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Identifying the Effects of Macroeconomic Attention Through Foreign Investor Distraction

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Abstract

While the causal impact of limited attention to macroeconomic news is difficult to detect, this article proposes one solution: exploiting when foreign investors are "distracted" by risk factors in their home markets. I demonstrate that financial activity in the average foreign investor's home market decreases foreign attention paid to 21 emerging economies, measured using Google search volume for economy-specific financial terms that emanate from outside each economy's border. Exploiting this effect using an instrumental variables approach, I find that an exogenous increase in foreign attention preceding a scheduled monetary policy rate announcement raises preannouncement stock returns and announcement day turnover.

I. Introduction

A growing body of empirical evidence suggests that investor attention around scheduled announcements plays an important role in how these news releases are incorporated into asset prices. While most of the analysis has focused on firm-specific news releases, few studies have attempted to isolate the causal effect of attention on aggregate-level announcements, which has significant implications for macroeconomic policy communication and transparency (Sims (2003), Blinder, Ehrmann, Fratzscher, De Haan, and Jansen (2008)). These efforts are largely confounded by the two-way direction of causality between risk and information choice implied by theory: attention helps reduce uncertainty, but agents endogenously choose to pay greater attention when volatility is high (Bansal and Shaliastovich (2011)), leading to a classic case of simultaneity bias in empirical estimation. Moreover, aggregate news is much less likely to be ignored, especially during times of high volatility (Kacperczyk, Van Nieuwerburgh, and Veldkamp (2016)), which further hinders the identification of macroeconomic attention effects.

In this article, I overcome these challenges by exploring one of the few instances in which a subset of investors are likely to ignore major macroeconomic announcements: when nonresident equity holders (i.e., "foreign investors") are distracted by stock market activity in their home countries. In information choice models, agents with a preference for the early resolution of uncertainty endogenously choose to allocate more attention to assets that they are more familiar with,

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a mechanism that can account for persistence of the home bias puzzle (Van Nieuwerburgh and Veldkamp (2009), Mondria and Wu (2010)). Given that this mechanism has recently gained empirical support (Chen (2017), Cziraki, Mondria, and Wu (2021)), it raises the possibility that independent shocks in a foreign investor's home market can draw their attention away from domestic macroeconomic news. Therefore, by estimating the reduction in foreign attention induced by independent activity in the average foreign investor's home country, one can potentially isolate variation in attention to domestic macroeconomic news that is orthogonal to domestic market risk, thus providing a novel testing ground for alternative theories of information choice.

To implement this strategy, I create a foreign attention index, constructed using the principal component of daily Google search volume for financial terms specific to 21 emerging economies (such as each emerging economy's benchmark stock index acronym) coming from users located *outside* each emerging economy's border from 2015 to 2019.[1] I then verify that this foreign attention index is reduced by independent activity in the average foreign investor's home market, which I construct using international asset holdings data from the Coordinated Portfolio Investment Survey (CPIS). These effects are strongest for emerging equity markets that are less open to foreign investment and less reliant on international funds, consistent with the notion that investors are more likely to be distracted away from markets where they hold little wealth and when they do not invest through mutual funds. Importantly, these foreign investor home market shocks have no comparable effect on internet search volume coming from local residents, that is, from Google users located within the emerging countries themselves, suggesting that the foreign attention index reduction is truly measuring exogenous distraction, as any endogenous factors correlated with domestic risk should also elicit a change in local attention.

Once the existence of foreign investor home distraction is confirmed, I then exploit it to measure the effect of an exogenous rise in foreign attention on preannouncement stock returns and announcement day trading volume for scheduled monetary policy rate announcements in the 21 emerging economies. The high frequency of the foreign attention index is well-suited to the analysis of prescheduled monetary policy announcements, as it allows me to distinguish between foreign attention in anticipation of an upcoming announcement, as opposed to in reaction to the content of the announcement itself. Crucially, with foreign investor home distraction in mind, the foreign attention index is instrumented with two average foreign investor home stock market variables, each of which is first filtered for any comovement with their domestic market counterparts: average turnover over the last 20 trading days and return volatility over the last 20 trading days, with 20 days roughly corresponding to the minimum duration between central bank

[1]Several characteristics of emerging economies make them ideal for this analysis. Most notably, while foreign investors tend to hold a significant percentage of emerging market equity, local investors in emerging markets hold relatively few foreign assets in comparison. This asymmetry enables me to use the unresponsiveness of local attention to independent foreign market volatility as corroborating evidence that these foreign market shocks are indeed exogenous, as local investor attention should be relatively unaffected by independent foreign risk factors provided that these local investors do not hold many foreign assets themselves.

announcements in the sample.[2] The key advantage of instrumenting with foreign stock market variables is that they provide multiple continuous sources of estimated distraction with a high degree of variation, in contrast to previous studies that rely on discrete high-distraction events occurring over a predetermined narrow window of time. Nevertheless, to further ensure that these foreign stock market instruments are indeed exogenous, I also include indicators for official holidays in the average foreign investor's home country as additional instruments, which allows me to verify the exogeneity of the foreign stock market instruments using a Sargan–Hansen overidentification test.

Using an instrumental variables approach with a fixed-effects regression, which helps account for cross-country variation in announcement timing and central bank credibility, I find that a 1% exogenous rise in the foreign attention index over a 2-day window preceding a scheduled monetary policy rate announcement raises preannouncement benchmark stock index returns by 1.28 basis points and raises the announcement day turnover reaction by 2.74%. Given that macroeconomic attention theoretically alleviates aggregate market uncertainty, these findings lend direct support to Ai and Bansal (2018), who develop a revealed preference model of prescheduled announcements where the magnitude of the announcement premium is proportional to the amount of uncertainty reduction.[3] The results are also consistent with standard rational expectations models of prescheduled announcements such as Kim and Verrecchia (1991), whereby a greater precision of information communicated to investors triggers a larger announcement day spike in trading volume.

This analysis contributes to several strands of literature. Motivated by theoretical frameworks where the allocation of attention has significant asset-pricing implications (Merton (1987), Peng and Xiong (2006)), many studies have captured the effect of attention utilizing the timing of news coverage (Huberman and Regev (2001), Tetlock (2007), Barber and Odean (2008), and Engelberg and Parsons (2011)). More recent efforts have turned to Google search volume as a more direct proxy for attention, starting with Da, Engelberg, and Gao (2011). Of particular relevance to this study are papers measuring attention around prescheduled macroeconomic announcements (Wohlfarth (2018), Boguth, Gregoire, and Martineau (2019), Guo, Gia, and Sun (2020), and Fisher, Martineau, and Sheng (2022)), often with the objective of testing explanations for the preannouncement premium documented by Lucca and Moench (2015). Perhaps the most formidable obstacle facing these studies is how to disentangle the aforementioned 2-way direction of causality between risk and information gathering. This difficulty has led several studies to view attention proxies as merely an instrument or predictor of risk (Tillman (2020), Fisher et al. (2022)), which obscures any effect that exogenous variation in

[2]The use of stock market instrumental variables over a 20-day period also avoids having to estimate dynamic relationships between foreign and domestic markets at higher frequencies, which are further complicated by cross-country time zone differences.

[3]A positive association between information processing and risk premiums is also documented empirically by Ben-Rephael, Carlin, Da, and Israelsen (2020) and theoretically by Ai, Bansal, and Jianyu Han (2022), the latter deriving preannouncement drift through endogenous information acquisition rather than early leaks.

information gathering may have in and of itself. In contrast, by exploiting foreign investor home distraction, I am able to isolate variation in attention toward emerging markets that is orthogonal to emerging market risk.[4]

This study is also related to the literature exploring the stock market reaction to earnings announcements during high-distraction periods, including when earnings announcements fall on a Friday (DellaVigna and Pollet (2009)), on days with multiple earnings announcements (Hirshleifer, Lim, and Hong Teoh (2009)), when earnings announcements coincide with highly publicized sporting events (Drake, Gee, and Thornock (2016)), when there are exogenous shocks in unrelated industries (Kempf, Manconi, and Spalt (2017)), and when earnings announcements fall on the same day as macroeconomic press releases (Chen, Jiang, and Zhu (2018)). While the distraction-event strategy has been limited to the study of firm-specific announcements, in part because investors are less susceptible to diversions away from macroeconomic press releases, I am able to extend this general approach to aggregate news by focusing on the distraction of nonresident equity holders, who have a much smaller stake in domestic markets, particularly in emerging countries that are less integrated with the global economy.[5] Furthermore, unlike the prescheduled high-distraction events used in previous studies, variation in foreign investor home stock market activity is not confined to specific predetermined time periods, which is recommended by Israeli, Kasznik, and Sridharan (2022) to avoid self-selection biases associated with firms and governments strategically choosing press release dates in anticipation of upcoming high-distraction events.

Several previous studies have also examined the relationship between regional variation in search volume and asset markets. Cziraki et al. (2021) analyze differences between national Google search volume and state-level Google search volume toward S&P 500 firms. They find that local attention is biased toward local firms, which supports the identification strategy employed here. However, Cziraki et al. (2021) do not explore whether the home bias learning preference they document reduces the amount of local attention paid to nonlocal corporate announcements. Moreover, by analyzing search variation within the same country, they are unable to match regional variation in search volume data with regional variation in asset holding data, something that is possible on the international level with the CPIS.[6]

[4]One paper that does attempt to isolate exogenous variation in attention around monetary announcements is Guo et al. (2020), who exploit the "quasi-scheduled" nature of select Chinese monetary aggregate announcements. Like Guo et al. (2020), I also find that the size of the preannouncement premium is positively correlated with uncertainty reduction. However, the foreign investor distraction instrumental variable strategy used here can be applied to many countries and is not sensitive to the specific conditions unique to their quasi-experimental setting.

[5]Recent studies have indeed identified market-level distraction events, such as summer vacations (Hong and Yu (2009)), sensational news stories (Peress and Schmidt (2020)), sporting events, and major holidays (Wang (2022)). However, these studies do not isolate exogenous attention around macroeconomic announcements, which would be difficult to do considering that these distracting events are either infrequent or prescheduled.

[6]Another closely related study that uses international search volume data is Chen (2017), who finds that an increase in search volume toward global benchmark indexes decreases stock returns, an effect primarily driven by local and U.S. investors. However, Chen (2017) does not match search volume with asset holdings data or focus on attention around macroeconomic announcements.

One study that does match internet search behavior with international asset holdings is Mondria, Wu, and Zhang (2010), who combine U.S. data on international security holdings with data on the number of times a U.S. internet user clicked through a search result from other countries. Utilizing instrumental variables that affect attention but not asset holdings (such as popular tourist destinations) and instrumental variables that affect asset holdings but not attention (such as implicit financial costs), Mondria et al. (2010) find that causality between attention allocation and international asset holdings runs in both directions. The analysis differs from Mondria et al. (2010) along several dimensions. First, by combining CPIS data on nonresident equity holdings with regional Google search data on country-specific finance-related keywords, I am able to focus in on finance-related searches coming from all countries, rather than general searches coming from the United States alone. Second, while Mondria et al. (2010) find that U.S. (i.e., foreign) attention is greater toward countries whose assets make up a greater share of U.S. portfolios, I find that foreign attention responds to recent activity in domestic and international stock markets, the latter implying foreign investor home distraction. Finally, while Mondria et al. (2010) successfully identify exogenous variation in foreign search frequency, this study demonstrates how to exploit this variation to identify the causal effect of attention on macroeconomic announcement reactions.

The rest of this article is organized as follows: Section II describes the data sources, including details on the construction of the foreign attention index and on the average foreign investor's home market variables. Section III investigates the determinants of foreign attention and documents the evidence suggestive of foreign investor home distraction. Section IV exploits foreign investor home distraction to estimate the effect of attention on stock returns and turnover around scheduled monetary policy rate announcements. Section V concludes with policy implications and directions for future research.

II. Data Sources

The data set consists of 27,363 trading day observations for a balanced panel of 21 emerging countries from 2015 to 2019.[7] Countries had to satisfy three criteria to be included in the sample. First, the country had to be classified as either an emerging or frontier economy according to the Morgan Stanley Capital International (MSCI) Global Market Accessibility Review. According to the MSCI Classification Framework, frontier and emerging economies are considered to have "at least partial" ease of capital flows and openness to foreign ownership, while also meeting certain size and liquidity requirements (https://www.msci.com/market-classification). This ensures a sample of countries whose markets are sufficiently accessible to foreign investors, but at the same time, whose local investors do not hold a large proportion of international equity themselves, so that foreign market

[7]2015 corresponds to the earliest year that central bank announcement dates are tracked by both centralbanknews.info and cbrates.com, whereas 2020 and beyond were excluded due to the Covid-19 outbreak, which brought about many abrupt changes to central bank announcement schedules and also coincided with sizeable reductions in investor distraction effects (Wang (2022)).

shocks are more likely to distract the former but not the latter.[8] The second criteria for inclusion are having regularly scheduled monetary policy rate announcements by the central bank. With this criteria in mind, countries were excluded if they either had a de facto conventional peg or stabilized monetary arrangement according to the IMF's annual report of Exchange Arrangements and Exchange Restrictions, or if the country is not mentioned in the Global Central Bank Calendar on centralbanknews.info, which tracks prescheduled monetary policy announcements throughout the year (https://www.imf.org/en/Publications/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions/Issues/2020/08/10/Annual-Report-on-Exchange-Arrangements-and-Exchange-Restrictions-2019-47102). Finally, since the analysis relies on Google searches to extrapolate foreign attention, countries are only included if Google was the most popular search engine for a majority of the sample period.

Monetary policy rate announcement dates are taken from each central bank's website. When these exact dates are not available in the sample period, announcement dates are taken from the Global Central Bank Monetary Policy Calendar on centralbanknews.info, while the central bank decisions are taken from cbrates.com (http://www.cbrates.com/decisions.htm). In total, the sample includes 903 announcement dates, with 341 dates when the key monetary rate was changed and 658 dates when the key monetary rate was left unchanged.

I use benchmark equity indexes that market participants follow closely to capture the aggregate equity market performance of each emerging country. All benchmark stock market index variables, including daily stock returns, volatility, daily turnover, and daily free-float market capitalization, are taken from Bloomberg Terminals. Table 1 reports the Bloomberg stock market index tickers used for each of the 21 emerging countries. Daily stock returns are total returns using net dividends. Index volatility is calculated by Bloomberg using the annualized standard deviation of the relative change in daily closing prices, expressed as a percentage. Market turnover is calculated as the total market value of shares traded divided by free-float market capitalization.

A. Google Trends Data

To estimate the degree of attention paid to each emerging economy's financial market, the analysis utilizes daily observations of Google search volume calculated by Google Trends, a publicly available website that measures how frequently a particular term is entered into Google's search engine relative to the site's total search volume in a given time period and location.[9] Google Trends then scales the entire requested time-series by standardizing the highest requested search frequency in the time period to 100. Since the longest permitted request

[8]According to the IMF's Coordinated Portfolio Investment Survey (CPIS), the 21 emerging economies included in the sample only reported holding 11% in foreign equity and investments as a percentage of GDP in 2019, compared to larger developing countries like the United States and the United Kingdom, who reported holding 44% and 78%, respectively.

[9]Across the entire sample period, Google maintained over an 87% search engine market share in all but 5 of the 21 emerging markets and never fell below 42% in any given month (*Source*: https://gs.statcounter.com/).

TABLE 1

Emerging Economy Index Ticker and Search Terms

Table 1 presents the 21 emerging economies in the sample, along with their corresponding stock market indexes and search terms used in the analysis. Ticker names for the stock indexes come from Bloomberg Terminals. Stock market search volume and central bank search volume are extracted from Google Trends separately for each country.

Country	Ticker	Stock Search Term	Central Bank Search Term
Brazil	IBOV	"IBOVESPA"	"Central Bank of Brazil"
Chile	IPSA	"Santiago Stock Exchange"	"Central Bank of Chile"
Colombia	COLCAP	"Colombia Stock Exchange"	"Central Bank of Colombia"
Czech Republic	PX	"Prague Stock Exchange"	"Czech National Bank"
Hungary	BUX	"BUX"	"Nemzeti Bank"
India	NIFTY	"NIFTY 50"	"Reserve Bank of India"
Indonesia	JCI	"Indonesia Stock Exchange"	"Bank Indonesia"
Kazakhstan	KZKAK	"Kazakhstan Stock Exchange"	"National Bank of Kazakhstan"
Malaysia	FBMKLCI	"FTSE Bursa Malaysia KLCI"	"Central Bank of Malaysia"
Mauritius	SEMDEX	"SEMDEX"	"Bank of Mauritius"
Mexico	MEXBOL	"BMV"	"Bank of Mexico"
Peru	SPBLPGPT	"Lima Stock Exchange"	"Central Reserve Bank of Peru"
Philippines	PCOMP	"PSE Composite Index"	"Bangko Sentral ng Pilipinas"
Poland	WIG	"WIG20"	"National Bank of Poland"
Russia	IMOEX	"MOEX Russia Index"	"Central Bank of Russia"
South Africa	JALSHTR	"JSE"	"South African Reserve Bank"
South Korea	KOSPI	"KOSPI"	"Bank of Korea"
Sri Lanka	CSEALL	"Colombo Stock Exchange"	"Central Bank of Sri Lanka"
Thailand	SET	"SET Index"	"Bank of Thailand"
Tunisia	TUSISE	"Bourse de Tunis"	"Central Bank of Tunisia"
Turkey	XU100T	"BIST 100"	"Central Bank of the Republic of Turkey"

at a daily frequency is 9 months, I construct every daily Google Trends series covering 2015–2019 by requesting 11 separate queries under 9 months individually then "stitching" these 11 series together using a 10 day overlapping method for consistent scaling.[10]

For each of the 21 countries in the sample, I use Google Trends to gather daily search volume on three different terms associated with the country's financial markets, both to ensure robustness and to potentially capture different facets of the country's financial markets. These search terms are the name of the country's central bank, the name of the country's benchmark stock market index (or if unavailable, the name of the country's main stock exchange), and the country's name within the "Finance" category.[11] To circumvent the issue of multiple languages and avoid picking up search volume for names and abbreviations that have multiple meanings, a common problem when requesting individual stock names like "Apple," I utilize the "Topics" classification feature for all searches. When typing a given term into the Google Trends search bar, the site presents a list of autocomplete options called "Topics" that the requested term is potentially related to. The feature allows me to confirm that the requested central bank search terms fall under a "Bank" topic, the requested stock market index search terms fall under a "Market Index" topic, the requested stock exchange search terms fall

[10]The stitching methodology employed here has been demonstrated to be the most accurate way of constructing daily Google Trends data over longer time periods. The stitching methodology and its alternatives are discussed here: https://towardsdatascience.com/reconstruct-google-trends-daily-data-for-extended-period-75b6ca1d3420.

[11]Google Trends records terms that fail to meet certain search frequency minimums in a given time and location with a 0. In instances where search volume on the benchmark stock index name had a significant number of zeros over the sample period, the country's stock exchange name was used instead.

under a "Stock Exchange" topic, and the requested country name search terms fall under a "Country" topic.[12] All three series are collected at the global level (i.e., search volume among Google users located across the world) and local level (i.e., search volume among Google users located within the country's borders).

Once these 6 series are collected from Google Trends, I use them to construct a world attention index (measured with the first principal component of the three global searches) and a local attention index (measured with the first principal component of the three local searches). Next, I estimate a panel regression of the world attention index on the local attention index. The residual of this regression captures variation in world attention not accounted for by variation in local attention (i.e., "foreign" attention). The following subsections explain the extraction of each Google Trends search term in greater detail, and also reviews the procedure to indirectly extrapolate how much of this search volume is emanating from abroad.

1. Local and World Attention Index Construction

The first step in constructing the local and world attention indexes is to extract daily search volume on central bank names, stock market-related names, and country names from Google Trends for all 21 emerging economies. The main advantage of the central bank and stock market searches is that their names are unique to their respective countries while also being less familiar to the foreign noninvesting general public. In instances when Google Trends does not recognize either the full name or acronym of a country's stock market index as a "Market Index" topic, I use the name of the country's stock exchange instead. In instances where the same acronym is popular for multiple stock exchanges around the world, I verify that search volume is highest in the intended country.[13] Table 1 reports both the stock search topic names and the central bank search topic names for each of the 21 emerging countries.

In addition to the stock market and central bank search terms, I also collect search volume for the country's name within the "Finance" category. Google Trends allows users to refine their queries into specific categories. By requesting the name of the country specifically within the "Finance" category, I can focus on interest in country-specific financial information, which, according to the category definition provided by Google Trends, includes investing, banking, and foreign exchange-related searches, thus filtering out instances when Google users search a country's name for information on vacation options, shopping, or the national football team.

As a means of comparing the different search terms, Figure 1 presents the central bank search volumes, stock search volumes, and country finance search volumes for a representative country (Kazakhstan) at the global level. While all three series share similar spikes in volume, most notably around monetary policy rate changes, there are also visually noticeable differences as well. Indeed, this is

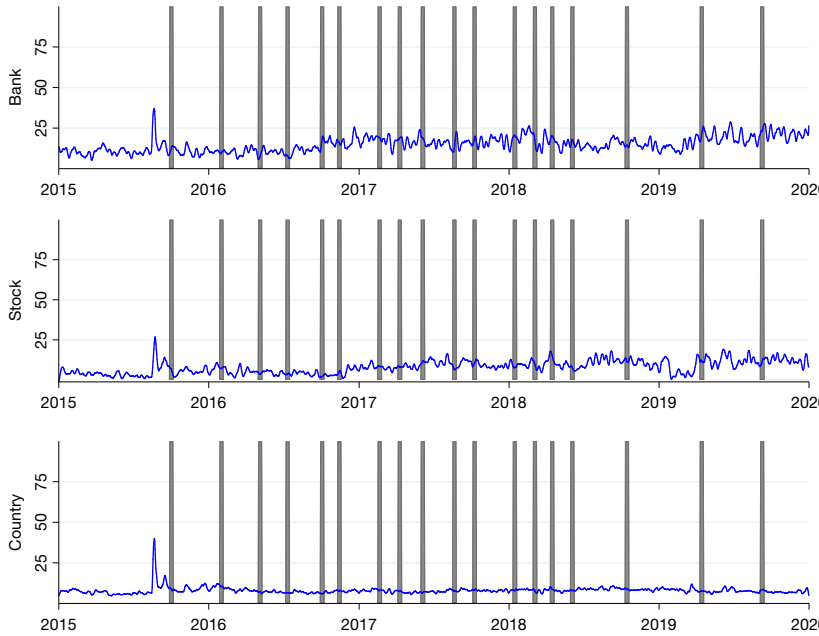
[12]Another advantage of the Topics classification is that a topics-requested series includes search volume on all alternative names of a subject in common usage, including those in different languages. For example, if one were to request "India Central Bank," the autocomplete feature recommends "Reserve Bank of India" as a topic name.

[13]As an illustrative example, the acronym "JSE" represents both the Johannesburg and Jamaican stock exchanges.

FIGURE 1

Kazakhstan Global Search Volume

Figure 1 presents the central bank name global search volume, stock market name global search volume, and country financial global search volume extracted from Google Trends for the representative country of Kazakhstan. Ten-day windows around monetary policy rate changes appear in gray. For ease of visualization, search volumes are smoothed using a local linear smoothing method.



confirmed by the low Pearson correlations between the three global series, which all fall between 0.20 and 0.33, suggesting that the three search terms are capturing different aspects of financial markets. Another possible explanation is that the individual search terms are noisy indicators of investor information demand on their own. For example, an undergraduate economics student who wants to learn more about Brazil's central bank may search for "Central Bank of Brazil," even if they are not interested in tracking Brazil's financial markets. Similarly, interest in country-specific financial information is not limited to potential investors, as it also includes searches for accounting and insurance providers.

Given the aforementioned advantages and disadvantages of using each search term individually, rather than rely on a single term, the main measure of attention in this article utilizes an index constructed from the first principal component of all three searches. Principal component analysis is often used in dynamic models as a means of combining several correlated variables into a single measure.[14] In effect, the attention index captures linear relationships between spikes in stock market attention, central bank attention, and country-specific financial attention, which makes it better equipped to capture investor attention allocated toward general

[14]Examples include macroeconomic performance (Stock and Watson (2002)), financial development (Saci and Holden (2008)), and investor attention (Chen, Tang, Yao, and Zhou (2022)).

TABLE 2

PCA for World and Local Searches

Table 2 shows the results of the principal component analysis between central bank search volume, stock market search volume, and country financial search volume at both the global level and at the local level.

			Eigenvectors		
Component	Eigenvalue	Proportion	Bank	Stock	Country
Panel A. World Search Principal Component Analysis					
1	1.5671	0.5224	0.6209	0.5329	0.5749
2	0.7931	0.2644	−0.1342	0.7948	−0.5918
3	0.6397	0.2132	−0.7723	0.2902	0.5650
Panel B. Local Search Principal Component Analysis					
1	1.6656	0.5552	0.5984	0.5948	0.5367
2	0.7309	0.2436	−0.3556	−0.4031	0.8432
3	0.6035	0.2012	−0.7179	0.6955	0.0297

financial market conditions, as investors are likely demanding information on all three terms during times of macroeconomic uncertainty.[15]

Results of the principal component analysis at both the local level and world level are reported in Table 2. In the world and local cases, the first principal component accounts for 52.2% and 55.5% of the total variation, respectively, and includes fairly similar positive factor loadings across the three search terms. These first principal components are then used to construct a world attention index (WORLD_ATTENTION) and a local attention index (LOCAL_ATTENTION) separately, which are both normalized between 0 and 100 to coincide with the range of Google Trends data.

2. Foreign Attention Index Extrapolation

While Google Trends does permit search queries either globally or within one specific geographical region, it does not allow users to specify search frequency within a range of multiple regions. This prohibits the measurement of search volume emanating from outside a country's borders, at least directly.[16] Consequently, a foreign attention index must be indirectly extrapolated by computing differences in variation between local attention and world attention. More specifically, I run a panel regression of WORLD_ATTENTION on LOCAL_ATTENTION. The residuals can then be interpreted as variation in world attention not coinciding with variation in local attention (i.e., attention emanating from foreign countries).

LOCAL_ATTENTION and WORLD_ATTENTION both exhibit nonstationarity in some panels according to the panel unit-root test of Hadri (2000).[17] Since

[15]Utilizing a combination of multiple search terms also helps mitigate well-known measurement errors inherent in the Google Trends sampling method (Cho and Varian (2009)).

[16]Requesting search volume for different foreign countries one at a time is also problematic due to low search frequency in countries with smaller populations.

[17]These results as well as the subsequent results on cointegration and the group-mean panel FMOLS regression are available from the authors.

using OLS with nonstationary pooled data will produce biased estimates, I next check for a cointegrating relationship using the residual-based tests of Pedroni (2004). These results strongly reject the null hypothesis of no cointegrating relationships. Therefore, the regression is run using the group-mean Fully Modified Ordinary Least Squares (FMOLS) panel estimator developed by Pedroni (2001), which accounts for long-run coefficient heterogeneity and the effects of autocorrelation.[18] The coefficient on LOCAL_ATTENTION is 0.72 and statistically significant. Residuals from the group-mean panel FMOLS regression are then calculated and normalized between 0 and 100, thus becoming our measure of foreign attention (FOREIGN_ATTENTION).[19] As an illustrative example, FOREIGN_ATTENTION for Brazil measures a linear combination of search volume for "IBOVESPA," search volume for "Central Bank of Brazil," and finance-specific search volume for "Brazil," all emanating from Google users located outside Brazil's borders.

B. Average Foreign Investor Home Market Activity

Since investors are more likely to search for information on countries where they hold more assets (Mondria et al. (2010)), the level of foreign attention paid to the 21 emerging markets, captured by FOREIGN_ATTENTION, should be reduced when there is greater activity in foreign investors' own home markets. To determine where these home markets are likely to be, I construct a representative "average foreign investor home market" for each emerging economy using equity and investment fund liability data derived from the IMF's Coordinated Portfolio Investment Survey (CPIS). The CPIS collects semi-annual data on each participating economy's foreign assets. Using these foreign asset reports, the CPIS is then able to derive foreign portfolio liabilities broken down by country of the nonresident holder.

The steps used to calculate activity in the average foreign investor's home market are as follows: First, for each of the 21 emerging countries in the analysis, I calculate the percentage of the emerging country's total equity liabilities held by each country in the CPIS. These percentages are then used as weights in the construction of various indicators in the average foreign investor's home country, such as stock returns, market turnover, volatility, and official holidays.[20] More specifically, the calculation of the average foreign investor's home market value of the indicator X is

[18]The group-mean panel FMOLS coefficient effectively averages over FMOLS coefficients for each individual panel. As an alternative, one can also calculate residuals using each emerging market's individual FMOLS coefficient. However, several panels suffer from low variation caused by the Google Trends series being truncated at 0 when search intensity is low, which increases the standard error of these individual FMOLS coefficients substantially.

[19]While Da et al. (2011) utilize both Google SVI and detrended Google SVI values as proxies for attention, the analysis here relies on the former, since foreign investors are more likely to be distracted during extended periods of home market volatility. Instead, time trends are accounted for in each regression by the inclusion of time-fixed effects. I also confirm that FOREIGN_ATTENTION is trend stationary according to the panel unit-root test of Levin, Lin, and Chu (2002), which is applicable in panels with a large T relative to N.

[20]Official holiday data in each country is collected from https://www.timeanddate.com.

$$\text{FOREIGN\_HOME\_X}_{i,t} = \sum_{j=1}^{j=N} \alpha_{j,i,t} X_{j,t}, \quad (1)$$

where $\alpha_{j,i,t}$ is the percentage of emerging country i's total foreign equity liabilities held by country j at time t. As an illustrative example, in June 2015, Canada reported owning 4.6% of Brazil's total foreign equity liabilities. Therefore, in the calculation of Brazil's average foreign investor home stock return from June to Dec. 2015, the return on Canada's benchmark stock index (S&P/TSX Composite) is weighted by 0.046.

Table 3 reports the countries used in the construction of the average foreign investor home markets, along with their respective benchmark stock indexes. These include all of the 21 emerging economies in the CPIS as well as additional countries included in the CPIS where relevant stock market data could be collected. Table 4 reports descriptive stock market statistics for both the 21 emerging economies and the 21 average foreign investor home economies, along with Pearson correlations between them. Not surprisingly, there is significant comovement between domestic stock market activity and their average foreign investor home market counterparts.

TABLE 3

Average Foreign Investor Home Markets

Table 3 presents countries used in the calculation of the average foreign investor home markets, along with their corresponding Bloomberg stock index tickers.

Country	Ticker	Country	Ticker
Argentina	MERVAL	Lebanon	BLOM
Australia	AS51	Lithuania	VILSE
Austria	ATX	Luxembourg	LUXXR
Bahrain	BHSEASI	Macedonia	MBI
Bangladesh	MXBD	Malaysia	FBMKLCI
Belgium	BEL20	Malta	MALTEXTR
Brazil	IBOV	Mauritius	SEMDEX
Bulgaria	SOFIX	Mexico	MEXBOL
Canada	SPTSX	Mongolia	MSETOP
Chile	IPSA	Netherlands	AEX
China	SHCOMP	New Zealand	NZSE
Colombia	COLCAP	Norway	OSEAX
Costa Rica	CRSMBCT	Pakistan	KSE100
Cyprus	CYSMFTSE	Peru	SPBLPGPT
Czech Republic	PX	Philippines	PCOMP
Denmark	KAX	Poland	WIG
Egypt	EGX30	Portugal	PSI20
Estonia	TALSE	Romania	BET
Finland	OMXHB	Russia	IMOEX
France	CAC	Saudi Arabia	SASEIDX
Germany	DAX	Singapore	STI
Greece	ASE	Slovakia	SKSM
Hong Kong	HSI	Slovenia	SBITOP
Hungary	BUX	Spain	IBEX
Iceland	ICEXI	South Africa	JALSHTR
India	NIFTY	South Korea	KOSPI
Indonesia	JCI	Sweden	SBX
Ireland	ISEQ	Switzerland	SMIC
Israel	TA125	Thailand	SET
Italy	FTSEMIB	Turkey	XU100T
Japan	NKY	Ukraine	PFTS
Kazakhstan	KZKAK	United Kingdom	ASX
Kuwait	KWSEAST	United States	SPX
Latvia	RIGSE	Uruguay	IRUBEVSA

TABLE 4

Stock Market Descriptive Statistics

Table 4 presents descriptive statistics for stock market variables in the 21 emerging economies, stock market variables in the 21 average foreign investor home economies, and Pearson correlations between them. Daily stock returns are total returns using net dividends. Index volatility is calculated using the annualized standard deviation of the relative change in daily closing prices during either a 10-day window or 20-day window, expressed as a percentage. Daily turnover is the total market value of shares traded reported by Bloomberg divided by free-float market capitalization.

Panel A. Emerging Stock Market Variables

	Mean	Std. Dev.	25%	50%	75%
DAILY_RETURN	0.04	0.88	−0.38	0.03	0.49
DAILY_TURNOVER	3.27	5.04	0.75	1.85	3.48
DAY_VOLATILITY	12.38	7.02	7.58	11.07	15.69
DAY_RETURN	0.56	3.55	−1.39	0.52	2.54
DAY_AVERAGE_TURNOVER	3.14	4.81	0.81	1.80	3.10
DAY_VOLATILITY	12.79	6.43	8.48	11.73	15.89

Panel B. Average Foreign Investor Home Stock Market Variables

DAILY_RETURN	0.04	0.68	−0.27	0.06	0.40
DAILY_TURNOVER	2.13	0.65	1.76	2.06	2.38
DAY_VOLATILITY	12.94	5.76	8.80	11.53	15.52
DAY_RETURN	0.49	2.71	−0.77	0.75	2.13
DAY_AVERAGE_TURNOVER	2.06	0.41	1.79	2.06	2.29
DAY_VOLATILITY	13.37	5.18	9.49	12.10	15.79

Panel C. Pearson Correlations

	Daily Return	Daily Turnover	10-Day Volatility	20-Day Returns	20-Day Turnover	20-Day Volatility
Correlations	0.3586	0.1316	0.3560	0.4054	0.1357	0.3684

Also noteworthy is the considerable overlap in average foreign investor home market activity across panels, with unreported simple Pearson correlations between panels never falling below 0.80. Nonetheless, there are still noticeable differences between average foreign investor home markets across emerging economies as well, in ways that are indicative of geographical proximity, trade agreements, and historical association.[21] Furthermore, all regressions in the analysis include time-fixed effects, which should help account for global shocks affecting all average foreign investor home markets simultaneously, as is likely the case for shocks to the U.S. economy.

III. Determinants of Attention

A. Methodology

Before exploiting foreign investor home market distraction to investigate the effects of macroeconomic attention, I first verify whether such distraction occurs by exploring the determinants of LOCAL_ATTENTION and FOREIGN_ATTENTION in panel regressions. Domestic stock market regressors include the absolute value of abnormal returns, daily turnover, stock returns over the previous trading 20 days (roughly corresponding to the minimum duration between central bank announcements), and return volatility over various time intervals. To get a sense of how attention reacts to central bank statements, I also include dummy

[21] A good example of the latter is the large proportion of French equity ownership in Tunisia, which was a French protectorate until 1956.

variables for the day before and the day of a scheduled monetary policy rate announcement.

In order to capture the possibility of foreign investor home distraction, each regression also includes the average foreign investor home market equivalents of each domestic market regressor, computed using equation (1). Since their domestic market counterparts are also included in the regression, the coefficients on these average foreign investor home country variables can be interpreted as the effect of the average foreign investor's home market activity on attention, *keeping domestic market activity fixed.* The fact that domestic market activity is held constant is a crucial part of the hypothesis, since home-country shocks should only theoretically distract foreign investors from their emerging market asset holdings if these shocks are independent of emerging markets.[22]

B. Attention Regression Results

Table 5 presents the fixed-effects regression full sample results for local attention and foreign attention. Several interesting observations can be made by comparing the determinants of LOCAL_ATTENTION to FOREIGN_ATTENTION in the full sample. First, local attention increases the day before a central bank announcement, whereas the foreign attention spike is only statistically significant on the day of the announcement itself, suggesting that local residents are more cognizant of an impending announcement than nonresidents.

Second, and more importantly for the purposes at hand, while LOCAL_ATTENTION only responds to domestic market activity, FOREIGN_ATTENTION responds strongly to foreign home market activity. According to the full sample regression, foreign attention is reduced by foreign turnover and foreign 20-day volatility, supporting the hypothesis that foreign investors pay less attention to emerging markets when home market activity is high.[23] Likewise, foreign attention increases in both daily absolute abnormal returns and cumulative 20-day returns, the former of which is consistent with evidence that both extreme positive and negative returns attract greater attention (Barber and Odean (2008)), while the latter is consistent with evidence that international investment into emerging markets rises when conditions improve at home (Raddatz and Schmukler (2012)). In stark contrast, none of the average foreign investor home market variables have a statistically significant effect on LOCAL_ATTENTION. Recall from Section II that local residents of emerging economies hold relatively few international assets. Therefore, foreign market activity that does not covary with domestic market activity should theoretically have little to no effect on local attention, which is directly supported by Table 5.

[22]One advantage of relying on stock market variables over a longer period is that they circumvent having to capture dynamic relationships between markets that occur at daily frequencies, which are made even more complicated by cross-country time zone differences.

[23]Interestingly, Table 5 implies that foreign attention only responds to return volatility over a 20-day period and not 10 or 60 days. This is consistent with evidence that investors are more distracted by events that last between 2 and 4 weeks, and that prolonged volatility persistence is related to, and perhaps even caused by, information arrival and attention (Wang (2022)).

TABLE 5

Determinants of Attention Regression Results

Each specification is a fixed-effects panel regression with either $\ln(\text{LOCAL\_ATTENTION}_{i,t})$ or $\ln(\text{FOREIGN\_ATTENTION}_{i,t})$ as the dependent variable, both for the full sample and for various subsamples (broken down by above-median and below-median values of foreign equity funding and foreign fund exposure provided by Cerutti et al. (2019)). $\text{PREANNOUNCE}_{i,t}$ is a dummy variable for whether country i has a scheduled monetary policy rate announcement on day $t+1$. $\text{ANNOUNCE}_{i,t}$ is a dummy variable for whether country i has a scheduled monetary policy rate announcement on day t. $\text{ABRETURN}_{i,t}$ is the natural log of the absolute value of daily stock returns, detrended by its median value over the last 20 trading days. $\text{RETURN20}_{i,t}$ is the stock return over the last 20 trading days for country i's benchmark stock index. $\text{TURNOVER}_{i,t}$ is the natural log of daily turnover of country i's benchmark stock index. $\text{VOLATILITY10}_{i,t}$, $\text{VOLATILITY20}_{i,t}$, and $\text{VOLATILITY60}_{i,t}$ are the natural logs of country i's volatility over the last 10 trading days, 20 trading days, and 60 trading days, respectively (calculated by Bloomberg using the annualized standard deviation of the relative change in daily closing prices, expressed as a percentage). The average foreign investor home market counterparts of each variable are computed using equation (1). Controls include time-fixed effects, country-fixed effects, nominal GDP, market capitalization, inflation, interest rates, and total foreign equity liabilities. The LOCAL_ATTENTION regression also includes $\ln(\text{FOREIGN\_ATTENTION}_{i,t})$ as an additional control variable, whereas the FOREIGN_ATTENTION regressions also include $\ln(\text{LOCAL\_ATTENTION}_{i,t})$ as an additional control variable. Standard errors are clustered at both the country and daily level, following Cameron, Gelbach, and Miller (2011). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	LOCAL_ ATTENTION	FOREIGN_ATTENTION				
	Full Sample	Full Sample	High Foreign Equity	Low Foreign Equity	High Fund Exposure	Low Fund Exposure
$\text{PREANNOUNCE}_{i,t}$	0.0215**	0.0162	−0.0089	0.0167	0.0048	−0.0001
	(0.0079)	(0.0109)	(0.0199)	(0.0195)	(0.0163)	(0.0207)
$\text{ANNOUNCE}_{i,t}$	0.0772***	0.0489***	0.0472**	0.0665***	0.0540**	0.0443**
	(0.0168)	(0.0105)	(0.0175)	(0.0135)	(0.0198)	(0.0176)
$\text{ABRETURN}_{i,t}$	0.0284***	0.0165**	−0.0009	0.0246	0.0076	0.0088
	(0.0075)	(0.0074)	(0.0122)	(0.0145)	(0.0118)	(0.0102)
$\text{FOREIGN\_HOME\_ABRETURN}_{i,t}$	−0.0320	0.0637**	0.0058	0.0889*	0.0301	0.0617
	(0.0199)	(0.0231)	(0.0603)	(0.0419)	(0.0443)	(0.0441)
$\text{RETURN20}_{i,t}$	−0.0050***	−0.0016	−0.0005	0.0002	−0.0013	−0.0014
	(0.0014)	(0.0013)	(0.0027)	(0.0020)	(0.0023)	(0.0029)
$\text{FOREIGN\_HOME\_RETURN20}_{i,t}$	0.0107	0.0263**	0.0249	0.0487**	0.0200	0.0534**
	(0.0084)	(0.0107)	(0.0270)	(0.0156)	(0.0265)	(0.0189)
$\text{TURNOVER}_{i,t}$	0.0472**	0.0457**	0.0357	0.0433	0.0738*	0.0419
	(0.0149)	(0.0197)	(0.0209)	(0.0332)	(0.0342)	(0.0349)
$\text{FOREIGN\_HOME\_TURNOVER}_{i,t}$	−0.0634	−0.1984***	−0.2794*	−0.2880**	−0.2649	−0.3155***
	(0.0708)	(0.0463)	(0.1296)	(0.0950)	(0.1884)	(0.0609)
$\text{VOLATILITY10}_{i,t}$	0.0026	−0.0053	0.0032	−0.0166	−0.0074	−0.0013
	(0.0083)	(0.0099)	(0.0203)	(0.0188)	(0.0242)	(0.0121)
$\text{FOREIGN\_HOME\_VOLATILITY10}_{i,t}$	0.0615	0.0141	0.1862	0.1409	0.0468	0.1710
	(0.0618)	(0.0806)	(0.1713)	(0.1069)	(0.2207)	(0.1014)
$\text{VOLATILITY20}_{i,t}$	0.0250	0.0345	0.0581*	0.0123	0.0240	0.0272
	(0.0216)	(0.0201)	(0.0300)	(0.0354)	(0.0341)	(0.0303)
$\text{FOREIGN\_HOME\_VOLATILITY20}_{i,t}$	−0.1427	−0.1901*	0.0191	−0.5395***	0.2852	−0.5420***
	(0.2064)	(0.1053)	(0.1306)	(0.1398)	(0.2134)	(0.0908)
$\text{VOLATILITY60}_{i,t}$	0.0532	0.0476	0.0805	0.0918*	0.0837	0.1161**
	(0.0543)	(0.0376)	(0.0754)	(0.0339)	(0.0509)	(0.0474)
$\text{FOREIGN\_HOME\_VOLATILITY60}_{i,t}$	0.0520	−0.0199	0.3561	0.1567	0.3282	0.4067
	(0.2416)	(0.1442)	(0.4446)	(0.2537)	(0.3146)	(0.2642)
No. of obs.	27,363	27,363	10,424	10,424	10,424	10,424
Countries	21	21	8	8	8	8
R^2	0.6419	0.4320	0.4246	0.5791	0.4765	0.5505

If the full sample FOREIGN_ATTENTION coefficients in Table 5 are truly being driven by distraction, one would expect to find that these effects are magnified in certain emerging markets. For example, investors are theoretically more likely to be distracted away from markets where they hold a smaller proportion of assets. Similarly, distraction effects are presumably stronger when investors purchase securities directly, as opposed to through institutions that may assign separate

individuals to each market.[24] With these cross-sectional differences in mind, Table 5 reports FOREIGN_ATTENTION regression results estimated using 4 subsamples: countries with above-median and below-median values of foreign equity funding to GDP, and countries with above-median and below-median values of exposure to international funds, as reported by Cerutti, Claessens, and Puy (2019).[25] Consistent with the hypothesis of foreign investor home distraction, the foreign home market effects on FOREIGN_ATTENTION are almost entirely driven by emerging markets with low foreign equity liabilities and low exposure to international fund flows.

IV. Foreign Attention and Monetary Policy Rate Announcements

In the previous section, I found evidence that foreign investors are distracted by financial market conditions in their home country when these conditions are independent of domestic markets. In this section, I exploit this effect to shed light on stock market reactions to monetary policy rate announcements in the 21 emerging economies.

Several features of monetary policy rate announcements make them ideally suited for this application. First, monetary policy rate announcements are typically scheduled well in advance, which allows me to distinguish between attention in anticipation of the announcement and attention in response to the announcement's content. Second, the fact that these announcements are prescheduled allows me to focus on foreign attention over a window of days leading up to the announcement, as opposed to relying on foreign attention over a single day. This helps mitigate the influence of noise in the Google Trends sampling method while also helping to circumvent cross-country time zone differences. Third, a growing body of empirical evidence documents abnormal financial market activity around scheduled central bank news releases. At the heart of many explanations for these anomalies is information acquisition and the resolution of uncertainty. Exogenous increases in foreign attention, which should theoretically correspond to exogenous reductions in uncertainty, thus provide a good way to test the proposed theories.

Given that these abnormal stock reactions are generally observed to occur within 3 days of an upcoming news release (Bomfim (2003), Lucca and Moench (2015), and Guo et al. (2020)) which directly coincides with when attention proxies begin to rise (Fisher et al. (2022)), I focus on the effect of mean foreign attention

[24]Although the distinction between the behavior of retail and institutional investors is somewhat muddled since international funds often cater to the whims of their shareholders (Gelos (2011)) and institutional investors are also prone to distraction (Schmidt (2019)), it is still conceivable that the informational benefits provided by mutual funds and ETF's may help attenuate distraction effects.

[25]Exposure to international funds is defined as the correlation between balance of payment equity flows and EPFR Global fund flows, which capture flows from mutual funds and ETF's into emerging markets. Note that Cerutti et al. (2019) do not report figures for 5 out of the 21 emerging economies in the sample.

within the 3 day period preceding a monetary policy rate announcement. One potential issue is that central banks are known to give selected journalists early access to the release and the chance to question officials, which has led to reported instances of preannouncement leaks and is consistent with substantial informed trading before the official release date (Kurov, Sancetta, Strasser, and Wolfe (2019); https://www.ft.com/content/b17eec9c-022f-11e6-99cb-83242733f755). An even bigger issue arises due to time zone considerations, where an announcement in East Asian economies scheduled on day t actually affects Google Trends in the Western Hemisphere on day $t - 1$. Consequently, to ensure that the foreign attention effects I document are not being driven by the response to an announcement's content, I ignore foreign attention with a 1-day lag, and instead focus the analysis on the effect of mean foreign attention over days $t - 2$ and $t - 3$ relative to the announcement (MEAN_FOREIGN_ATTENTION). In order to isolate attention variation that is exogenous with respect to domestic risk, I instrument MEAN_FOREIGN_ATTENTION with stock market conditions in the average foreign investor's home country, after filtering out covariation with domestic stock markets. The construction of these instrumental variables is discussed in the next section.

A. Instrumental Variable Construction

If investors allocate more attention to markets with greater volatility, higher recorded levels of attention may simply be a reflection of greater ex ante risk, rather than an ex post reduction in uncertainty. Therefore, in order to capture exogenous spikes in foreign attention, I instrument MEAN_FOREIGN_ATTENTION with two average foreign investor home stock market variables calculated using equation (1): 20-day volatility and 20-day average turnover, with both volatility and turnover having long been theoretically and empirically tied to investor attention (Hong and Stein (2007), Bansal and Shaliastovich (2011)). I use instruments over a 20 trading day period for several reasons, including that 20-day volatility has the strongest effect on foreign attention according to Table 5, distraction effects tend to be stronger during events that last over several weeks (Wang (2022)), the duration between monetary policy rate announcements is typically over a month, and the use of longer time periods helps circumvent cross-country time zone differences. Nevertheless, as a robustness check, I do verify that the announcement effects I document are robust to using instruments over shorter time frames.

The key identifying assumption of this strategy is that the average foreign investor home stock market variables are correlated with foreign attention, but are otherwise independent of domestic stock market activity around central bank announcements. Therefore, before these foreign stock market variables can be considered valid instruments, they must be filtered for any covariation with their domestic counterparts. Using a similar method to the one used to extrapolate foreign attention in Section II, I run separate regressions with each of the two 20 day average foreign investor home stock market variables as the dependent variable and their domestic counterparts as the regressor. The residuals of these regressions

are then used to create a panel of 2 separate instruments for MEAN_FOREIGN_ATTENTION: independent foreign home market 20-day volatility (FOREIGN_HOME_IND_VOL) and independent foreign home market 20-day turnover (FOREIGN_HOME_IND_TURN).[26]

Although the 2 instruments have been filtered for covariation with their domestic market counterparts, there may still be reasons to suspect violations of the exclusion restriction. For example, foreign market volatility may play a role in the central bank's decision-making process, even if it has yet to manifest itself in domestic market volatility. This would make FOREIGN_HOME_IND_VOL an invalid instrument, as an increase in FOREIGN_HOME_IND_VOL would influence the central bank's decision, and thus announcement day trading, independent of foreign attention. Under such a scenario, one would expect to find that foreign home market volatility has some influence on local attention, which I found no evidence of in Section III. Nevertheless, as a precaution, the analysis includes additional instrumental variables that capture the number of official holidays in the average foreign investor's home country (FOREIGN_HOME_HOLIDAY) over the relevant 2-day preannouncement window, computed using equation (1). Provided that foreign official holidays influence foreign attention but have no direct impact on domestic market risk or central bank decision-making otherwise, they can also serve as valid instruments.[27] The inclusion of foreign holidays as an additional instrumental variable allows me to directly check the exogeneity of the 2 foreign stock market instruments by conducting a Sargan–Hansen test of overidentifying restrictions.

Besides satisfying exclusion restrictions, the instrumental variables must also be sufficiently correlated with foreign attention preceding a central bank announcement. Figure 2 graphs average FOREIGN_ATTENTION (detrended by the day of the week) in a 8 day window around central bank announcements, broken down by countries experiencing above-median and below-median FOREIGN_HOME_IND_VOL. Foreign attention starts ascending within several days of the announcement, regardless of whether foreign investor home market volatility is high or low. However, when foreign investor home market volatility is high, foreign attention remains well below its daily trend both before and after announcement day. This suggests that FOREIGN_HOME_IND_VOL reduces foreign attention leading up to the announcement date, which supports its use as an instrument. Interestingly, Figure 2 also shows that FOREIGN_HOME_IND_VOL has a noticeably smaller impact on foreign attention on the date of the announcement itself, which is when news coverage of the announcement usually intensifies.

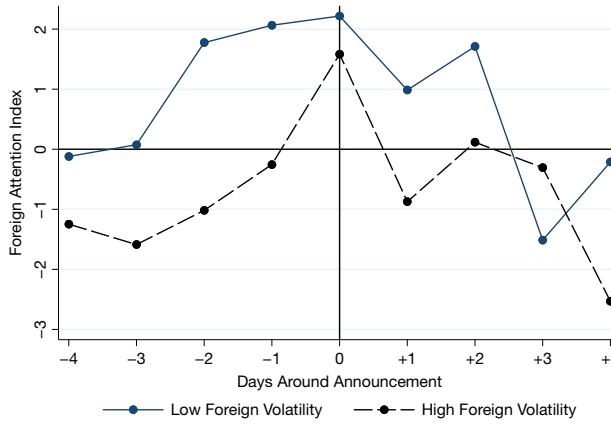
[26]Given that domestic and international equity markets are known to have long-run cointegrating relationships (Kasa (1992)), I estimate these regressions using FMOLS, as in Section II. However, in this section, I run individual FMOLS regressions for each emerging economy-stock market variable combination separately. This allows the long-run cointegrating relationship between domestic and foreign markets to differ for each emerging economy, which is consistent with evidence that emerging economies exhibit wide variation in global market integration (Cerutti et al. (2019)). These regression results are available from the authors.

[27]Although official foreign holidays likely satisfy exclusion restrictions, foreign holidays occur infrequently and are only weakly correlated with attention, making it difficult to justify using them as the sole instrument for MEAN_FOREIGN_ATTENTION.

FIGURE 2

Foreign Attention Around Monetary Policy Rate Announcements

Figure 2 presents average detrended values of FOREIGN_ATTENTION around monetary policy rate announcements, broken down by whether FOREIGN_HOME_IND_VOL is above or below its median value over the sample period. To control for significant variation in search volumes across the average week, the foreign attention index is detrended by day of the week.



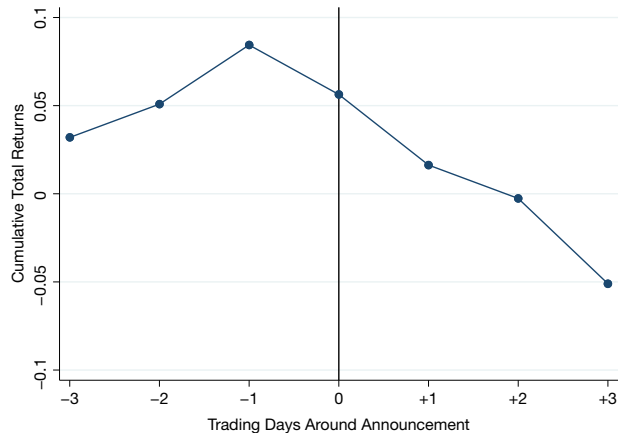
B. Preannouncement Returns

A growing body of literature documents significant excess returns in the days leading up to scheduled macroeconomic announcements, which accounts for a large percentage of the total equity premium (Lucca and Moench (2015), Ai and Bansal (2018), and Guo et al. (2020)). Figure 3 presents detrended average

FIGURE 3

Cumulative Returns Around Monetary Policy Rate Announcements

Figure 3 presents average detrended values of cumulative stock returns around monetary policy rate announcements. Daily returns are detrended by their median value over the previous 20 trading days.



cumulative returns over a 7-day window around a monetary policy rate announcement. There is a statistically significant cumulative uptick in returns in the 3 days leading up to the announcement followed by a statistically significant fall beginning on announcement day.[28,29]

The explanation for this phenomenon proposed by Lucca and Moench (2015), and one that has recently gained theoretical support, is that investors who hold stock before a major announcement must be compensated for bearing nondiversifiable risk (Ai and Bansal (2018)). Since these models predict that the magnitude of the preannouncement premium is proportional to a reduction in uncertainty, and greater attention should theoretically reduce uncertainty, this hypothesis implies that greater foreign attention should increase preannouncement returns. To test this implication, I estimate the following panel regression:

$$\begin{aligned}(2)\quad \text{RETURN}_{i,t} = {} & \beta_1 \ln(\text{MEAN\_FOREIGN\_ATTENTION}_{i,t}) + \beta_2 \text{PREANNOUNCE}_{i,t} \\ & + \beta_3 \text{PREANNOUNCE}_{i,t} \times \ln(\text{MEAN\_FOREIGN\_ATTENTION}_{i,t}) \\ & + \beta_4 \text{CONTROLS}_{i,t} + \beta_5 \text{PREANNOUNCE}_{i,t} \times \text{CONTROLS}_{i,t} \\ & + \lambda_t + \eta_i + \nu_{i,t},\end{aligned}$$

where $\text{RETURN}_{i,t}$ is country i's daily total stock return on day t, $\text{PREANNOUNCE}_{i,t}$ is an indicator variable for whether a monetary policy rate announcement is scheduled in country i on day $t + 1$, and $\text{MEAN\_FOREIGN\_ATTENTION}_{i,t}$ is the mean value of country i's foreign attention index on day $t - 1$ and day $t - 2$, corresponding to day $t - 2$ and day $t - 3$ relative to the actual announcement. The main coefficient of interest is β_3, which measures whether the preannouncement daily return is impacted by average foreign attention over the preceding 2 days. If the preannouncement risk premium is due to the resolution of uncertainty, as predicted by Ai and Bansal (2018), β_3 is expected to be positive, as greater information processing should correspond to greater uncertainty resolution (Ai et al. (2022)). Time-fixed effects, country-fixed effects, and time-varying country-specific controls are also included. Since the main coefficient of interest involves the interaction of PREANNOUNCE, the interaction of PREANNOUNCE and control variables are also included as additional regressors. To account for expected cross-country variation in monetary policy reactions, I include the interaction of PREANNOUNCE and individual emerging market dummy variables.[30]

[28]Detrending stock returns in Figure 3 helps visually account for known serial correlation in preannouncement returns (Aboody, Lehavy, and Trueman (2010), which could arise if returns are affected by information leaks prior to the scheduled announcement time (Kurov et al. (2019)) and decisions are influenced by recent stock returns (Cieslak and Vissing-Jorgensen (2021)). In the main regressions, this persistence is accounted for by the inclusion of preannouncement domestic market controls and instruments that are independent of recent domestic market activity.

[29]The statistical significance of the preannouncement return run-up and subsequent fall is also confirmed in an unreported fixed-effects panel regression with 2-way clustered standard errors.

[30]For example, cross-country variation in announcement responses could arise from different announcement times or differences in central bank credibility.

To account for the correlation between foreign attention and ex ante domestic risk, both the level term and the interaction term of MEAN_FOREIGN_ATTENTION are instrumented with the average foreign investor home market variables discussed in Section IV.A, as well as the average foreign investor home market variables interacted with PREANNOUNCE, following standard convention for instrumenting endogenous interaction terms.[31]

Table 6 reports the first-stage regression results of the main endogenous variable of interest: the interaction of PREANNOUNCE and MEAN_FOREIGN_ATTENTION.[32] The instrumental variables include the two average foreign investor home stock market variables derived in the previous section and two more variables for average foreign investor home market holidays over the relevant 2-day window. Since the interactions of each instrumental variable with PREANNOUNCE are also included, there are 8 instruments in total.[33]

According to the first-stage regression results, FOREIGN_HOME_IND_TURN has a statistically significant negative effect on foreign attention preceding a central bank announcement, which is consistent with the regression results in Section III. FOREIGN_HOME_IND_VOL also has a negative effect on foreign attention around central bank announcements, although the coefficient is not statistically significant, which is largely attributable to multicollinearity with FOREIGN_HOME_IND_TURN. Table 6 reports the Sanderson and Windmeijer (2016) first-stage chi-squared and *F*-statistic *p*-values, which are used to test for underidentification and weak identification when there are multiple endogenous variables.[34] In both cases, the null hypothesis of underidentification and weak identification is rejected at the 1% level.

The bottom of Table 6 reports coefficients in the second-stage regression. According to the main specification in Table 6, a 1% exogenous increase in foreign attention preceding a central bank announcement increases the preannouncement return premium by 1.28 basis points, representing 2.63% of the 24-hour pre-FOMC drift documented in Lucca and Moench (2015).[35] Since a causal interpretation of this coefficient relies crucially on the assumption that the foreign stock market instrumental variables are exogenous, I conduct a Sargan–Hansen *C*-statistic test for the exogeneity of these stock market instruments. The *C*-statistic is a valid test of suspect instrumental variables provided that the instruments excluded from the test,

[31]On the merits of creating extra instruments for endogenous interaction terms, see Wooldridge (2010).

[32]First-stage regression results for the noninteracting endogenous variable are available from the authors.

[33]Note that since MEAN_FOREIGN_ATTENTION measures mean foreign attention between 2 and 3 days before an announcement, the average foreign investor home market instruments are lagged accordingly.

[34]The Sanderson and Windmeijer (2016) first-stage chi-squared and *F*-statistics modify the procedure to test for weak identification with multiple endogenous variables described by Angriest and Pischke (2009). The statistics are constructed by "partialling-out" linear projections of the other endogenous regressors.

[35]In an unreported regression, I find that exogenous foreign attention has no influence on announcement day returns, in support of Lucca and Moench (2015), who find that preannouncement drift does not carry over to postannouncement, and in contrast to Fisher et al. (2022), who do not disentangle preannouncement attention from any domestic concerns that may have induced it.

TABLE 6

Preannouncement Return Regression Results

Table 6 reports the results of the first stage return regression (with $PREANNOUNCE_{i,t} \times \ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$ as the dependent variable) and the second-stage return regression (with daily domestic total returns $RETURN_{i,t}$ as the dependent variable) using several alternative specifications. Both stages include exogenous control variables in both their level terms and interacted with $PREANNOUNCE_{i,t}$. These controls include domestic attention, nominal GDP, inflation, interest rates, total foreign equity liabilities, dummy variables for official domestic holidays over the preceding 3 days, 20-day domestic market volatility, 20-day domestic market capitalization, and both domestic market turnover and domestic market daily returns over the previous 6 days. Time-fixed effects, country-fixed effects, and the interaction of $PREANNOUNCE_{i,t}$ with country-fixed effects are also included. Standard errors are clustered at both the country and daily level, following Cameron et al. (2011). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *P*-values for the Sanderson first-stage chi-squared test of underidentification and *F*-statistic test of weak identification are reported for the first-stage regression. *P*-values for the Hansen *J*-test of overidentifying restrictions (testing the joint validity of all instruments) and the *C*-statistic (testing the joint validity of FOREIGN_HOME_IND_VOL, FOREIGN_HOME_IND_TURN, and their interactions) are reported for the second-stage regression. As a robustness check against the main specification, the second column specification utilizes foreign bank attention to calculate MEAN_FOREIGN_ATTENTION (instead of the foreign attention index), whereas the third column specification utilizes FOREIGN_HOME_IND_VOL and FOREIGN_HOME_IND_TURN constructed over a 10-day window (instead of a 20-day window).

	Main Specification	Foreign Bank Attention	10-Day Foreign Home IVs
First Stage Results (Dependent Variable: $PREANNOUNCE_{i,t} \times \ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$)			
$FOREIGN\_HOME\_IND\_VOL_{i,t-1}$	0.0006	−0.0009	0.0016
	(0.0024)	(0.0012)	(0.0020)
$PREANNOUNCE_{i,t} \times FOREIGN\_HOME\_IND\_VOL_{i,t-1}$	−0.0583	−0.0144	−0.0384
	(0.0436)	(0.0144)	(0.0317)
$FOREIGN\_HOME\_IND\_TURN_{i,t-1}$	0.0003	0.0005	−0.0002
	(0.0032)	(0.0013)	(0.0029)
$PREANNOUNCE_{i,t} \times FOREIGN\_HOME\_IND\_TURN_{i,t-1}$	−0.2715***	−0.0680*	−0.2872***
	(0.0843)	(0.0352)	(0.0765)
$FOREIGN\_HOME\_HOLIDAY_{i,t-1}$	0.0054	0.0041	0.0053
	(0.0073)	(0.0038)	(0.0075)
$PREANNOUNCE_{i,t} \times FOREIGN\_HOME\_HOLIDAY_{i,t-1}$	−0.0992	−0.0719	−0.1063
	(0.1197)	(0.0745)	(0.1231)
$FOREIGN\_HOME\_HOLIDAY_{i,t-2}$	−0.0058	−0.0029	−0.0057
	(0.0060)	(0.0038)	(0.0060)
$PREANNOUNCE_{i,t} \times FOREIGN\_HOME\_HOLIDAY_{i,t-2}$	−0.0338	−0.0623	−0.0419
	(0.0799)	(0.0429)	(0.0823)
Sanderson first-stage chi-squared *p*-value	0.0000	0.0000	0.0000
Sanderson first-stage *F*-stat. *p*-value	0.0008	0.0362	0.0000
Second-Stage Results (Dependent Variable: $RETURN_{i,t}$)			
$PREANNOUNCE_{i,t}$	−7.6690	−11.0695	−7.5794
	(7.5821)	(8.2180)	(7.5558)
$\ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$	−0.3387	−1.7498	−0.1017
	(0.4453)	(1.7353)	(0.3047)
$PREANNOUNCE_{i,t} \times \ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$	1.2887**	3.9199*	0.9601*
	(0.5940)	(2.3341)	(0.5612)
Hansen *J*-stat. *p*-value	0.3276	0.3075	0.3053
Sargan–Hansen *C*-stat. *p*-value	0.1535	0.3559	0.1401

in this case, official foreign holidays, are exogenous themselves.[36] The *p*-value on the *C*-statistic is 0.1535, suggesting that the set of average foreign investor home stock market variables is indeed exogenous in the main specification.

To ensure that this preannouncement return effect is robust to reasonable modifications in variable construction, Table 6 reports regression results using

[36]The *C*-statistic (also known as a "GMM distance" or "difference-in-Sargan" statistic) allows one to test the exogeneity of a subset of instruments. It is defined as the difference between the Sargan–Hansen statistic of the equation with the smaller set of instruments assumed to be valid and the equation with the full set of instruments.

several alternative specifications. The second column reports regression results utilizing only foreign central bank searches in the construction of MEAN_FOREIGN_ATTENTION (instead of the foreign attention index comprised of central bank searches, stock searches, and country finance searches), whereas the third column reports results where the two foreign home market instruments are constructed over a 10-day window (instead of a 20-day window).[37] Although central bank searches unaccompanied by stock or financial information searches are arguably less likely to capture investor attention, while 10-day volatility had no effect on foreign attention in Table 5, in both alternative specifications the effect of exogenous foreign attention on preannouncement returns remains positive and statistically significant.

C. Announcement Day Turnover

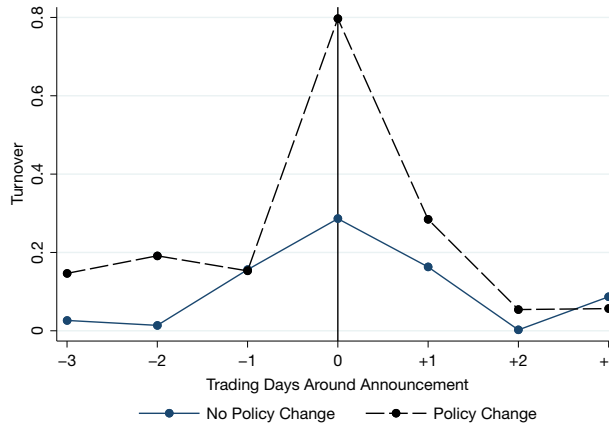
Several studies document that equity markets experience unusually low trading volume in the days leading up to a monetary policy decision, followed by a large spike on announcement day (Bomfim (2003), Lucca and Moench (2015)). This pattern is corroborated by Figure 4.

Ai et al. (2022) develop a model of prescheduled macroeconomic announcements where this trading volume pattern is accounted for by heightened uncertainty, which induces greater information gathering preannouncement and more resolution of uncertainty postannouncement, the latter of which is consistent with a large set of

FIGURE 4

Daily Turnover Around Monetary Policy Rate Announcements

Figure 4 presents average detrended values of daily turnover around monetary policy rate announcements, broken down by whether the monetary policy rate was altered or left unchanged. Turnover is detrended by its median value over the previous 20 trading days.



[37]The former is constructed by repeating the same steps discussed in Section II.A for only central bank name searches, while the latter is constructed by repeating the same steps discussed in Section IV.A over a 10-day period.

models where trade volume is proportional to the precision of public information communicated to investors (Kim and Verrecchia (1991)). To test this hypothesis, I estimate the following panel regression:

$$\begin{aligned}(3)\quad \Delta\text{TURNOVER}_{i,t} = {} & \delta_1 \ln(\text{MEAN\_FOREIGN\_ATTENTION}_{i,t}) + \delta_2 \text{ANNOUNCE}_{i,t} \\ & + \delta_3 \text{ANNOUNCE}_{i,t} \times \ln(\text{MEAN\_FOREIGN\_ATTENTION}_{i,t}) \\ & + \delta_4 \text{CONTROLS}_{i,t} + \delta_5 \text{ANNOUNCE}_{i,t} \times \text{CONTROLS}_{i,t} \\ & + \tau_t + \theta_i + e_{i,t},\end{aligned}$$

where $\Delta\text{TURNOVER}_{i,t}$ is the change in daily stock market turnover for country i on day t, $\text{ANNOUNCE}_{i,t}$ is an indicator variable for whether a monetary policy rate announcement is scheduled in country i on day t, and $\text{MEAN\_FOREIGN\_ATTENTION}_{i,t}$ is the mean value of country i's foreign attention index on day $t-2$ and day $t-3$. The main coefficient of interest in equation (3) is δ_3, which measures whether the announcement day turnover reaction is impacted by foreign attention preceding the announcement. Insomuch as greater exogenous attention corresponds to greater resolution of uncertainty and greater precision of information communicated to investors, recent theoretical asset-pricing models predict that δ_3 is positive. As in the return regression of the previous section, controls and emerging market dummy variables interacted with ANNOUNCE are included as additional regressors. As in the return regression, both MEAN_FOREIGN_ATTENTION and its interaction with ANNOUNCE are instrumented with appropriately lagged average foreign investor home market instrumental variables derived in Section IV.A, along with their ANNOUNCE interactions.

The top of Table 7 reports the first-stage regression results for the interaction of ANNOUNCE and MEAN_FOREIGN_ATTENTION, which are predictably similar to results of the preannouncement return first-stage regression in Table 6. As per the Sanderson and Windmeijer (2016) p-values, the first stage regression does not suffer from underidentification or weak identification. The bottom of Table 7 reports coefficients in the second-stage regression. According to the main specification in Table 7, a 1% exogenous increase in foreign attention preceding a central bank announcement increases the announcement day turnover reaction by 2.74%.[38] The C-statistic p-value testing orthogonality of the average foreign investor home stock market instruments (under the assumption that the foreign holiday instruments are exogenous) is 0.3593, again suggesting that these average foreign investor home stock market variables are exogenous. Moreover, Table 7 reports that the sign and statistical significance of δ_3 is robust to the use of foreign bank searches alone to measure MEAN_FOREIGN_ATTENTION and to instruments constructed over a 10-day window.[39]

[38]In an unreported estimation of equations (2) and (3) without the use of instrumental variables, the interaction terms are statistically insignificant. These results are available from the authors.

[39]The estimates in Tables 6 and 7 involve a generated regressor, which can lead to biased standard errors (Pagan (1984)). To alleviate this concern, I obtain alternative standard errors by bootstraping the entire foreign attention extrapolation procedure and the main specification estimates in Tables 6 and 7 simultaneously. The bootstrap is conducted by resampling with replacement at the panel level for 1,000 replications. In both cases, the main interaction terms of interest remain statistically significant at the 10% level.

TABLE 7

Announcement Turnover Regression Results

Table 7 reports the results of the first stage turnover regression (with $ANNOUNCE_{i,t} \times \ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$ as the dependent variable) and the second-stage turnover regression (with the change in daily domestic stock market turnover $\Delta TURNOVER_{i,t}$ as the dependent variable) using several alternative specifications. Both stages include exogenous control variables in both their level terms and interacted with $ANNOUNCE_{i,t}$. These controls include domestic attention, nominal GDP, inflation, interest rates, total foreign equity liabilities, dummy variables for official domestic holidays over the preceding 3 days, 20-day domestic market volatility, 20-day domestic market capitalization, and both domestic market turnover and domestic market daily returns over the previous 6 days. Time-fixed effects, country-fixed effects, and the interaction of $ANNOUNCE_{i,t}$ with country-fixed effects are also included. Standard errors are clustered at both the country and daily level, following Cameron et al. (2011). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively. *P*-values for the Sanderson first-stage chi-squared test of underidentification and *F*-statistic test of weak identification are reported for the first-stage regression. *P*-values for the Hansen *J*-test of overidentifying restrictions (testing the joint validity of all instruments) and the *C*-statistic (testing the joint validity of FOREIGN_HOME_IND_VOL, FOREIGN_HOME_IND_TURN, and their interactions) are reported for the second-stage regression. As a robustness check against the main specification, the second column specification utilizes foreign bank attention to calculate MEAN_FOREIGN_ATTENTION (instead of the foreign attention index), whereas the third column specification utilizes FOREIGN_HOME_IND_VOL and FOREIGN_HOME_IND_TURN constructed over a 10-day window (instead of a 20-day window).

	Main Specification	Foreign Bank Specification	10-Day Foreign Home IVs
First Stage Results (Dependent Variable: $ANNOUNCE_{i,t} \times \ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$)			
$FOREIGN\_HOME\_IND\_VOL_{i,t-2}$	−0.0016	−0.0011	−0.0005
	(0.0027)	(0.0013)	(0.0022)
$ANNOUNCE_{i,t} \times FOREIGN\_HOME\_IND\_VOL_{i,t-2}$	−0.0498	−0.0105	−0.0247
	(0.0436)	(0.0128)	(0.0315)
$FOREIGN\_HOME\_IND\_TURN_{i,t-2}$	0.0007	−0.0002	0.0001
	(0.0027)	(0.0012)	(0.0025)
$ANNOUNCE_{i,t} \times FOREIGN\_HOME\_IND\_TURN_{i,t-2}$	−0.2544***	−0.0705**	−0.2697***
	(0.0862)	(0.0307)	(0.0791)
$FOREIGN\_HOME\_HOLIDAY_{i,t-2}$	0.0065	0.0046	0.0066
	(0.0079)	(0.0044)	(0.0081)
$ANNOUNCE_{i,t} \times FOREIGN\_HOME\_HOLIDAY_{i,t-2}$	−0.0981	−0.0717	−0.1041
	(0.1196)	(0.0767)	(0.1224)
$FOREIGN\_HOME\_HOLIDAY_{i,t-3}$	−0.0053	−0.0029	−0.0052
	(0.0062)	(0.0037)	(0.0062)
$ANNOUNCE_{i,t} \times FOREIGN\_HOME\_HOLIDAY_{i,t-3}$	−0.0319	−0.0529	−0.0376
	(0.0783)	(0.0393)	(0.0808)
Sanderson first-stage chi-squared *p*-value	0.0000	0.0000	0.0000
Sanderson first-stage *F*-stat. *p*-value	0.0054	0.0335	0.0003
Second-Stage Results (Dependent Variable: $\Delta TURNOVER_{i,t}$)			
$ANNOUNCE_{i,t}$	−7.0127	−14.2852	−6.0837
	(7.0628)	(10.0112)	(6.7750)
$\ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$	−0.0813	0.1891	−0.1935
	(0.7171)	(1.9566)	(0.8816)
$ANNOUNCE_{i,t} \times \ln(MEAN\_FOREIGN\_ATTENTION_{i,t})$	2.7471**	7.3680*	2.1733*
	(1.3090)	(3.9210)	(1.1646)
Hansen *J*-stat. *p*-value	0.4040	0.8562	0.5250
Sargan–Hansen *C*-stat. *p*-value	0.3593	0.7381	0.5214

V. Conclusion

In this article, I demonstrate how foreign investor home distraction could be exploited to infer the causal effect of attention to macroeconomic news. However, it is important to emphasize that the mere existence of foreign investor home distraction has several significant policy implications in its own right. As argued by Gaballo (2016), an excessively detailed announcement of forward guidance can be welfare-reducing when the announcement's interpretation is sufficiently heterogenous across agents. Given the foreign investor distraction effect documented

in Section III, the model of Gaballo (2016) suggests that central banks should consider more concise, less descriptive news releases when international markets are volatile, *regardless of whether this international volatility has any direct consequences for the domestic economy*, because foreign investor attention will be in shorter supply than usual, increasing the likelihood that excessively detailed releases will simply become fodder for disagreement.

Policymakers should also take foreign investor home distraction into account when considering the optimal timing of unscheduled news releases. Reis (2010) presents a dynamic model with inattentive agents and finds that policymakers must balance early announcements that are more likely to be ignored with later announcements that give agents less time to prepare. If foreign investors are distracted by news in their home countries, policymakers could strategically advance or delay announcements when international markets are in turmoil, essentially following the same strategy that firms undertake when dealing with high-distraction events around earnings announcements (deHaan, Shevlin, and Thornock (2015), Kempf et al. (2017)). If governments frequently implement such strategies, one intriguing possibility is that the scheduling of a news release foreshadows the release's content, as appears to be the case with earnings announcements (Johnson and So (2018)).

The analysis in this article lends itself to several extensions. A natural question is whether foreign investor home distraction effects persist or eventually reverse over longer time horizons, a phenomenon often observed with the impact of news on stock returns (Tetlock (2007)). One can also make use of other home bias distraction events similar to the ones utilized in the earnings announcement literature, such as extreme weather conditions and major national sporting events. On a more general level, the empirical strategy of matching regional high-distraction events with regional search volume has many potential applications. Over the last decade, theoretical work on information choice in macroeconomics and finance has grown substantially, but these models are often difficult to test. By matching cross-regional differences in expected distraction with cross-regional differences in search volume, one can potentially measure exogenous variation in international macroeconomic attention at higher frequencies. This research design could yield new insights into topics including inflation expectations, asset bubbles, and financial market responses to political events.

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