Familiarity and Surprises in International Financial Markets: Bad news travels like wildfire; good news travels slow*

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Abstract

In this paper, we decompose attention allocation into two components – the familiar and the surprising – with opposite implications for US purchases of foreign stocks. On the one hand, familiarity-induced attention leads to an increase in US holdings of foreign equities. On the other hand, surprise-induced attention is associated with net selling of foreign stocks because US investors tend to pay more attention to negative than to positive economic surprises from foreign countries. Our findings suggest that information asymmetries between locals and non-locals are more pronounced when it comes to good news, with information regarding bad news being relatively symmetric.

Keywords: US Purchases of Foreign Stocks, Attention Allocation, Asymmetric Information, Geography, Economic Surprises.

JEL Codes: F30, D82, G11.

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"Well bad news travels like wildfire, good news travel slow. They all call me Wildfire, 'cause everybody knows I'm bad, everywhere I go."

– Bad News, song written by John Loudermilk and performed by Johnny Cash.

1 Introduction

Attention is a scarce resource. When we browse the headlines of our daily newspaper, which stories attract our attention? Do we focus on the familiar events, for instance, business news about the industry we work in, political news about our local government, or sports news about our favorite teams? Or are we attracted to surprising events, such as natural disasters or economic crises, even in remote places? In this paper, we decompose attention allocation into two components, the familiar and the surprising, and analyze the portfolio implications in international finance.

The literature in international finance has mainly focused on studying the portfolio implications of the familiar component of attention, which the literature usually calls geography. Portes and Rey (2005) are the first to document that a gravity model would account for a significant share of variation in cross-border equity flows. According to the authors, geographical distance is a barrier to cultural exchange and thus a good proxy for familiarity or information costs. Dahlquist et al (2003), Ahearne et al (2004), Chan et al (2005), and Kraay et al (2005) also use proxies for local information advantages, which can be interpreted as the familiar component of attention, to explain the home equity bias puzzle.[1] Theoretical work from Van Nieuwerburgh and Veldkamp (2009) and Mondria and Wu (2010) show that when investor attention is limited, the interaction between portfolio and attention allocation choices amplify small exogenous local informational advantages into large levels of home bias. Mondria et al (2010) and Mondria and Wu (2013) find empirical support for such predictions. Specifically, they construct proxies for the familiar component of attention using Internet search query data (from AOL in the former paper, and from Google in the latter one) and present empir-

[1]French and Poterba (1991) and Tesar and Werner (1995) are the first to document the home equity bias puzzle. In the domestic market, Coval and Moskowitz (1999) also document that investor have a preference for local stocks.

ical evidence that small increases in familiarity or financial integration lead to an increase in attention allocation and, consequently, to a reduction in home equity bias.

The finance literature, however, has either focused on only the familiar component or the surprising component of attention. Coval and Moskowitz (2001) and Malloy (2005), among others, focus on the familiar component of attention by providing evidence that local institutional investors and analysts have a local information advantage. On the other hand, Barber and Odean (2008), Fang and Peress (2009), Da et al (2011), and Cziraki et al (2018) focus on the surprising component of attention, which is attention to abnormal events. They document that attention-grabbing events – news, extreme returns, unusual trading volumes, abnormal search queries – affect future returns and buying decisions. We bridge both literatures by presenting a methodology that formally disentangles the influence of familiarity and surprises on attention and the implications of each component for international asset allocation choices.

In this paper, we construct a measure of Americans' attention allocated towards domestic and foreign stocks based on Google search volume index (henceforth, Google SVI) for queries that lead users to real-time financial information from those markets. Using a panel of monthly data from January 2006 to December 2017, we find that, contrary to what has been suggested by previous studies, an increase in the attention Americans allocate towards foreign stock markets is associated with US net sales of foreign stocks.

To understand and isolate the importance of geography, we estimate a gravity model for our attention allocation variable and calculate two new series: the fitted-values (familiar component or the part of attention that is predicted by gravity variables) and the residuals (surprising component or the unpredicted part). Then, we reassess the effects of attention on US purchases of foreign stocks by including both components (predicted and unpredicted attention) as separate regressors. We find that familiarity-induced attention leads to an increase in US holdings of foreign equities, while surprise-induced attention is associated with net selling of foreign stocks.

Moreover, we find that the composition of attention to equity markets by US investors differs between good and bad news and depends on the investors' familiarity level with those

markets. Investors allocate a uniform amount of attention to bad news about any equity market. However, investors' attention to good news depends on their familiarity with those equity markets. US investors allocate more attention to positive news from familiar equity markets. Specifically, in their own local market, US investors tend to process much more information about good news rather than bad news. US investors also tend to process more information about good news than bad news in Canada, a foreign market that is nonetheless culturally similar to the US. In the other non-local markets located in Europe and Asia, US investors tend to process more information about bad news rather than good news.[2] This evidence is consistent with studies of information processing at the individual level. Different papers have shown that individuals react to positive and negative information about personal qualities differently depending on whether the feedback is about themselves or about other people. The psychology literature on impression formation (e.g., Ronis and Lipinski, 1985; Singh and Teoh, 2000; Van der Pligt and Eiser, 1980; Vonk, 1993, 1996) finds that unfavorable information has a greater impact on our impression of others than favorable information does. In contrast, an experiment conducted by Eil and Rao (2011) reveals that when the information is about a quality of the agent herself, positive feedback is rationally processed (i.e., according to the Bayes' rule), while negative feedback tends to be ignored or disregarded.

Our paper is the first to suggest that asymmetries between locals and non-locals are more pronounced when it comes to good news, with information regarding bad news being relatively symmetric. This finding could help explain the asymmetric effects of good versus bad news on conditional returns and volatilities reported by Conrad et al (2002) for stocks, Hautsch and Hess (2002) for bonds, and Andersen et al (2003) for exchange rates.

The remainder of the paper is organized as follows. Section 2 describes the data set. Section 3 explains the methodology. Section 4 explores the relationship between US net purchases of foreign stocks and attention allocation. Section 5 analyses how attention responds to economic news. Finally, section 6 concludes.

[2]This result is consistent with Barber and Odean (2008), Fang and Peress (2009), Da et al (2011), and Cziraki et al (2018).

2 Data

This section describes our panel data set, which includes observations from 2006 to 2017 for the following 10 major equity markets: Australia, Canada, China, Japan, New Zealand, Norway, Sweden, Switzerland, the United Kingdom, and the United States.[3]

2.1 Attention Allocation

Da et al (2011) propose a direct measure of the attention investors pay to particular stocks using Google SVI for search queries containing the stock ticker symbols.[4] For instance, if you type the stock ticker symbol for Microsoft Corporation, "MSFT", inside the Google search box, the first link on the results page will most likely lead you to either Yahoo! Finance or Google Finance. Needless to say, in both websites you will find real-time stock quotes, historical charts, and financial news related to Microsoft Corporation. This will also be true for most, although not all, stocks traded in the US market.

Since in this paper we are interested in the attention Americans allocate to foreign stocks, a natural extension of their methodology is to download Google SVI for search queries containing ticker symbols associated with each foreign market's main equity index, such as "AORD" for the Australian All Ordinaries or "N225" for the Japanese Nikkei 225.[5] On the one hand, these search queries will definitely find us real-time financial information about both equity indices. On the other hand, this procedure implicitly assumes that all US investors who trade foreign stocks are necessarily buying or selling stock market indices, which is certainly not true. Many US investors might be just as interested in buying or selling individual Canadian or Japanese stocks included in the All Ordinaries or in the Nikkei 225.

[3]Our sample period starts in 2006 since Google SVI for some countries contains a large number of "zeroes" in 2004 and 2005 (specially at the weekly frequency). Citigroup compiles individual economic surprise indices for the 10 countries in the sample. Economic surprise indices are not available for the Euro area's individual members, but only as a regional aggregate. Unfortunately, the Euro area is not in our sample since we could not obtain a clean measure of attention allocation towards an entire region comprising of 17 different economies, each with its own stock exchange.

[4]Google SVI for a particular search query represents the search traffic for the query relative to the total number of searches on Google at a given location and time period. An increase in Google SVI allows us to conclude that the search query is becoming more popular, but not that the absolute number of searches for the query is increasing.

[5]These ticker symbols are used by Reuters and are not necessarily the same used by Bloomberg.

The natural place to find real-time financial information not only about a foreign country's composite equity index, but also about individual stocks included in the composite index is in the country's stock exchange website. Therefore, we measure the attention investors allocate to foreign stocks using Google SVI for search queries containing a combination of country name, country demonym, and city in which the stock exchange is located, all followed by the word "stock." Google searches for any term in "Australia stock + Australian stock + Sydney stock" will lead you to the Australian Securities Exchange website (http://www.asx.com.au/). Similarly, Google searches for any terms in "Japan stock + Japanese stock + Tokyo stock" will lead you to the Tokyo Stock Exchange website (http://www.tse.or.jp/english/). This methodology implicitly assumes that enough US investors who trade foreign stocks are using the Google search engine.

[Insert Table 1 about here]

We download the data from Google Trends, which allows us to filter the results in such a way that only searches originating from the US are included.[6] Furthermore, results are normalized so that the highest search traffic recorded in the downloaded sample is assigned a value of 100.[7] Therefore, when downloading our data we repeat one country in all consultations so that we are able to renormalize the results in a way that the final data reflect the relative popularity between all countries in our sample. Table 1 reveals that Americans naturally allocate more attention towards their own local market, with a Google SVI sample average of 26.54. Canada is a close second, followed by China and Australia, with Google SVI sample averages of 25.58, 25.45, and 21.65, respectively. Then, in fifth place, we see the United Kingdom, with a Google SVI sample average of 18.63. Figure 1 describes the weekly evolution of the Google SVI for the US. The Google SVI for the US increases significantly to 76 in the week ending on September 14, 2008, which is just a day before the bankruptcy of Lehman Brothers. Then, the Google SVI reaches its highest value of 100 in the week ending on October 5, 2008.

[6]Google Trends uses IP address information to identify the location of its users.

[7]We download both the monthly and weekly Google SVI data. For the monthly Google SVI data, we can download the whole dataset from 2006-2017 directly. For the weekly data, each time we download 5 years' data and use the overlapping 3 months between each 5 years to construct the full sample.

[Insert Figure 1 about here]

2.2 Economic Surprise Indices

Citigroup calculates economic surprise indices for some countries and regions based on the aggregation of the unanticipated component of different macroeconomic announcements. Different macroeconomic indicators are officially announced in different measurement units (non-farm payrolls in number of workers, CPI in percentage points, and trade balance in US$).

It is important to emphasize that economic surprise indices are measures of unexpected economic performance and not of economic performance *per se*. Figure 2 describes the daily evolution of the economic surprise index for the US. Although US economic growth has been unimpressive since the Global Financial Crisis of 2008, the economic surprise index has not remained negative since then. The economic surprise index indeed suffers a sharp drop which starts 10 days before the bankruptcy of Lehman Brothers and lasts for roughly a quarter. But as agents start to update their expectations regarding the weaker prospects for US growth, the economic surprise index converges back to zero.[8]

[Insert Figure 2 about here]

2.3 US Net Purchases of Foreign Stocks

The US Department of the Treasury publishes monthly data on US investors' purchases and sales of foreign stocks in individual countries and regions in its Treasury International Capital (TIC) System (in US$ billion). Specifically, the US Department of the Treasury reports gross purchases (sales) by foreigners from (to) US residents in both domestic and foreign

[8]The aggregation methodology involves, first, the normalization of the unexpected component into standardized news surprises. Let $A_{q,i,t}$ denote the value of a given macroeconomic fundamental q from country i announced at date t. Let $E_{q,i,t}$ refer to the median value of the preceding market expectations collected by the Bloomberg survey for the corresponding announcement, and let $\widehat{\sigma}_{q,i}$ denote the sample standard deviation of all the surprise components associated with fundamental q from country i. The standardized surprise of macroeconomic fundamental q from country i announced at date t is then defined as $S_{q,i,t} = \frac{A_{q,i,t}-E_{q,i,t}}{\widehat{\sigma}_{q,i}}$. Citigroup's methodology attributes different weights $\theta_{q,i}$ to different fundamentals q based on high-frequency regressions of spot exchange rates on standardized news surprises. Fundamentals q that have stronger impact on exchange rate dynamics are deemed more relevant by market participants and hence receive larger weights. This also implies that positive readings of the economic surprise index indicate stronger than expected economic activity. Finally, the indices are calculated daily in a rolling three-month window. Another set of weights ρ_τ discounts past observations employing a time decay function, which replicates the limited memory of markets.

securities from January 1977. Domestic securities include marketable US Treasury and Federal Financing Bank bonds & notes, bonds of US Gov't corps. & federally sponsored agencies, US corporate & other bonds, and US corporate stocks. Foreign securities include bonds and stocks. In this paper, we focus on US investors' purchases and sales of foreign stocks.[9] Table 1 shows that US investors purchase 2.99 US$ billion of British stocks, followed by 0.57 US$ billion of Japanese stocks in a month. On average, US investors sell 0.07 US$ billion of Norwegian stocks.

2.4 Additional Controls

We collect from Bloomberg daily data for the major stock market index of each country in our sample to construct two measures of stock market performance: the cumulative monthly returns and the monthly standard deviation of daily returns.[10] We also collect four series from the World Bank's *World Development Indicators*: GDP (in constant 2010 US$) and market capitalization of listed companies (as share of GDP) as measures of economic size, and total land area (in square kilometers) and total population as proxies for physical mass.[11] Using the CIA's *The World Factbook*, we construct two dummy variables: language, to identify English-speaking countries, and common law, to denote countries which have the same legal system as the US.[12] Finally, we complete our data set with a measure of geographical distance (in miles) between each country's national capital and Washington, DC, the national capital of the US.

Our instrumental variable for attention is an indicator of cultural sites, natural sites, and mixed sites within a country. We use the number of World Heritage cultural sites, natural sites, and mixed sites from the UNESCO/World Heritage Centre list.

[9]Note that our interest lies in the behavior of US net purchases of foreign stocks and not in US bilateral equity flows, which also take into account foreigners' net sales of US stocks.

[10]The stock market indices are: the All Ordinaries in Australia; the S&P TSX Composite in Canada; the Shanghai Composite in China; the Nikkei 225 in Japan; the NZSE 50 in New Zealand; the OSE All Share in Norway; the Stockholm General in Sweden; the Swiss Market in Switzerland; the FTSE 100 in the United Kingdom; and the S&P 500 in the United States.

[11]GDP, market capitalization, total land area, and total population are four different measures of size. In this paper, we mainly use market capitalization to measure size. The results still hold if we use the other three variables to measure size instead.

[12]Language and common law are highly correlated. In this paper, we mainly focus on language. The results hold if we change to common law.

3 Methodology

Our methodology consists of two parts. In the first part, we check whether an increase in attention leads to US purchases of foreign stocks and also decompose attention allocation into two components, the familiar and the surprising. In the second part, we test whether economic surprises relate to the surprising component of attention from the first part.

3.1 Attention Allocation and US Net Purchases of Foreign Stocks

The objective of this part is two-fold: to test whether more US investors' attention results in more US investors' purchases of foreign stocks and also to highlight the role played by gravity variables in this channel. In this part, we only consider the attention Americans allocate towards the foreign countries in our sample: Australia, Canada, China, Japan, New Zealand, Norway, Sweden, Switzerland, and the United Kingdom.

Equation (1) models the following period's net purchases of foreign stocks by US investors using as explanatory variables the attention Americans allocate towards the destination country's equity market and a set of controls, which includes gravity variables and measures of stock market performance.[13] The estimation technique in equation (1) is Ordinary Least Squares. Given empirical evidence documented in both finance and international finance, our prior expectation is to estimate a positive and statistically significant coefficient associated with attention allocation in equation (1):[14]

$$net\ purchases_{i,t+1} = \alpha_0 + \alpha_1 attention_{i,t} + \overrightarrow{\alpha}_2 additional\ controls_{i,t} + u_{i,t+1} \qquad (1)$$

The set of additional controls included in equation (1) follows Portes and Rey (2005), who show that gravity variables are important determinants of cross-border equity flows. We include two proxies for cultural proximity: geographical distance and language; and we

[13] We use explanatory variables in t to explain our dependent variable in $t+1$ to reduce concerns related to potential time-series endogeneity issues. For instance, shocks which generate unusually high volumes of US purchases of foreign stocks could both attract attention and affect stock market performance. With respect to gravity variables, most of them have no time-series variation (distance, language, common law, and land area), while some have variation only at the annual frequency (market capitalization, GDP, land area, and population).

[14] Reviewed in the Introduction.

expect information costs to decrease with greater familiarity, therefore leading to more positive equity flows. We also expect larger economies to attract larger equity flows from US investors. Furthermore, we also include two measures of stock market performance in the destination country. We include monthly stock market returns to allow for "return chasing" behavior, in which case we should expect a positive coefficient, and also the monthly standard deviation of daily returns as a proxy for market volatility, for which we expect a negative coefficient. Since we are only focusing on net purchases of foreign stocks made by US investors, the inclusion of time dummies fully control for omitted factors such as changes in US investors' risk appetite or US markets' liquidity conditions, which may affect their behavior through time but uniformly across destination countries.

Next, we decompose attention allocation into two components, the familiar and the surprising. We first estimate a gravity model for our attention allocation variable. We anticipate attention allocation to increase with the cultural proximity, proxied by distance and language, and the economic size, captured by market capitalization:

$$attention_{i,t} = \delta_0 + \overrightarrow{\delta}_1 gravity\ variables_{i,t} + \eta_{i,t} \tag{2}$$

We employ the Ordinary Least Squares technique in equation (2) and use estimation output from equation (2) to decompose attention allocation into two series: the part which is predicted by gravity variables, given by the fitted-values, and the unpredicted part, given by the residuals. Then, we reassess the effects of attention on US purchases of foreign stocks by including both components (predicted attention, which is also called the familiar component of attention, and unpredicted attention, which is also called the surprising component of attention) as separate regressors:

$$net\ purchases_{i,t+1} = \alpha_0 + \alpha_1 attention^{pred}_{i,t} + \alpha_2 attention^{unpred}_{i,t} + \overrightarrow{\alpha}_3 control\ variables_{i,t} + u_{i,t+1} \tag{3}$$

In equations (1) and (3), we include monthly fixed effects, and the standard errors are computed with a Newey-West correction with 4 lags and clustered at the monthly level. The

standard errors are also computed with a Newey-West correction with 4 lags and clustered at the monthly level in equation (2).[15]

3.2 Attention Allocation and Economic Surprises

The objective of this part is to test whether (and how) economic surprises relate to unpredicted attention. Our baseline model in this second part is given by equation (4)[16]:

$$attention_{i,t} = \beta_0 + \beta_1 \left(surprise_{i,t}\right)^2 + \overrightarrow{\beta}_2 gravity\ variables_{i,t} + \varepsilon_{i,t} \tag{4}$$

Note that the coefficient β_1 captures the effect of economic surprises on the component of attention allocation which is not explained by gravity variables.[17,18] Our initial prior is that both good and bad news from different countries attract attention from Americans in a similar manner. Hence, we include in equation (4) the squared value of the economic surprise index as a regressor, expecting to estimate a positive and statistically significant coefficient.[19] With respect to the set of gravity variables, our priors are the same as described in equation (2): attention should increase with cultural proximity and economic mass.

After estimating our empirical model exactly as described by equation (4), we propose two additional extensions. In equation (5), we estimate separate semi-elasticities of attention with respect to squared positive and negative economic surprises. Intuitively, we are allowing Americans to allocate their attention asymmetrically between good and bad news:

$$\beta_1 = \begin{cases} \widetilde{\beta}_1, \text{ if } surprise_{i,t} \geq 0; \\ \widetilde{\beta}_2, \text{ if } surprise_{i,t} < 0. \end{cases} \tag{5}$$

Finally, in equation (6), we consider a double interaction between squared positive and

[15] In equations (1), (2), and (3), the key variable of interest, US net purchases of foreign stocks, only has monthly frequency; that is the reason why we run the regressions at the monthly frequency. If we use the Google SVI data at the weekly frequency and run regressions at the weekly frequency, the results still hold.

[16] The estimation technique in equations (3) to (4) is Ordinary Least Squares.

[17] Equivalently, if we obtain $attention_{i,t}^{unpred}$ as the residuals of equation (2), then β_1 in (4) equals γ_1 in: $attention_{i,t}^{unpred} = \gamma_0 + \gamma_1 \left(surprise_{i,t}\right)^2 + \overrightarrow{\gamma}_2 gravity\ variables_{i,t} + \xi_{i,t}$.

[18] Economic surprises represent the arrival of new information that has not yet been incorporated by financial markets participants. Hence, reverse causality is not a concern.

[19] Results are very similar if absolute value of economic surprise index is used instead (available upon request).

negative surprises with distance:

$$\beta_1 = \begin{cases} \widetilde{\beta}_1 + \widetilde{\beta}_2 distance_i, \text{ if } surprise_{i,t} \geq 0; \\ \widetilde{\beta}_3 + \widetilde{\beta}_4 distance_i, \text{ if } surprise_{i,t} < 0. \end{cases} \tag{6}$$

In equations (4), (5), and (6), we include weekly fixed effects. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level.

4 Attention Allocation and US Net Purchases of Foreign Stocks

In this section, we test whether shocks to the attention Americans allocate towards foreign markets lead to an increase in US investors' net purchases of those foreign stocks, with a special focus on the importance of geography as a proxy for familiarity.

4.1 Effects of Attention Allocation

Equation (1) models the following period's net purchases of foreign stocks by US investors using as explanatory variables the attention Americans allocate towards each destination country's equity market, measures of stock market performance, and gravity variables. Column (2.1) in Table 2 presents the estimation output using our full sample: monthly data from January 2006 to December 2017.[20] Contrary to our prior expectations, attention allocation yields a negative and statistically significant coefficient: a 10% increase in the attention Americans allocate to a foreign equity market is associated with a US$ 94.2 million decrease in US net purchases of that market's stocks.

[Insert Table 2 about here]

The estimated coefficients associated with both measures of stock market performance in the destination economy are not statistically significant.[21] With regards to gravity variables,

[20] Monthly data are used in this section since monthly data are the highest frequency at which US purchases of foreign stocks series are available.

[21] As we have mentioned in our methodological description, our panel data only have variation in the country of destination, but not with respect to the country of origin, since we are only focusing on net purchases made by US investors. Therefore, stock market performance in the country of origin is fully controlled by the inclusion of time effects.

both measures of cultural proximity are statistically significant: a 100% increase in geographical distance between a country's national capital and Washington, DC reduces US purchases of that country's stocks by US$ 174 million; and countries which share the same language (English) with the US tend to receive on average an additional US$ 1,041 million in US net purchases. Moreover, larger economies are more likely to attract larger US purchases: a 10% increase in a country's market capitalization increases US net purchases of that country's stocks by US$ 59.3 million.

One potential explanation for the negative and significant coefficient of attention allocation in the net purchase of stocks equation is the choice of sample period. Our sample period includes the Great Recession, an event that attracted a lot of attention in American society and simultaneously forced US investors to sell foreign stocks across the globe due to liquidity constraints.[22] Consequently, a regression between both variables would capture this negative co-movement in spite of the absence of any direct economic linkage between them. In order to check this alternative story, we re-estimate equation (1) excluding the Great Recession from the sample. However, estimation output reported by column (2.2) in Table 2 shows that the effect of attention on US net purchases of foreign stocks becomes even larger in magnitude once the financial crisis is omitted. Columns (2.1) and (2.2) show that investor attention is negatively correlated with US investors' net purchases of foreign stocks. In columns (2.3) and (2.4), using two-stage least squares, we test whether the attention Americans allocate towards foreign markets causally leads to US investors' net sales of foreign stocks. Following Mondria et al (2010), we use the number of World Heritage cultural sites, natural sites, and mixed sites within a country as an instrumental variable for the attention US investors pay to financial information about this country. Pass et al (2006) divide search queries into 18 categories. After eliminating 4 out of 18 categories that are potentially associated with asset holdings ("Research", "Business", "News", and "Finance"), we use the category of "Places", which is a popular search category, as an instrumental variable. The number of World Heritage sites, which varies both across countries and over time, is an indicator of a country's popularity in

[22] According to the classification by NBER's Business Cycle Dating Committee, the Great Recession started in December 2007 and ended in June 2009.

search queries for "Places". Column (2.3) shows the results of the first-stage regression. The coefficient of World Heritage sites is negative and statistically significant: a 10% increase in the number of World Heritage sites is associated with a 5.57% decrease in attention Americans allocate to a foreign equity market. World Heritage sites and financial information represent two different search topics and are competing for limited investor attention. Column (2.4) tabulates the causal effect of attention on US investors' purchase of foreign stocks, when using the number of World Heritage sites as an instrumental variable for attention. The attention allocation yields a negative and statistically significant coefficient: a 10% increase in the attention Americans allocate to a foreign equity market is associated with a US$ 124.6 million decrease in US net purchases of that market's stocks.

4.2 Predicted versus Unpredicted Attention

Contrary to empirical evidence documented in finance and international finance, our initial regressions suggest that attention allocation has a negative and significant effect on US purchases of foreign stocks. Our first step to better understand such surprising results is to isolate the familiarity channel. Portes and Rey (2005), Mondria and Wu (2010), and Mondria and Wu (2013) show that familiarity – proxied by geography – induces attention, which, in turn, is positive for holdings of foreign equities.

Column (3.1) in Table 3 reports estimation output of the gravity model for attention allocation. It is interesting to note that the estimated coefficients reinforce previous results documenting the influence of geography in attention allocation. Our two proxies for cultural proximity are statistically significant: a 100% increase in geographical distance leads to a reduction in attention of 19.5%; English-speaking countries tend to attract 8% more attention than non-English speaking countries. The measure of economic mass is also statistically significant: a 10% increase in market capitalization increases attention by 2.17% .

[Insert Table 3 about here]

Once we verify that familiarity breeds attention, we move on to test whether familiarity-induced attention leads to US purchases of foreign equities. First, we use the fitted-values of

regression (2) as a proxy for the familiar component of attention, which is predicted by gravity variables and the residuals as a proxy for the unpredicted and surprising part of attention. Then, we estimate equation (3), in which both components of attention (predicted and unpredicted) are included as independent determinants of US net purchases of foreign stocks. Column (3.2) in Table 3 confirms that familiarity-induced attention does have a positive effect on holdings of foreign equity: a 10% increase in predicted attention increases US purchases of foreign stocks by US$ 141.1 million. In contrast, unpredicted attention has a negative effect on holdings of foreign equity: a 10% increase in unpredicted attention increases US sales of foreign stocks by US$ 100.8 million. The results also suggest that stock market volatility has a negative and statistically significant effect on US net purchases of foreign stocks. Then, the remaining question is: what determines the unpredicted part of attention, and why does it have a negative effect on US purchases of foreign equities?

5 Attention Allocation and Economic Surprises

Our evidence that unpredicted attention leads to selling pressures in international stock markets seems to disagree with the findings of Barber and Odean (2008), Fang and Peress (2009), Da et al (2011), and Cziraki et al (2018) in which surprising events (for instance, extreme returns or abnormal trading volume) induce buying pressures in US stocks. One possible explanation for this apparent contradiction is that the bits of information economic agents process from local and non-local markets are qualitatively different. In this section, we test this hypothesis by studying the determinants of US attention allocation, with a special focus on potential distinctions in the reactions to good and bad economic news.

5.1 Asymmetric Responses to Economic Surprises

Equation (4) describes the attention allocated by Americans towards nine foreign stock markets as a function of economic surprises and a set of gravity variables capturing cultural proximity and economic size. Column (4.1) in Table 4 presents the estimation output using

weekly data from the first week of 2006 to the last week of 2017.[23] Once again, estimated coefficients associated with the gravity variables underline the influence of geography in attention allocation. Both of the proxies for cultural proximity are statistically significant at the 1% level, and their signs confirm that familiarity breeds attention: a 100% increase in the distance between a country's national capital and Washington, DC leads to a 20.2% decrease in attention; and countries which share the same language (English) with the US receive 18.5% more attention from Americans. Additionally, the measure of economic mass is not statistically significant.

[Insert Table 4 about here]

Secondly, column (4.1) reveals that country-specific economic surprises also affect the attention Americans allocate towards that country's stocks. Particularly, the estimated coefficient associated with squared surprises is positive and statistically significant at the 5% level. Column (4.2) in Table 4 re-estimates equation (4) but excludes the Great Recession from the sample.[24] The estimated coefficient associated with squared surprises is positive and statistically significant at the 1% level. Hence, the effects of surprises on investor attention are not driven by the inclusion of the Great Recession.

[Insert Table 5 about here]

In Table 5, Panel A presents the estimation outputs of equations (5) and (6), which take into account potential asymmetries in the responses to positive versus negative surprises. Column (5.1) estimates separate semi-elasticities of attention with respect to squared positive and negative surprises, as described by equation (5) and finds that the coefficient of squared negative surprises is 112.5% larger than the one of squared positive surprises. The coefficient of squared negative surprises is significant at the 10% level, while the coefficient of squared positive surprises is not significant. This result suggests that Americans pay more attention to bad news than good news. A more detailed picture is painted by column (5.2), which

[23]Note that in this section, we are able to estimate our model using a higher frequency (weekly rather than monthly) since we are not including US purchases of foreign stocks in the regressions.

[24]The results are similar when we just exclude the year 2008 from our sample.

not only separates the responses to squared positive and negative surprises, but also allows distance to affect the magnitude of each individual semi-elasticity, as formalized in equation (6). First, ignoring the interaction terms, we find that the semi-elasticity of squared positive surprises is larger than that of squared negative surprises. Second, the coefficient associated with the interaction between squared negative surprises and distance is not statistically significant, which implies that the attention Americans allocate to different stock markets responds uniformly to bad news, regardless of the country from which the economic news originates. Third, contrary to what is observed for bad news, an increase in distance, or equivalently, a reduction in cultural proximity, does dampen the reaction to good news.

Based on the regression results in Panel A, we calculate individual countries' semi-elasticities of attention with respect to positive and negative surprises and present the results in Panel B. For the semi-elasticity of attention with respect to positive surprises, only the semi-elasticities of Canada and the United Kingdom are significant at the 5% level. For the semi-elasticity of attention with respect to negative surprises, the semi-elasticities of all the countries excluding Canada are significant at the 5% level.

[Insert Figure 3 about here]

To help visualize the practical lessons that such results entail, Figure 3 presents the individual semi-elasticities of the attention Americans allocate to country i with respect to both positive and negative surprises originating from country i, which is calculated based on the estimation output of column (5.2). Blue columns refer to reactions to positive surprises and red columns to negative surprises. Transparent (non-solid) colors denote that the individual semi-elasticity is not statistically significantly different from zero at the 5% significance level. It is clear from Figure 3 that an increase in the attention Americans allocate to different equity markets reflects different combinations between good and bad news. Americans tend to process more information about good news than bad news in Canada, a country which is geographically and culturally closer to the US But in all other non-local markets located in Europe and Asia Pacific, bad news attracts more attention from Americans than good news.

5.2 Robustness Checks

One concern we have with the empirical evidence obtained in the previous section is that the distinction between US and non-US markets might be driving all results. In other words, the only relevant information is whether a market is domestic or foreign. The most straightforward way to formally test this alternative hypothesis is by re-estimating all equations with a sample which includes the US. In other words, we analyze the attention Americans allocate to both local and foreign equity markets and how it responds to surprises arising from those economies.

[Insert Tables 6 and 7 about here]

The estimation output presented in Tables 6 and 7 rejects this alternative hypothesis. When we re-estimate our empirical model including the US from the sample, our main conclusions remain. Column (6.1) reinforces that squared economic surprises do affect attention allocation and that increases in cultural proximity also increase attention. Column (6.2) confirms the results in column (6.1) when excluding the Great Recession. In Table 7, column (7.1) shows once again that, on average, negative surprises are more important than positive surprises. The coefficient of negative surprises is 32.5% larger than that of positive surprises. Panel B shows that for the semi-elasticity of attention with respect to positive surprises, the semi-elasticities of Japan, China, New Zealand, and Australia are not significant at the 5% level; for the semi-elasticity of attention with respect to negative surprises, the semi-elasticity of the United States is the only one not significant at the 5% level.

[Insert Figure 4 about here]

Finally, Figure 4 presents the individual semi-elasticities of Americans' attention towards each country's stock market with respect to economic news originating in those countries, based on the estimation output reported in Column (7.2). When we include the US from the sample, our main results still hold: In their own local market, Americans tend to process much more information about good news rather than bad news. In Canada, a non-local market that is nonetheless culturally similar to the US, Americans tend to process moderately more

information about good than bad news. Finally, in other non-local markets located in Europe and Asia Pacific, Americans tend to process more information about bad news rather than good news.

[Insert Figure 5 about here]

We entertain one last possible explanation for the statistically significant dampening effect of distance on the semi-elasticity of attention with respect to economic surprises. If a country's geographical location relative to the US somehow relates to the size of its stock market, then it could be the case that it is not cultural proximity that matters, but how influential a stock market is to the world economy. Figure 5 presents the scatter plot of distance between each foreign county's national capital and Washington, DC (on the horizontal axis) against market capitalization in 2017 (on the vertical axis). Canada, the closest economy, has about an average size stock market. In Europe, we find large markets, such as the United Kingdom, but also small ones, such as Norway and Sweden. A similar pattern is found in Asia Pacific, which includes large markets, such as China and Japan, but also small ones, such as Australia and New Zealand. In a nutshell, distance is a proxy for cultural proximity rather than market capitalization.

6 Conclusion

In this paper, we construct a measure of Americans' revealed attention towards domestic and foreign stocks based on Google SVI for queries that lead users to real-time financial information from those markets. Contrary to what has been documented by the finance and international finance literature, our initial regressions suggest that an increase in the attention Americans allocate to foreign equity markets is associated with an increase in US sales of foreign stocks.

In order to understand our puzzling results, we estimate a gravity model for our attention allocation variable and calculate two new series: the fitted-values (the part of attention that is predicted by geography) and the residuals (the unpredicted part). Since gravity variables proxy for cultural proximity and information costs, we conclude that the predicted part of

attention is its familiarity-induced component. Moreover, we show that economic surprise indices help explain the variation of unpredicted attention, allowing us to interpret it as the surprise-induced component of attention. Then, we reassess the influence of attention on US purchases of foreign stocks by including both components as separate regressors and find that familiarity-induced attention has a positive effect, while surprise-induced attention has a negative effect.

Finally, we report evidence that an increase in the attention Americans allocate to different equity markets reflects different combinations between good and bad news, depending on their familiarity level with those markets. In their own local market, Americans tend to process more information about good news rather than bad news. In Canada, a foreign market that is nonetheless culturally similar to the US, Americans also tend to process more information about good news than bad news. In the other non-local markets located in Europe and Asia Pacific, Americans tend to process more information about bad news rather than good news.

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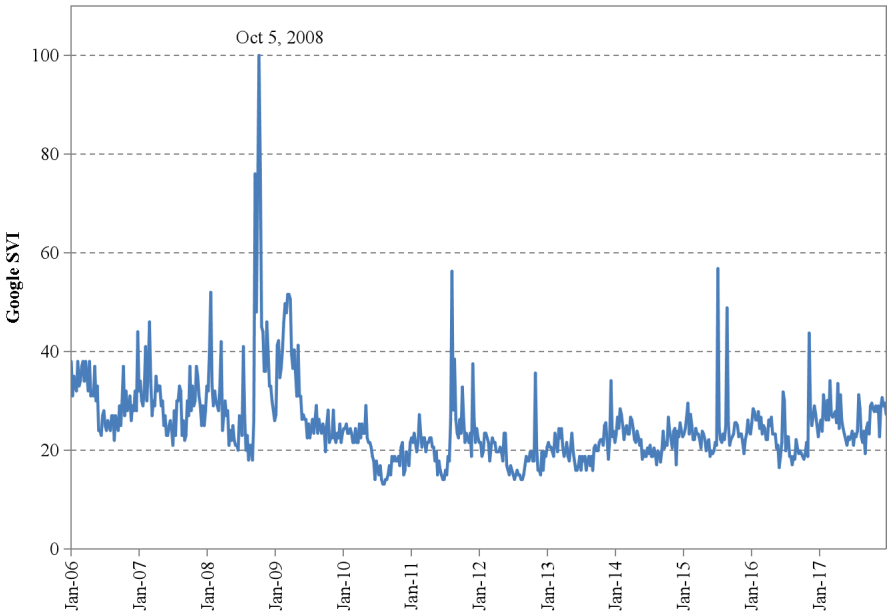
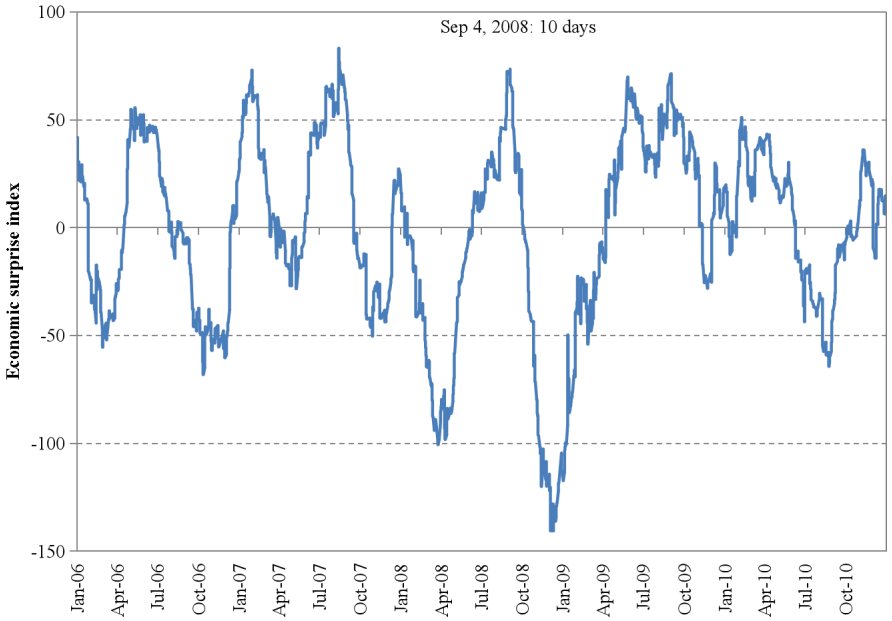
Figure 1: Evolution of the Google SVI for the United States



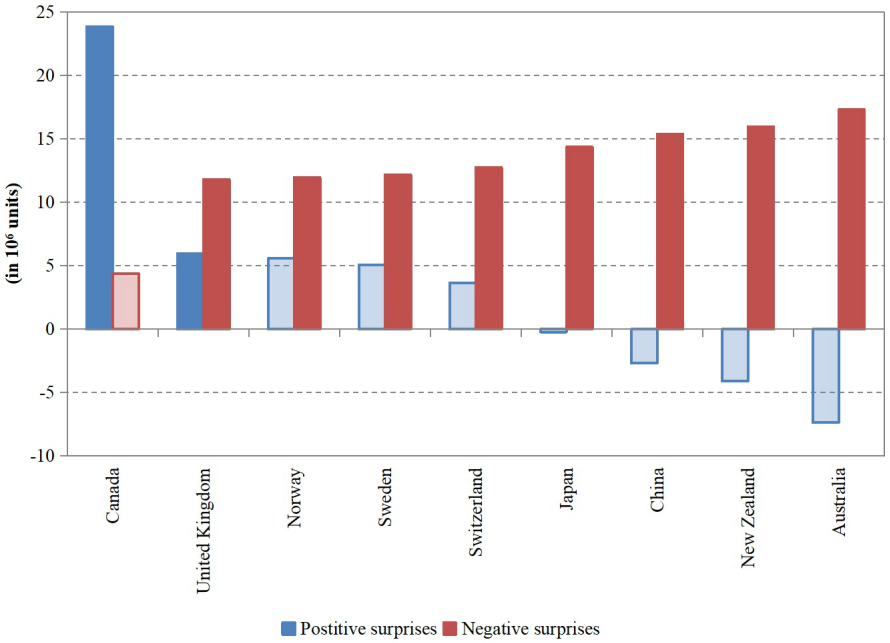
Note: This figure shows the weekly evolution of the Google SVI for the US from January 2006 to December 2017. The Google SVI reaches its highest value of 100 in the week ending on October 5, 2008.

Figure 2: Evolution of economic surprise index for the United States



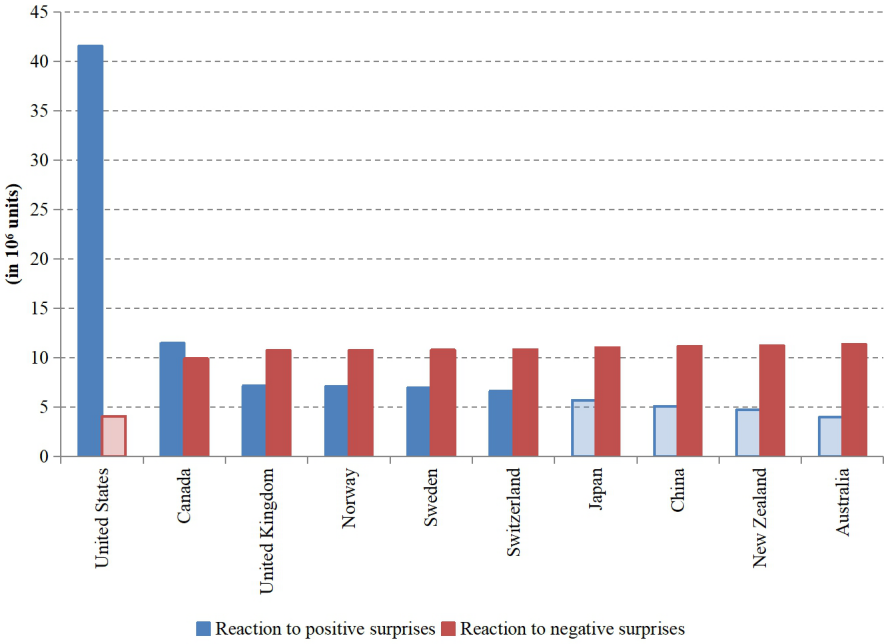
Note: This figure shows daily evolution of economic surprise index from January 2006 to December 2010. Positive values of economic surprise index denote stronger than expected economic activity. The economic surprise index suffers a sharp drop that starts 10 days before the bankruptcy of Lehman Brothers and lasts for roughly a quarter. The economic surprise index is downloaded from Citigroup.

Figure 3: Magnitude of reaction to positive versus negative surprises by country



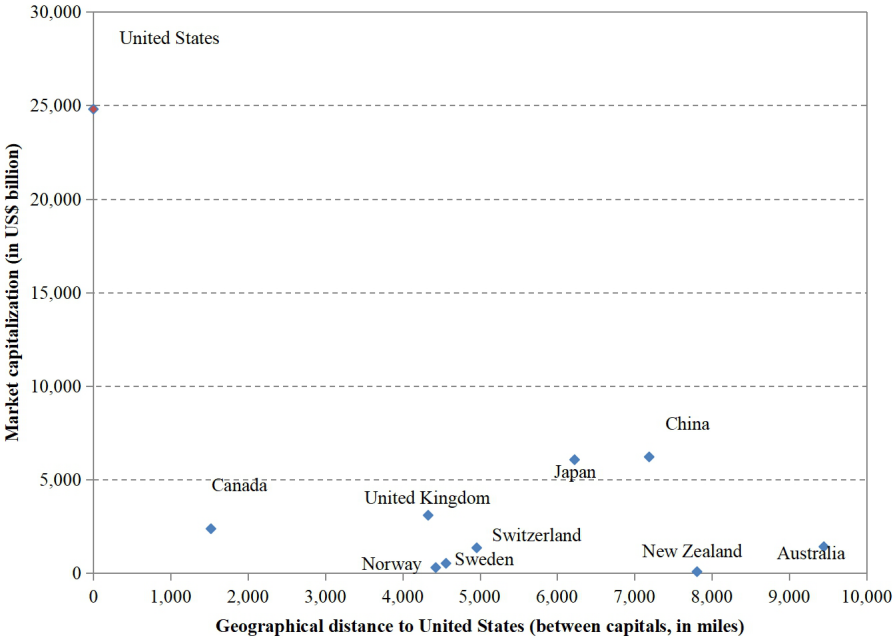
Note: This figure presents the individual semi-elasticities of Americans' attention towards each country's stock market with respect to economic news originating in these countries. Blue (red) columns refer to individual countries' semi-elasticity of attention with respect to positive (negative) surprises based on estimation output presented in Table 5. Non-solid colors denote that the height of the column is not statistically significantly different from zero at the 5% significance level.

Figure 4: Robustness check: Magnitude of reaction to positive versus negative surprises by country, estimated including the United States



Note: This figure presents the individual semi-elasticities of Americans' attention towards each country's stock market with respect to economic news originating in these countries when including the US. Blue (red) columns refer to individual countries' semi-elasticity of attention with respect to positive (negative) surprises based on estimation output presented in Table 7. Non-solid colors denote that the height of the column is not statistically significantly different from zero at the 5% significance level.

Figure 5: Market capitalization in 2017 versus geographical distance between country's national capital and Washington, DC



Note: This figure presents the scatter plot of distance between each foreign country's national capital and Washington, DC (on the horizontal axis) against this country's market capitalization in 2017 (on the vertical axis).

Table 1: Summary statistics

	Attention allocation (Google SVI)				Economic surprise index				US net purchases of foreign stocks			
Country	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Mean**	**Std. Dev.**	**Min**	**Max**
Australia	21.65	14.58	0.00	88.21	1.23	41.44	-106.86	92.80	0.26	0.63	-1.85	1.85
Canada	25.58	12.12	6.39	100.00	9.27	48.81	-213.30	137.72	0.26	1.32	-3.23	4.38
China	25.45	35.13	0.00	293.25	8.93	48.08	-132.03	151.62	0.06	0.60	-1.20	5.09
Japan	9.51	7.27	0.00	65.00	-2.65	35.53	-95.88	87.92	0.57	2.29	-7.38	7.21
New Zealand	13.95	13.93	0.00	100.00	3.58	38.48	-96.54	102.18	0.00	0.06	-0.38	0.16
Norway	16.60	21.81	0.00	117.12	3.02	55.95	-137.24	154.70	-0.07	0.26	-0.84	0.74
Sweden	2.78	7.85	0.00	78.00	2.08	42.52	-106.86	92.80	-0.01	0.59	-3.05	2.32
Switzerland	15.56	12.89	0.00	100.00	6.49	63.42	-214.62	188.42	-0.05	0.53	-2.21	1.29
United Kingdom	18.63	19.19	0.00	132.44	8.62	40.95	-78.88	148.64	2.99	5.53	-18.23	17.79
United States	26.54	8.36	13.13	100.00	0.12	41.71	-132.03	83.22	-	-	-	-
All countries	**17.62**	**18.72**	**0.00**	**293.25**	**4.07**	**46.54**	**-214.62**	**188.42**	**0.44**	**2.27**	**-18.23**	**17.79**

Note: This table reports the time-series summary statistics for individual countries and the panel summary statistics for the whole sample. US purchases of foreign stocks are measured in US$ billion. Sources: Google Trends, Citigroup, and Treasury International Capital (TIC) System.

Table 2: Effect of attention on following period's US net purchases of foreign stocks

Dependent variable:	US net purchases of foreign stocks (2.1)	US net purchases of foreign stocks (2.2)	attention (2.3)	US net purchases of foreign stocks (2.4)
attention	-0.942***	-1.081***	-	-1.246***
	(0.238)	(0.238)	-	(0.311)
stock market return	- 2.032	-1.751	-0.587	-2.400
	(1.461)	(1.815)	(0.535)	(1.543)
stock market volatility	0.969	8.625	18.773***	-9.902
	(11.648)	(18.961)	(6.576)	(15.006)
distance	-0.174***	-0.194***	-0.166***	-0.236***
	(0.076)	(0.065)	(0.032)	(0.088)
language	1.041***	1.096***	0.068	1.018***
	(0.219)	(0.240)	(0.043)	(0.213)
market capitalization	0.593***	0.660***	0.570***	0.654***
	(0.189)	(0.211)	(0.040)	(0.197)
world heritage sites	-	-	-0.557***	-
	-	-	(0.025)	-
Sample period	Full sample (2006 to 2017)	Excluding the Great Recession	Full sample (2006 to 2017)	Full sample (2006 to 2017)
Observations	1,214	1,044	1,223	1,214
R-squared	19.0%	19.1%	47.4%	20.4%

Note: This table shows the effects of attention allocation on US net purchases of foreign stocks in the next month. In columns (2.1) and (2.2), we run OLS regressions with panel data. In columns (2.3) and (2.4), we use the number of World Heritage sites as an instrumental variable for investor attention. Regressions also include monthly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the monthly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, market capitalization, and world heritage sites.

Table 3: Gravity model for attention allocation and effect of predicted and unpredicted attention on following period's US net purchases of foreign stocks

Dependent variable:	attention	US net purchases of foreign stocks
	(3.1)	(3.2)
predicted attention	-	1.411***
	-	(0.393)
unpredicted attention	-	-1.008***
	-	(0.249)
stock market return	-	-2.450
	-	(1.528)
stock market volatility	-	-46.256***
	-	(15.507)
distance	-0.195***	-
	(0.032)	-
language	0.080***	-
	(0.029)	-
market capitalization	0.217***	-
	(0.049)	-
Observations	1,223	1,214
R-squared	7.3%	17.4%

Note: This table decomposes attention allocation into two components, the familiar and the surprising, with opposite implications for US purchases of foreign stocks. Regression (3.2) also includes monthly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the monthly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, predicted attention, unpredicted attention, (one plus) distance, and market capitalization.

Table 4: Effect of economic surprise on investor attention

Dependent variable:	attention (4.1)	attention (4.2)
surprises	0.088**	0.156***
	(0.037)	(0.056)
distance	-0.202***	-0.212***
	(0.017)	(0.018)
language	0.185***	0.157***
	(0.034)	(0.037)
market capitalization	-0.062	-0.109**
	(0.045)	(0.050)
Sample period	Full sample (2006 to 2017)	Excluding the Great Recession
Observations	4,655	4,078
R-squared	22.6%	21.5%

Note: This table reports the effects of economic surprises on investor attention. In column (4.1), the full sample period is from January 2006 to December 2017. In column (4.2), we exclude the Great Recession from the full sample. Regressions also include weekly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, and market capitalization.

Table 5: Effects of positive versus negative surprises and interaction with distance

Panel A: Regression Results

Dependent variable:	attention (5.1)	attention (5.2)
positive surprises	0.056	1.491***
	(0.045)	(0.540)
(positive surprises)*distance	-	-0.171**
	-	(0.066)
negative surprises	0.119*	-0.474
	(0.065)	(0.530)
(negative surprises)*distance	-	0.071
	-	(0.070)
distance	-0.203***	-0.186***
	(0.017)	(0.019)
language	0.185***	0.183***
	(0.034)	(0.034)
market capitalization	-0.062	- 0.059
	(0.045)	(0.045)
Observations	4,655	4,655
R-squared	22.6%	22.8%

Panel B: F-tests

Country name	Positive surprises	Negative surprises
Canada	23.87***	4.41
United Kingdom	5.98**	11.81***
Norway	5.60*	11.96***
Sweden	5.09*	12.17***
Switzerland	3.67	12.76***
Japan	-0.22	14.37***
China	-2.69	15.39**
New Zealand	-4.10	15.97**
Australia	-7.36	17.32**

Note: This table estimates separate semi-elasticities of attention with respect to squared positive and negative economic surprises. Panel A shows the regression results. In column (5.2), we add interactions between squared positive and negative surprises with distance. Regressions also include weekly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, and market capitalization. In Panel B, we calculate individual countries' semi-elasticity of attention with respect to positive and negative surprises based on the regression results in Panel A. For each country, we perform an F-test to determine whether the semi-elasticity is statistically significant. The symbols "*", "**", and "***" denote that the individual semi-elasticity is statistically significant at the 10%, 5%, and 1% significance level, respectively.

Table 6: Robustness check: Effect of economic surprise on investor attention including the United States

Dependent variable:	attention (6.1)	attention (6.2)
surprises	0.090**	0.161***
	(0.036)	(0.054)
distance	-0.050***	-0.052***
	(0.004)	(0.004)
language	0.211***	0.184***
	(0.033)	(0.036)
market capitalization	-0.011	-0.052
	(0.042)	(0.047)
Sample period	Full sample (2006 to 2017)	Excluding the Great Recession
Observations	5,281	4,622
R-squared	25.1%	23.4%

Note: This table shows the effects of economic surprises on investor attention when including the US. Regressions also include weekly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, and market capitalization.

Table 7: Robustness check: Effects of positive versus negative surprises and interaction with distance including the United States

Panel A: Regression Results

Dependent variable:	attention (7.1)	attention (7.2)
positive surprises	0.077*	0.416***
	(0.046)	(0.157)
(positive surprises)*distance	-	-0.041**
	-	(0.020)
negative surprises	0.102*	0.041
	(0.058)	(0.073)
(negative surprises)*distance	-	0.008
	-	(0.013)
distance	-0.050***	-0.047***
	(0.004)	(0.005)
language	0.212***	0.211***
	(0.033)	(0.033)
market capitalization	-0.011	- 0.011
	(0.042)	(0.042)
Observations	5,281	5,281
R-squared	25.1%	25.2%

Panel B: F-tests

Country name	Positive surprises	Negative surprises
United States	41.56***	4.05
Canada	11.46***	9.90***
United Kingdom	7.16**	10.73**
Norway	7.07**	10.75**
Sweden	6.95**	10.77**
Switzerland	6.60**	10.84**
Japan	5.67*	11.02**
China	5.08	11.14**
New Zealand	4.74	11.20**
Australia	3.96	11.35**

Note: This table estimates the asymmetric effects of positive and negative surprises on attention when including the US. In Panel A, regressions also include weekly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, and market capitalization. In Panel B, we calculate individual countries' semi-elasticities of attention with respect to positive and negative surprises based on the regression results in Panel A. For each country, we perform an F-test to determine whether the semi-elasticity is statistically significant. The symbols "*", "**", and "***" denote that the individual semi-elasticity is statistically significant at the 10%, 5%, and 1% significance level, respectively.

Appendix

Table A1: Effect of attention on following period's US net purchases of foreign stocks

Dependent variable:	US net purchases of foreign stocks (1.1)	US net purchases of foreign stocks (1.2)
attention	-0.908***	-1.085***
	(0.188)	(0.192)
stock market return	- 0.867	-0.173
	(2.507)	(3.053)
stock market volatility	0.837	22.506
	(18.673)	(27.734)
distance	-0.201***	-0.210***
	(0.076)	(0.079)
language	0.816***	0.858***
	(0.143)	(0.158)
quarterly GDP	0.236***	0.272***
	(0.070)	(0.081)
Sample period	Full sample (2006 to 2017)	Excluding the Great Recession
Observations	1,071	921
R-squared	20.9%	21.5%

Note: This table shows the effects of attention allocation on US net purchases of foreign stocks in the next month. In this table, we use quarterly GDP to measure economic size. Regressions also include monthly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the monthly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, and quarterly GDP.

Table A2: Gravity model for attention allocation and effect of predicted and unpredicted attention on following period's US net purchases of foreign stocks

Dependent variable:	attention	US net purchases of foreign stocks
	(2.1)	(2.2)
predicted attention	-	2.941***
	-	(0.641)
unpredicted attention	-	-0.599**
	-	(0.262)
stock market return	-	-1.558
	-	(1.560)
stock market volatility	-	15.487
	-	(10.989)
distance	-0.184***	-
	(0.017)	-
language	0.183***	-
	(0.034)	-
market capitalization	0.007	-
	(0.044)	-
Observations	4,655	1,211
R-squared	3.9%	15.7%

Note: This table decomposes attention allocation into two components, the familiar and the surprising, with opposite implications for US purchases of foreign stocks. We first estimate gravity equations with weekly-level data in column (2.1) and then average residuals and fitted values from gravity equations at the monthly basis in column (2.2). Regression (2.2) also includes monthly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level in column (2.1) and monthly level in column (2.2). The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, predicted attention, unpredicted attention, (one plus) distance, and market capitalization.

Table A3: Gravity model for attention allocation and effect of predicted and unpredicted attention on following period's US net purchases of foreign stocks

Dependent variable:	attention	US net purchases of foreign stocks	US net purchases of foreign stocks
	(3.1)	(3.2)	(3.3)
predicted attention	-	1.411***	1.478***
	-	(0.393)	(0.424)
unpredicted attention	-	-1.008***	-1.150***
	-	(0.249)	(0.251)
stock market return	-	-2.450	-1.893
	-	(1.528)	(1.922)
stock market volatility	-	-46.256***	-53.648**
	-	(15.507)	(21.568)
distance	-0.195***	-	-
	(0.032)	-	-
language	0.080***	-	-
	(0.029)	-	-
market capitalization	0.217***	-	-
	(0.049)	-	-
Sample period	Full sample (2006 to 2017)	Full sample (2006 to 2017)	Excluding the Great Recession
Observations	1,223	1,214	1,044
R-squared	7.3%	17.4%	17.6%

Note: This table decomposes attention allocation into two components, the familiar and the surprising, with opposite implications for US purchases of foreign stocks. In columns (3.1) and (3.2), we include the full sample; in column (3.3), we exclude the Great Recession. Regressions (3.2) and (3.3) also include monthly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the monthly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, predicted attention, unpredicted attention, (one plus) distance, and market capitalization.

Table A4: Effect of attention on following period's US net purchases of foreign stocks

Dependent variable:	US net purchases of foreign stocks (4.1)	US net purchases of foreign stocks (4.2)
attention	-0.453***	-0.492***
	(0.157)	(0.167)
stock market return	0.048	0.078
	(1.344)	(1.623)
stock market volatility	47.986***	70.997***
	(12.256)	(17.997)
distance	-0.038	-0.052
	(0.060)	(0.061)
language	1.253***	1.346***
	(0.206)	(0.231)
market capitalization	0.380***	0.370***
	(0.090)	(0.094)
Sample period	Full sample (2006 to 2017)	Excluding the Great Recession
Observations	4,647	4,070
R-squared	17.5%	16.8%

Note: This table shows the effects of attention allocation on US net purchases of foreign stocks in the next period. The key variable of interest, attention, is at the weekly frequency. In columns (4.1) and (4.2), we run OLS regressions with panel data. Regressions also include weekly time effects, which are not reported in the table. The standard errors are computed with a Newey-West correction with 4 lags and clustered at the weekly level. The symbols "*", "**", and "***" denote that the individual coefficient is statistically significant at the 10%, 5%, and 1% significance level, respectively. The following variables are in natural logs: attention, (one plus) distance, and market capitalization.