3.63	2.33
Qatar	0.97	43.66	29.85	0.57	0.28
Romania	0.79	43.91	30.45	1.61	1.74
Russia	24.58	83.36	40.19	5.56	3.32
Saudi Arabia	0.52	82.92	38.86	0.31	0.10
Serbia	0.30	5.08	19.12	0.74	2.07
Singapore	12.63	95.32	34.56	17.24	2.37
Slovenia	0.28	53.69	23.43	2.36	1.56
South Africa	22.31	88.31	37.23	6.28	4.59
Spain	18.59	80.87	30.73	5.56	2.09
Sri Lanka	0.80	36.57	25.99	1.10	2.25
Sweden	16.42	85.99	28.95	12.25	2.52
Switzerland	46.37	98.18	28.78	27.64	3.26
Taiwan Province of China	34.09	99.94	41.83	6.63	5.89
Thailand	10.84	93.34	38.57	10.67	3.80
Tunisia	0.04	32.66	36.39	0.09	0.10
Turkey	9.75	74.99	37.30	4.53	3.65
Ukraine	1.03	15.56	22.73	3.22	1.79
United Kingdom	120.26	90.20	26.83	17.61	3.32
Uruguay	0.58	0.59	19.99	1.10	/
Vietnam	1.20	80.79	58.59	2.48	1.98

Notes: refer to Table A2.
Sources: Emerging Portfolio Fund Research, International Monetary Fund, Haver and own calculations.

Table A4: Country characteristics

	#	mean	s.d.	Compiled by	Sourced from
Stock capitalization	69	0.61	0.79	WFE/NS/WEO	Haver/IMF
Trade openness	73	0.80	0.66	NS	PWT
KA opennes	68	1.29	1.38	Chinn and Ito (2008)	Haver
GDP growth	73	0.03	0.03	NS/WEO	Haver/IMF
Budget balance	73	-0.02	0.05	NS/WEO	Haver/IMF
Inflation	73	0.04	0.04	NS/WEO	Haver/IMF
External debt	72	0.70	0.86	IDS	BIS
NIIP	70	-0.08	0.96	IFS	IMF
CA balance	73	0.00	0.07	NS/WEO	Haver/IMF
Reserves	69	0.20	0.21	NS/WEO	Haver/IMF
Credit risk	73	0.33	0.24	OE	Datastream
Rule of law	73	0.52	0.94	WB/NRGI/Brookings	Haver
U.S. financial links	72	0.30	0.46	IFS	IMF
U.S. trade links	73	0.07	0.08	NS	Haver

Notes: the Table describes the country characteristics considered in Section 5. "Stock capitalization" is the value of the domestic stock market over GDP. "Trade openness" is the sum of imports and exports as share of GDP. "KA openness" is an index measuring the degree of capital account liberalization. "GDP growth" is the growth rate of local currency real GDP. "Budget balance" is government budget as share of GDP. "Inflation" is the growth rate in the consumer price index. "External debt" is debt held by foreigners as share of GDP. "NIIP" is the difference between domestic holdings of foreign assets and foreign holdings of domestic assets, as a share of GDP. "CA balance" is the current account balance as a share of GDP. "Foreign reserves" are foreign currency holdings as a share of GDP. "Credit risk" is the inverse of the sovereign credit rating. "Rule of law" is an index capturing perceptions about institutional quality. "U.S. financial links" is the sum of domestic holdings of U.S. portfolio securities and U.S. holdings of the country portfolio securities. "U.S. trade links" is the sum of imports from and exports to the U.S. as share of GDP. Column "#" indicates the number of countries covered. Column "s.d." reports the standard deviation. "WFE", "NS", "WEO, "IFS", "IDS" "WB" and "NRGI" stand respectively for World Federation of Exchange, national sources, World Economic Outlook, International Finance Statistics, International Debt Statistics, World Bank and National Resource Governance Institute. "IMF", "PWT" and "BIS" stand respectively for International Monetary Fund, Penn World Tables and Bank of International Settlements.

B. Robustness Checks on Unconditional Analysis

Here, I assess the robustness of the results from the unconditional analysis to some alternative specifications. First, I check that the estimates do not suffer from omitted variable bias. To do so, I include in Equation 2 other macroeconomic news variables as controls, capturing other major U.S. as well as foreign releases (listed in Table A1), still interacted with fund-focus dummies. Second, I verify that the results do not depend on NFP releases that are surrounded by high uncertainty. To do so, I follow Pericoli and Veronesi (2015) and construct two additional news series. In the first, observations below (above) the 25th (75th) percentile of the distribution of forecaster disagreement (as measured by the standard deviation of the Bloomberg survey analysts' responses) receive a weight equal to 1.5 (0.5), while all other observations have unit weight. In the second, I give weight equal to 0.5 to observations above the 66th percentile and unit weight to all the others. Estimates obtained from these sensitivity analyses are reported in Tables B1 and B2 and suggest that the baseline results are robust.

Table B1: Robustness check on potential omitted variable bias

		US	non-US	global
1-week (k = 0)	Only NFP (baseline)	**-0.02**	**-0.02**	**-0.03**
	Other U.S.	**-0.02**	**-0.02**	**-0.02**
	U.K.	**-0.02**	**-0.02**	**-0.03**
	Japan	**-0.02**	**-0.02**	**-0.03**
	Germany	**-0.02**	**-0.02**	**-0.03**
	Eurozone	**-0.02**	**-0.03**	**-0.03**
2-week (k = 1)	Only NFP (baseline)	**-0.05**	**-0.06**	**-0.04**
	Other U.S.	**-0.04**	**-0.06**	**-0.04**
	U.K.	**-0.05**	**-0.06**	**-0.04**
	Japan	**-0.05**	**-0.07**	**-0.05**
	Germany	**-0.05**	**-0.06**	**-0.04**
	Eurozone	**-0.05**	**-0.05**	**-0.07**
3-week (k = 2)	Only NFP (baseline)	**-0.05**	**-0.1**	**-0.08**
	Other U.S.	**-0.05**	**-1.00**	**-0.07**
	U.K.	**-0.05**	**-0.1**	**-0.08**
	Japan	**-0.06**	**-0.11**	**-0.09**
	Germany	**-0.05**	**-0.11**	**-0.08**
	Eurozone	**-0.05**	**-0.06**	**-0.11**
4-week (k = 3)	Only NFP (baseline)	**-0.06**	**-0.11**	**-0.1**
	Other U.S.	**-0.06**	**-0.11**	**-0.10**
	U.K.	**-0.06**	**-0.11**	**-0.1**
	Japan	**-0.06**	**-0.11**	**-0.11**
	Germany	**-0.06**	**-0.11**	**-0.1**
	Eurozone	**-0.06**	**-0.07**	**-0.17**

Notes: the Table shows results from a robustness check on the baseline unconditional specification (Equation 2) regarding potential omitted variables biases. Rows denoted by "Only NFP (baseline)" reports baseline estimates. Rows denoted by "Other U.S." report coefficients estimated including other US releases as controls. Rows denoted by "U.K.", "Japan", "Germany" and "Eurozone" report coefficients estimated including respectively all releases from those countries. Refer to Table A1 for a list of all releases considered. The funds considered are legally domiciled in the U.S. Columns denoted by "US", "non-US" and "global" report results for funds having the mandate to invest in, respectively, the U.S., foreign countries, and any country in the world. Sensitivities are measured in percentage of beginning of period assets. Estimates are obtained from Equation 2. Bold numbers indicate statistical significance at the 90 percent confidence level, based on clustered standard errors (at the fund-level).
Sources: Bloomberg, Investing.com, Thomson Reuters Datastream, EPFR and own calculations

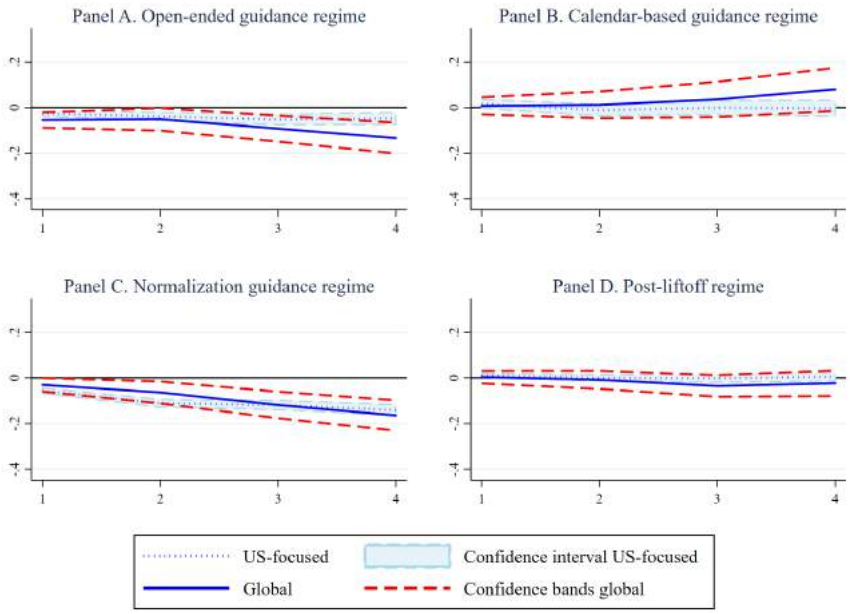
Table B2: Robustness check on the construction of the NFP news variable

		US	non-US	global
1-week	Equal weights (baseline)	**-0.02**	**-0.02**	**-0.03**
	High/low weights	**-0.02**	**-0.02**	**-0.02**
(k = 0)	Low weight	**-0.02**	**-0.03**	**-0.03**
2-week	Equal weights (baseline)	**-0.05**	**-0.06**	**-0.04**
	High/low weights	**-0.04**	**-0.06**	**-0.04**
(k = 1)	Low weight	**-0.06**	**-0.08**	**-0.05**
3-week	Equal weights (baseline)	**-0.05**	**-0.1**	**-0.08**
	High/low weights	**-0.05**	**-0.09**	**-0.07**
(k = 2)	Low weight	**-0.07**	**-0.12**	**-0.09**
4-week	Equal weights (baseline)	**-0.06**	**-0.11**	**-0.1**
	High/low weights	**-0.06**	**-0.1**	**-0.08**
(k = 3)	Low weight	**-0.07**	**-0.13**	**-0.11**

Notes: the Table shows results from a robustness check on the baseline analysis regarding the treatment of forecaster uncertainty in the construction of the NFP surprise variable. The leftmost column reports the horizon considered (k). The second leftmost column indicates the NFP variable that is used. "Equal weights" indicates that each NFP release is given equal weight. "High/low weights" indicates that observations for which forecaster disagreement is below (above) the 25th (75th) percentile of its distribution are given weight equal to 1.5 (0.5), and observations in between these threshold are given weight equal to 1. "Low weight" indicates that observations for which forecaster disagreement is above the 66th percentile of its distribution are given weight equal to 0.5 (all others have weight 1). The funds considered are legally domiciled in the U.S. Columns denoted by "US", "non-US" and "global" report results for funds having the mandate to invest in, respectively, the U.S., foreign countries, and any country in the world. Sensitivities are measured in percentage of beginning of period assets. Estimates are obtained from Equation 2. Bold numbers indicate statistical significance at the 90 percent confidence level, based on clustered standard errors (at the fund-level).
Sources: Bloomberg, EPFR and own calculations.

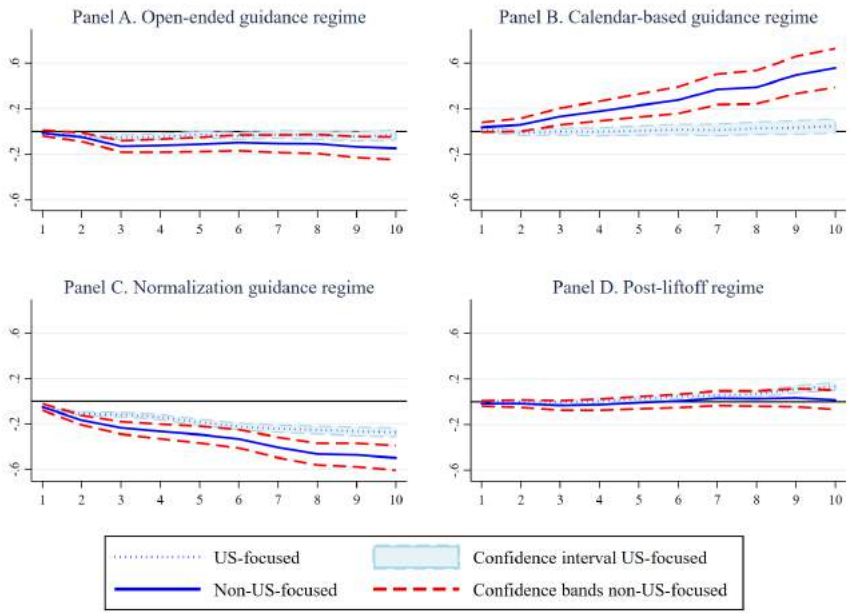
C. Additional results on Regime-specific Analysis

Figure C1: Fund flows responses to employment releases during different policy guidance regimes — global funds



Notes: refer to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

Figure C2: Fund flows responses to employment releases during different policy guidance regimes — 10-week horizon



Notes: the Figure shows 10-week responses of fund flows to U.S. employment releases during different Fed's guidance regimes. Responses are obtaining estimating the $\hat{\beta}_k^{r,f}$ coefficients from Equation 3, with $k = 0, .., 9$. For other notes, refer to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

D. Robustness checks on Regime-specific Analysis

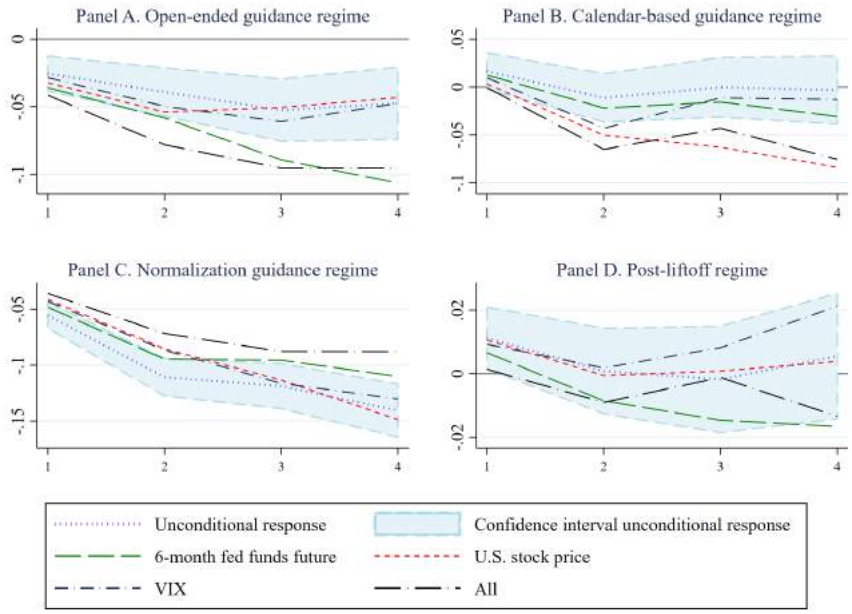
Table D1: Robustness check on the cutoff date used to distinguish between the calendar-based and normalization guidance periods

		(A)	(B)	(C)	(D)
		Panel A. US-focused funds			
1-week	Taper tantrum (baseline)	**-0.03**	0.02	**-0.06**	**0.01**
	Start of tapering	**-0.03**	0.00	**-0.05**	**0.01**
(k = 0)	Threshold-based guidance	**-0.03**	0.02	**-0.05**	**0.01**
2-week	Taper tantrum (baseline)	**-0.04**	-0.01	**-0.11**	0.00
	Start of tapering	**-0.04**	**-0.03**	**-0.11**	0.00
(k = 1)	Threshold-based guidance	**-0.04**	-0.01	**-0.1**	0.00
3-week	Taper tantrum (baseline)	**-0.05**	0.00	**-0.12**	0.00
	Start of tapering	**-0.05**	-0.01	**-0.13**	0.00
(k = 2)	Threshold-based guidance	**-0.05**	-0.01	**-0.10**	0.00
4-week	Taper tantrum (baseline)	**-0.05**	0.00	**-0.14**	0.01
	Start of tapering	**-0.05**	-0.01	**-0.15**	0.01
(k = 3)	Threshold-based guidance	**-0.05**	-0.01	**-0.12**	0.01
		Panel B. Non-US-focused funds			
1-week	Taper tantrum (baseline)	-0.01	0.04	**-0.05**	-0.02
	Start of tapering	-0.01	0.01	**-0.04**	-0.02
(k = 0)	Threshold-based guidance	-0.01	**0.05**	**-0.04**	-0.02
2-week	Taper tantrum (baseline)	**-0.05**	**0.06**	**-0.17**	-0.02
	Start of tapering	**-0.05**	0.02	**-0.16**	-0.02
(k = 1)	Threshold-based guidance	**-0.05**	0.06	**-0.14**	-0.02
3-week	Taper tantrum (baseline)	**-0.13**	**0.13**	**-0.24**	-0.03
	Start of tapering	**-0.13**	**0.08**	**-0.24**	-0.03
(k = 2)	Threshold-based guidance	**-0.13**	**0.18**	**-0.20**	-0.03
4-week	Taper tantrum (baseline)	**-0.12**	**0.18**	**-0.27**	-0.03
	Start of tapering	**-0.13**	**0.13**	**-0.28**	-0.03
(k = 3)	Threshold-based guidance	**-0.12**	**0.24**	**-0.23**	-0.03
		Panel C. Global funds			
1-week	Taper tantrum (baseline)	**-0.05**	0.01	**-0.03**	0.00
	Start of tapering	**-0.05**	0.00	-0.03	0.00
(k = 0)	Threshold-based guidance	**-0.05**	0.02	**-0.03**	0.00
2-week	Taper tantrum (baseline)	**-0.05**	0.01	**-0.06**	-0.01
	Start of tapering	**-0.05**	0.01	**-0.07**	-0.01
(k = 1)	Threshold-based guidance	**-0.05**	0.02	**-0.05**	-0.01
3-week	Taper tantrum (baseline)	**-0.09**	0.04	**-0.12**	-0.03
	Start of tapering	**-0.09**	0.03	**-0.13**	-0.03
(k = 2)	Threshold-based guidance	**-0.09**	0.01	**-0.09**	-0.03
4-week	Taper tantrum (baseline)	**-0.13**	0.08	**-0.16**	-0.02
	Start of tapering	**-0.13**	0.08	**-0.19**	-0.02
(k = 3)	Threshold-based guidance	**-0.13**	0.08	**-0.13**	-0.02

Notes the Table shows results from a robustness check on the baseline analysis (Equation 3) regarding the cutoff date chosen to distinguish between the Fed's calendar-based and normalization guidance regimes. Rows denoted by "Taper tantrum (baseline)", "Official start of tapering" and "Threshold-based guidance" denote respectively estimates obtained using the day of Bernanke's taper tantrum (May/22/2013), the day in which the FOMC announced the beginning of QE tapering (December/18/2013), and the day in which the FOMC switched from calendar-based to threshold-based forward guidance (December/12/2012). Columns denoted by (A), (B), (C), and (D) report estimates for different Fed's guidance regimes: respectively the open-ended, calendar-based, normalization and post-liftoff. Bold numbers indicate statistical significance at the 90 percent confidence level, based on fund-clustered standard errors.
Sources: Bloomberg, EPFR and own calculations.

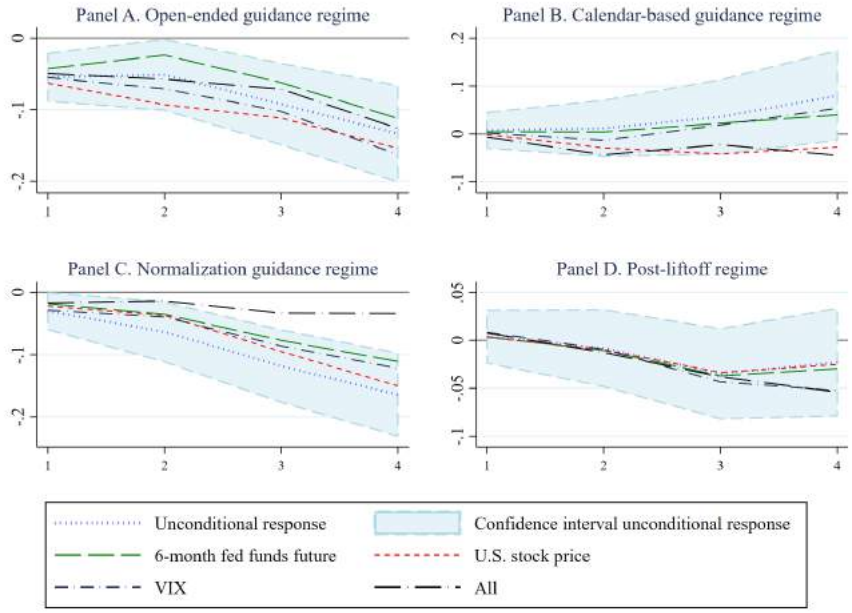
E. Additional Results on Transmission Channels

Figure E1: Responses to employment releases conditioning on the expected fed funds future rate, the VIX and the stock market price — US-focused funds



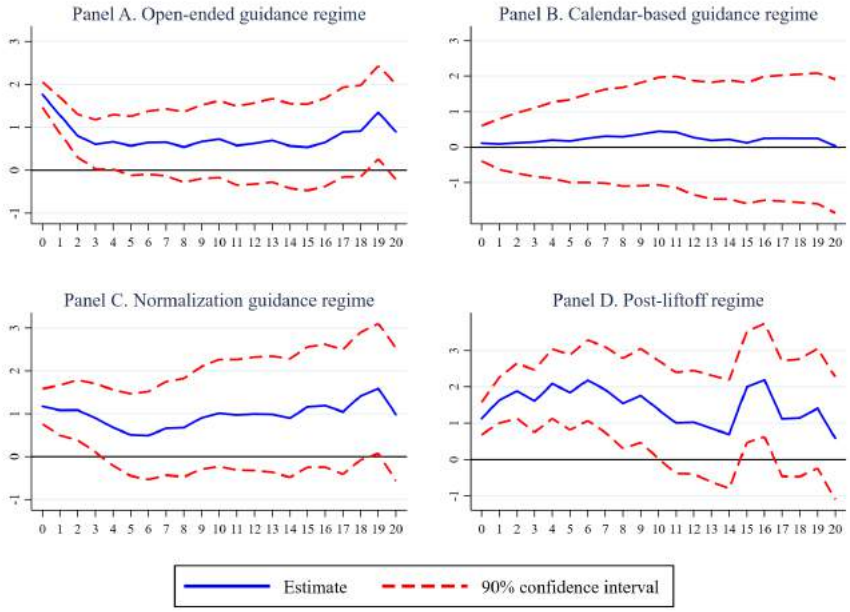
Notes: refer to Figure 4.
Sources: Bloomberg, EPFR, Thomson Reuters Datastream and own calculations.

Figure E2: Responses to employment releases conditioning on the expected fed funds future rate, the VIX and the stock market price — global funds



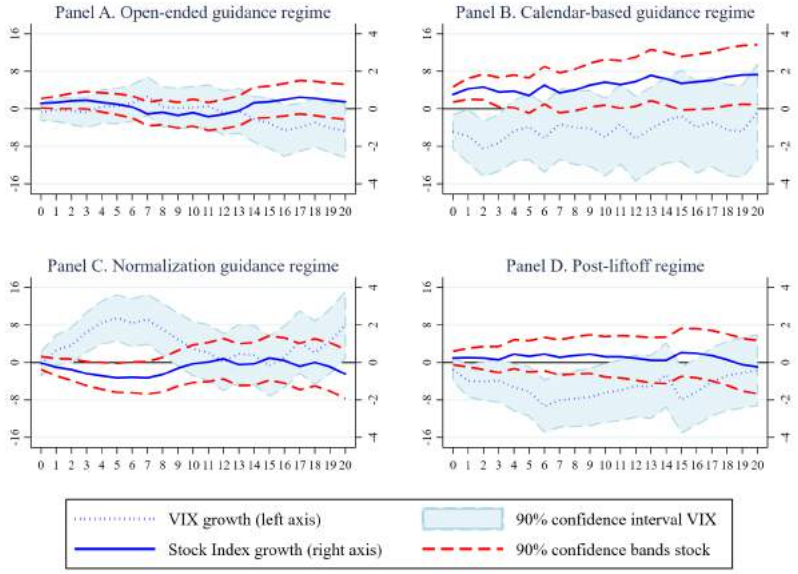
Notes: refer to Figure 4.
Sources: Bloomberg, EPFR, Thomson Reuters Datastream and own calculations.

Figure E3: Responses of the 6-month ahead expected federal funds rate to employment releases during different policy guidance regimes



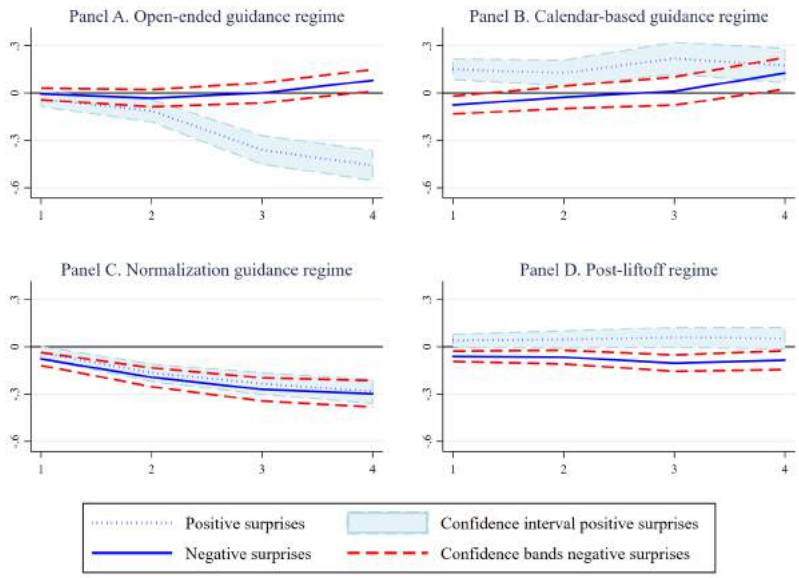
Notes: the Figure shows the response of the 6-month ahead expected federal funds rate to U.S. employment releases during different Fed's guidance regimes. The y-axes report cumulative responses to a one standard deviation surprise in the NFP data release, measured in basis points. Responses are obtained estimating the κ_k^τ coefficients from Equation 4.3. For a definition of Panels A, B, C, and D refer to Figure 3.
Sources: Bloomberg, Thomson Reuters Datastream and own calculations.

Figure E4: Responses of the stock market price and expected volatility to employment releases during different policy guidance regimes



Notes: the Figure shows the response of the VIX volatility index and the MSCI U.S. stock market price index to U.S. employment releases during different Fed's guidance regimes. The y-axes report cumulative responses to a one standard deviation surprise in the NFP data release, measured in percentage points. The left (right) y-axis refers to the VIX (stock market price) index. The x-axis reports the response horizon (in days), with 0 indicating the day of the release. Responses are obtained estimating the κ_k^τ coefficients from Equation 4.3. For a definition of Panels A, B, C, and D refer to Figure 3.
Sources: Bloomberg, Thomson Reuters Datastream and own calculations.

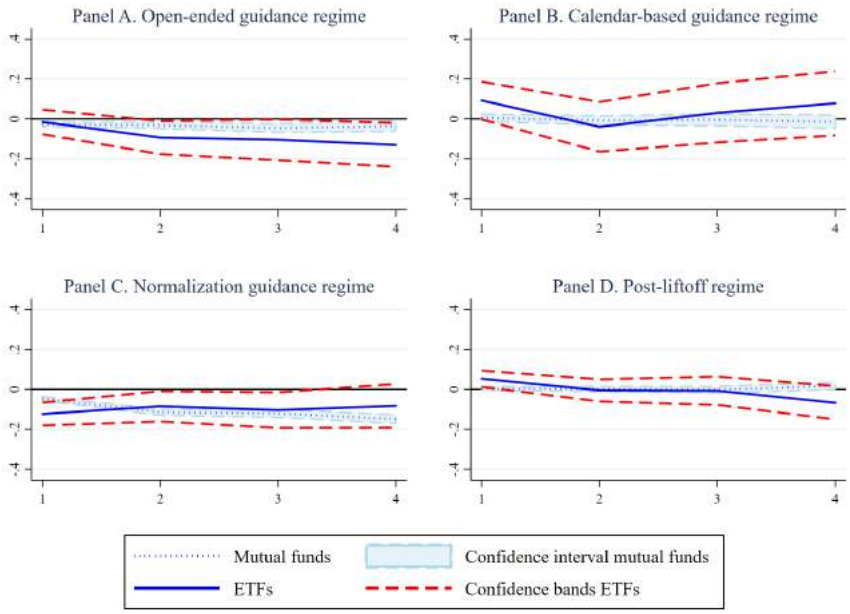
Figure E5: Fund flows responses to employment releases during different policy guidance regimes — distinguishing by the surprise sign



Notes: the Figure shows flows to non-US-focused funds in response to U.S. employment releases during different Fed's guidance regimes. The response is allowed to differ according to whether the announcement is better/worse than expected. Responses are obtained estimating an augmented specification of Equation 3, in which the news variable is interacted with surprise sign dummies. For the rest of the notes refer to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

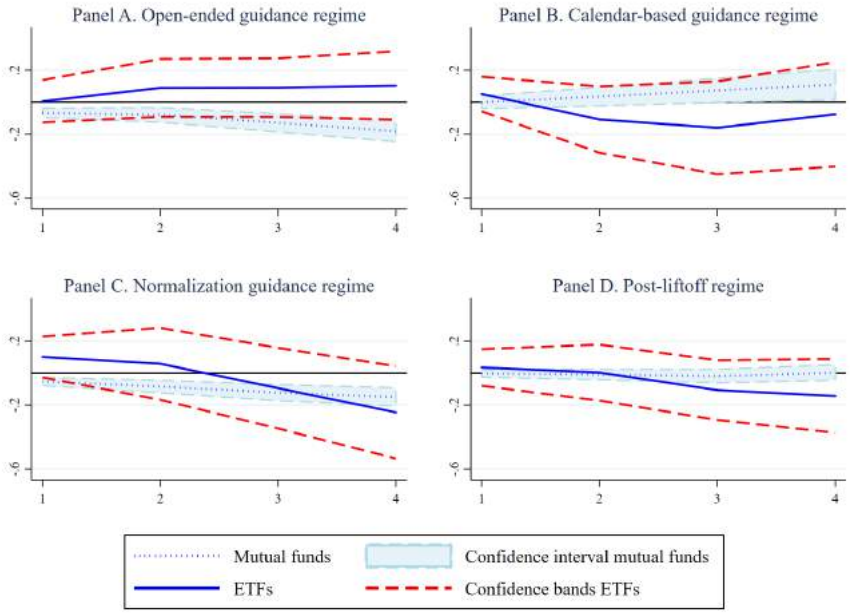
F. Additional Results and Robustness Checks on Role of ETFs

Figure F1: Exchange-traded (ETFs) versus mutual funds (MFs) — US-focused funds



Notes: the Figure shows the response of fund flows to U.S. employment releases distinguishing between exchange-traded funds (ETFs) and mutual funds (MFs). Responses are obtained estimating the $\beta_k^{r,f,t}$ coefficients from Equation 6. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

Figure F2: Exchange-traded (ETFs) versus mutual funds (MFs) — global funds



Notes: the Figure shows the response of fund flows to U.S. employment releases distinguishing between exchange-traded funds (ETFs) and mutual funds (MFs). Funds are domiciled in the U.S. and invest in any country in the world. Responses are obtained estimating the $\beta_k^{r,f,t}$ coefficients from Equation 6. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

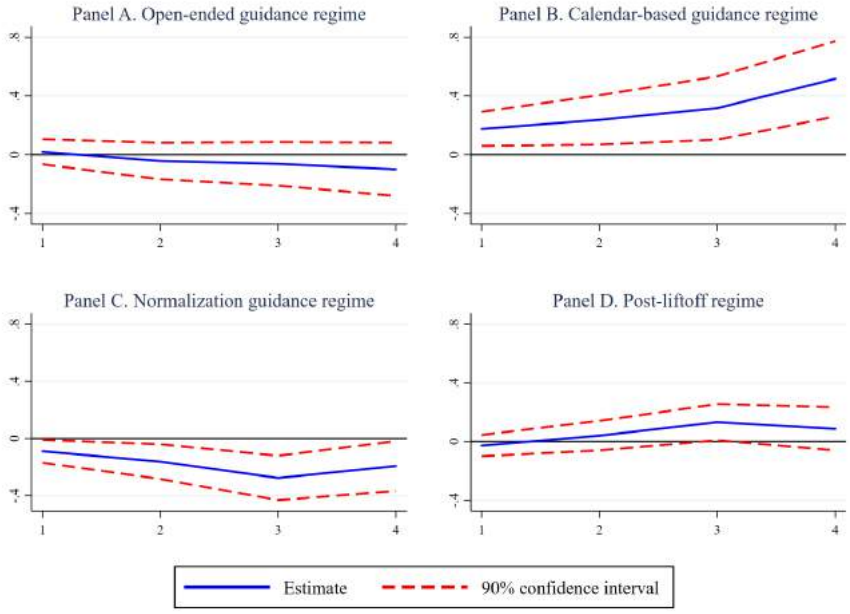
I next estimate a difference-in-differences (diff-in-diff) specification. This allows to control for any time-varying destination-specific event — such as local pull factors — by including time fixed effects at the investment destination.[21] In practice, I estimate the following specification:

$$\frac{\sum_{j=0}^{k} F_{i,t+j}}{A_{i,t}} = \sum_{R,F} \varphi_k^{r,f} d_t^r * d_i^f * d_i^E * news_t + D_k Z_{i,t} + \tau_{d,t} + \gamma_i + \varepsilon_{i,t} \tag{9}$$

where $\tau_{d,t}$ denotes investment destination-specific time fixed effects; d_i^E is the ETF dummy and the rest of the notation is as in Equation 3.

Note that the time effects absorb any common variation in ETFs and mutual funds flows. Therefore the $\varphi_k^{r,f}$ coefficients measure the differential (extra) effect of employment releases on flows to ETFs relative to mutual funds. In the interest of space, I only report results for non-US-focused funds (Figure F3 in Appendix F). These results show that ETFs reacted significantly more than those to MFs during both the calendar-based and normalization regimes. These estimates — derived from a richer specification including time-by-investment destination fixed effects — adds to the robustness of the previous results and confirms the intuition that ETFs attract a pool of investors that respond more strongly to changes in risk appetite than mutual funds.

Figure F3: The extra sensitivity of ETFs relative MFs — non-US-focused funds



Notes: the Figure shows the differential response of flows to exchange-traded funds (ETFs) relative mutual funds (MFs) following U.S. employment releases. Funds are domiciled in the U.S. and invest in non-US countries (non-US-focused funds). Responses are obtained estimating the $\varphi_k^{r,f,t}$ coefficients from Equation 9. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

[21] Saying that the destination-by-time fixed effects account for local pull factors assumes that ETFs and mutual funds respond to them in the same way (that is, ETFs are not more sensitive). Converse *et al.* (2018) show that this is indeed the case.

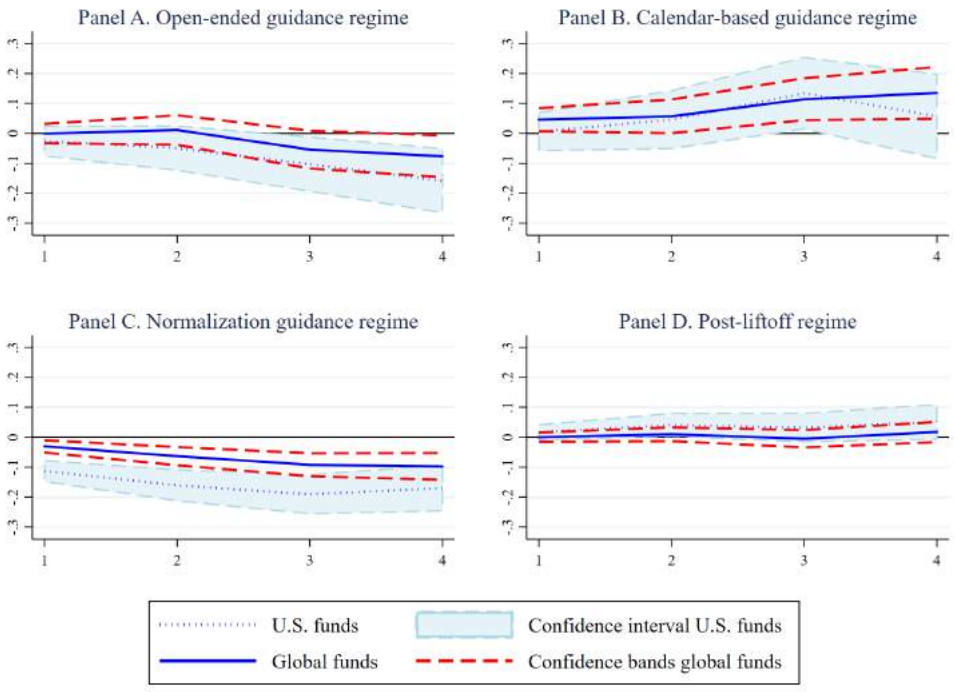
G. Additional Results on Foreign Investors

Table G1: Fund composition — funds not domiciled in the U.S.

Investment focus	# funds	% equity	% ETF	Assets	
				mean	s.d.
Non-US	10,977	68.9	16.5	360.8	970.5
Global	4,087	61.9	6.6	420.2	1,108.4
U.S.	1,737	73.9	21.1	421.7	1,005.8
Total	16,680	68.1	14.6	380.4	1,007.5

Notes: rows denoted by "Non-US", "Global", and "U.S." report statistics for funds investing, respectively, outside the U.S., in any country in the world, and in the U.S. For the definition of columns denoted by "# funds", "% equity", "% ETFs", "mean", and "s.d." refer to Table 1.
Sources: EPFR and own calculations.

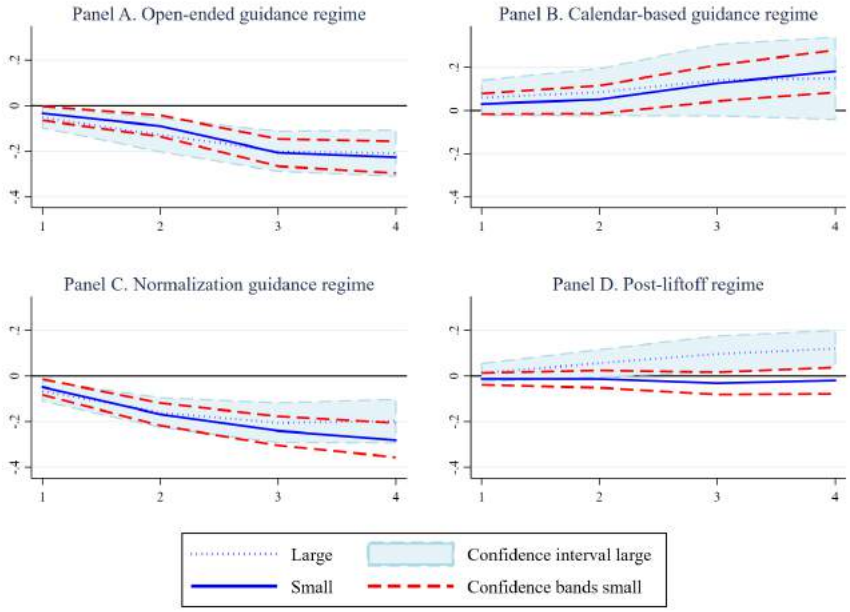
Figure G1: Response of flows to funds not domiciled in the U.S. — global funds



Notes: refer to Figure 7.
Sources: Bloomberg, EPFR and own calculations.

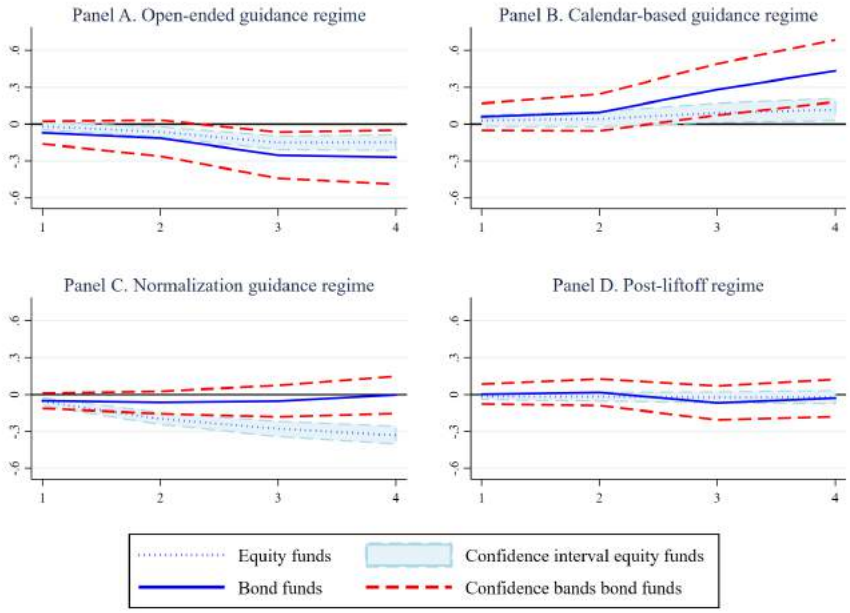
H. Other Extensions

Figure H1: Small versus large funds



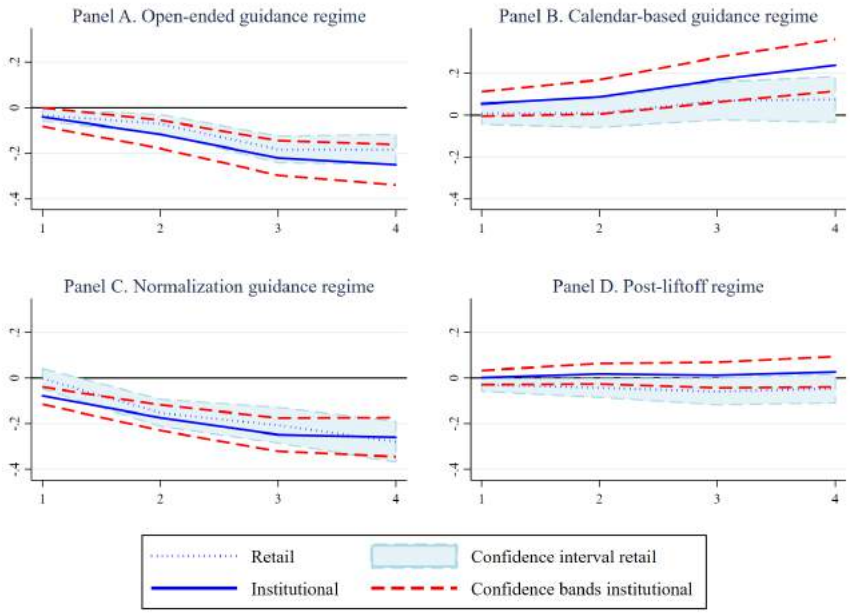
Notes: the Figure shows the response of fund flows to U.S. employment releases distinguishing between small and large funds. Small (large) funds have assets below the mean. Responses are obtained estimating the $\beta_k^{r,f,t}$ coefficients from Equation 6, with the d_i^ts dummies denoting small/large funds. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

Figure H2: Bond versus equity funds



Notes: the Figure shows the response of fund flows to U.S. employment releases distinguishing between bond and equity funds. Responses are obtained estimating the $\hat{\beta}_k^{r,f,t}$ coefficients from Equation 6, with the d_i^ts dummies denoting bond/equity funds. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

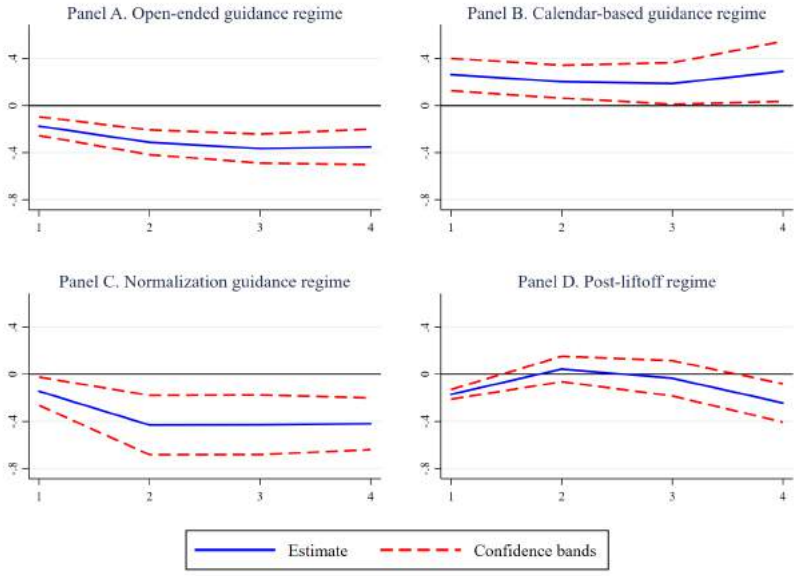
Figure H3: Retail versus institutional investors



Notes: the Figure shows the response of fund flows to U.S. employment releases distinguishing between retail and institutional funds. Responses are obtained estimating the $\beta_k^{r,f,t}$ coefficients from Equation 6, with the d_i^ts dummies denoting retail/institutional funds. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

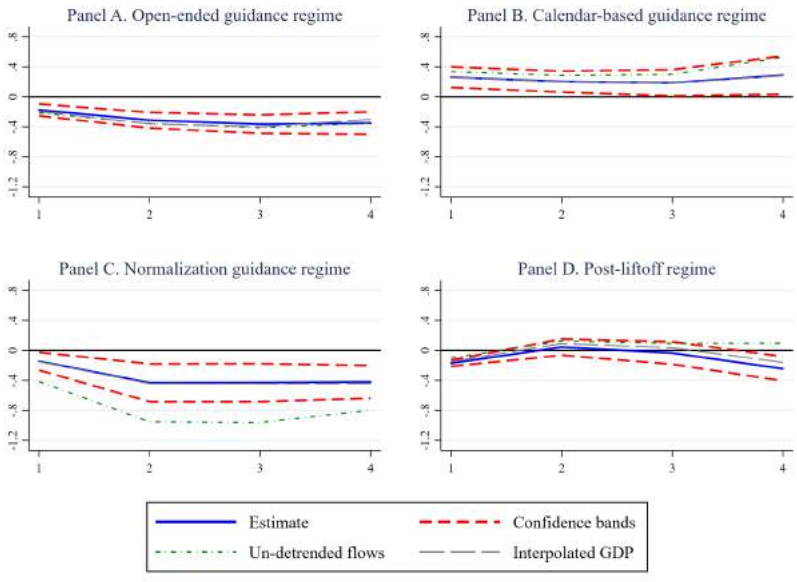
I. Additional Results and Robustness Checks on Country Analysis

Figure I1: Country flows responses to employment releases



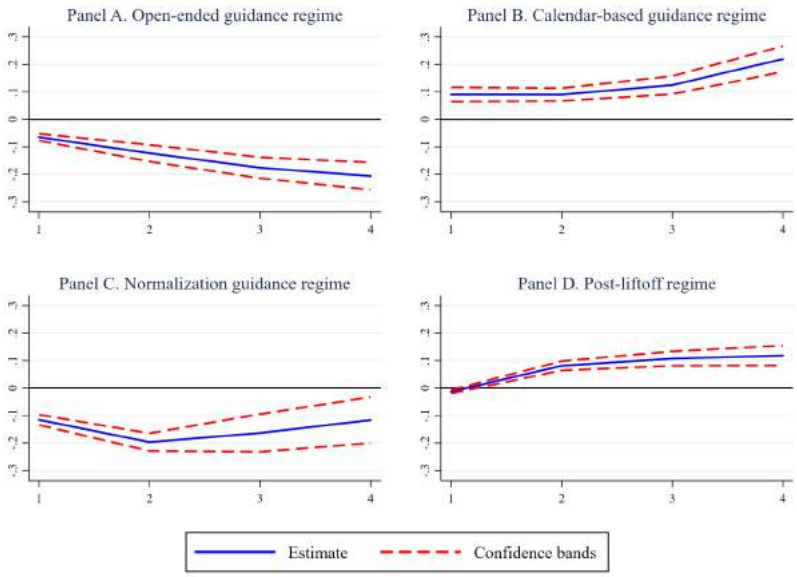
Notes: the Figure shows the response of cross-border flows from the U.S. to foreign countries following U.S. employment releases. Responses are measured in basis points of recipient countries' GDP and are obtained estimating the ζ_k^r coefficients from Equation 7. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

Figure I2: Robustness checks on the construction of the country flow variable (1)



Notes: the Figure shows robustness checks on the response of cross-border flows from the U.S. to foreign countries following U.S. employment releases. The blue solid and red dotted lines show IRFs from the baseline country flow specification (Figure I1). The green dotted line show responses from a specification in which the country flow series is not de-trended. Gray dashed lines show responses from a specification in which the GDP series used to normalize country flows is interpolated at the weekly frequency. Responses are measured in basis points of recipient countries' GDP and are obtained estimating the ζ_k^r coefficients from Equation 7. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.

Figure I3: Alternative country flows variable



Notes: the Figure shows response of cross-border flows from the U.S. to foreign countries following U.S. employment releases using an alternative normalization approach which relies on data on assets under management rather than GDP. Responses are therefore measured in percent of assets. Estimates are obtained estimating the ζ_k^r coefficients from Equation 7. For a definition of Panels A, B, C and refer to the notes to Figure 3.
Sources: Bloomberg, EPFR and own calculations.