Foreign economic policy uncertainty and U.S. equity returns

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First draft: June 2024
This draft: September 2024

Abstract

We document that foreign economic policy uncertainty (EPU^F) has significant incremental predictive power for excess U.S. stock returns in the presence of domestic EPU, both in aggregate and for returns of portfolios constructed on firm characteristics, for 6 to 12-months-ahead horizons. We find that EPU^F shocks primarily transmit to equity prices through cash flow news rather than the discount rate news channel. We examine whether responses of select macro-financial variables to an adverse EPU^F shock are consistent with this transmission mechanism. Corporate investment outlays, payouts, and aggregate credit demand decline in response to such a shock.

JEL Classification: G11, G12, C13, E20, E30.

Keywords: Economic policy uncertainty, Cash flows, Discount rates, ICAPM, Return predictability, Transmission channels.

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1 Introduction

Seminal studies of Bloom (2009), Basu and Bundick (2017), and Baker, Bloom and Davis (2016) establish that economic uncertainty in general and economic policy uncertainty (EPU)–uncertainty about fiscal, monetary, regulatory and other economic policies–in particular, affect real economic decisions, including firms' investment and hiring plans. Subsequently, Pástor and Veronesi (2012, 2013) and Brogaard and Detzel (2015) show that EPU predicts broad equity market index returns in the United States.[1] In addition, the latter study argues that EPU predictability operates through the discount-rate channel.

At the same time, the cross-country interactions of economic policy uncertainty and equity prices have received limited attention in academic literature, even as (1) the economies, financial markets, and businesses have been becoming increasingly interconnected (Demirer, Diebold, Liu and Yilmaz, 2018 and Candelon, Ferrara and Joëts, 2021),[2] (2) measures of economic activity, financial market volatility, and economic policy uncertainty across countries exhibit notable co-movement (Table 1), and (3) financial press, market analysts, and firm earnings call reports frequently cite uncertainty about economic conditions and policies abroad as affecting performance of the domestic equity returns and markets. For example, Hassan, Schreger, Schwedeler and Tahoun (2024) document that U.S.-based companies frequently discuss country risks originating from Brazil, Canada, China, Japan, and Mexico, based on textual analysis of their earnings calls. This paper closes the important but so far neglected gap in research on the relationship between economic policy uncertainty and equity markets by investigating whether foreign EPU (EPU^F) helps explain future excess equity returns in the U.S., as well as the channels through which EPU^F shocks transmit to the U.S. stock returns.

In particular, we ask (1) whether EPU^F predicts various measures of aggregate equity returns in the U.S.; (2) how the predictive ability of EPU^F differs across returns of equity portfolios formed on firm characteristics that may affect returns sensitivity to foreign EPU (to better understand sources of aggregate predictability); (3) whether EPU^F shocks transmit to equity prices through cash-flow or discount-rate channels; (4) what the responses of select financial and macro variables to EPU^F shocks shed additional light on the transmission of EPU^F shocks to U.S. stock prices.

To construct a proxy for foreign economic policy uncertainty, we turn to the widely-used global EPU measure of Baker et al. (2016), which is based on news article counts in 21 countries, including the United States. Global EPU reflects perceived uncertainty about what economic policies will be implemented, who will implement the policy and when, and what impact the policy in question will have. To obtain the foreign EPU measure, we strip the U.S. component from the global EPU

[1] Brogaard and Detzel (2015) also demonstrate that EPU commands a risk premium in the cross-section of returns.
[2] Note that trade in goods and services (exports plus imports) accounted for about 27% of the United States GDP in 2018, up from about 9.2% and 20% in 1960 and 1980, respectively.

by orthogonalizing global EPU (EPU^G) with respect to its U.S. counterpart (EPU^{US}).

We then investigate whether the constructed EPU^F measure has incremental predictive power for expected U.S. equity returns in the presence of EPU^{US} and other control variables. We find that EPU^F predicts U.S. stock index returns at horizons between 9 to 12 months ahead. For returns of portfolios formed on firm characteristics, we find that these predictive effects are concentrated in companies that are typically larger, acquire more assets, have higher capital expenditures, and have higher foreign exposure than their peers. On balance, we observe that EPU^F predicts longer-horizon U.S. returns compared to EPU^{US}, predictive power of which is concentrated for horizons less than six months. This is consistent with the delayed reaction mechanism (e.g. Hong and Stein, 1999), with information from abroad taking longer to diffuse to U.S. equity markets compared to domestic information.

We next show that foreign EPU primarily affects the cash flow news component of the U.S. equity returns, contributing to the debate on whether discount rate or expected cash flow news drive equity prices (see Bianchi, Lettau and Ludvigson, 2022, Chen, Da and Zhao, 2013, and Cochrane, 2011). This finding is intuitive. It is less likely that changes in economic policy uncertainty abroad materially and consistently affect monetary policy, policy rates, and discount rates in the United States. On the other hand, domestic firms with material foreign exposure are likely to adjust their investment projects following the arrival of adverse foreign EPU news. These adjustments may lead to lower future cash flows from successful projects and, as a result, lower future payouts to shareholders. We provide additional evidence consistent with this potential transmission mechanism by studying responses to such shocks of U.S. financial and macro variables that either affect or are affected by discount rates and future cash flows. We find that foreign EPU shocks appear to induce precautionary delays in demand for credit and capital expenditure. That is, after the arrival of an EPU^F shock, in aggregate, firms reduce dividend distributions, as well as borrow and invest less.

Our study contributes to the literature on effects of economic policy uncertainty on the macroeconomy and financial markets. Most of the literature focuses on domestic implications of changes in U.S. EPU. Examples include Pástor and Veronesi (2012, 2013) and Brogaard and Detzel (2015), which focus on the relationship between U.S. EPU and expected excess returns, as well as Kaviani et al. (2020) and Bonaime et al. (2018), which document effects of U.S. policy uncertainty on credit spreads and mergers and acquisition activity, respectively. Cross-country EPU spillovers have received limited attention, with the existing studies mostly focusing on cross-country spillovers of EPU measures. (Klößner and Sekkel, 2014, Shin et al., 2018). In contrast, ours is the first study on the cross-border effects of EPU in equity markets, an important question in a world of increasingly interconnected economies and financial markets. In addition, we validate our findings on cross-country EPU spillovers in equity markets with results on spillovers to macro-financial variables. These results contribute to nascent literature on cross-border economic spillovers of economic uncertainty measures, whether at aggregate uncertainty level (Londono et al., forthcoming, Greenland et al., 2019) or at firm level as in Hassan, Schreger, Schwedeler and Tahoun (2024). In particular, Hassan et al. (2024) document the relationship between perceived country risks transmitted from abroad and domestic firm-level corporate decisions. Moreover, our findings regarding the inverse relation between EPU levels and investment and capital expenditure are in line with Gulen and Ion (2015).

By documenting that U.S. equities in aggregate are exposed to uncertainty spillovers from abroad, our findings also contribute to the growing literature on the cross-country interactions between political risk and financial markets. Examples include Boutchkova, Doshi, Durnev and Molchanov (2012) who study the relationship between national and foreign political risk and returns volatility, Kelly, Pástor and Veronesi (2016) who extract the political uncertainty protection embedded in options and find that the effects of political uncertainty spill over across countries, Kim (2019) studies the link between political uncertainty and financing costs using syndicated loan premiums. Brogaard, Dai, Ngo and Zhang (2020) find that political uncertainty measured by the United States election cycle spills over to equity prices abroad through the discount rate channel. It is intuitively plausible that political developments in the United States–as the largest and most significant global financial center–meaningfully transmit to other markets and affect investors' risk tolerance and discount rates. In contrast, our study formally tests the reverse relationship (spillovers from abroad to the U.S. equity market) and documents that the dominant transmission mechanism for spillovers from abroad is through cash flows. We also note that while political risk and EPU overlap, they measure different types of risk.

The rest of the paper proceeds as follows. We present our data, construction of foreign economic policy uncertainty measure, and the method of extraction of foreign EPU shocks in Section 2. We present aggregate index-level and portfolio returns predictability empirical findings in Section 3. Section 4 presents our findings regarding transmission channels of economic policy uncertainty shocks to financial and macroeconomic variables. Section 5 concludes.

2 Data

We use the global and the Unites States EPU measures provided by Baker, Bloom, and Davis for January 1997 to May 2021.[3] We use the 3-component index version of U.S. EPU (henceforth, EPU^{US}). This index is a weighted average of the news-based EPU (50%), tax-code expiration data, forecaster disagreement, and Federal/State/Local disagreement measures (each accounting for 1/6 of the remaining 50%). The global EPU index combines news article counts in 21 countries, including the United States, that account for about 75% of world output. EPU^{G} reflects perceived

[3] See https://www.policyuncertainty.com/index.html. While global EPU index is only available from January 1997, U.S. EPU is available for a longer period.

uncertainty about which economic policies will be implemented, who will implement the policy and when, and what impact the policy in question will have. It reflects uncertainty about a broad range of policies, including those by fiscal and monetary authorities, but also the potential economic effects of policies that are not traditionally viewed as economic, such as military actions. It is available in two versions: current price GDP-weighted and PPP-adjusted GDP-weighted. We use the current price GDP-weighted series. Our results are robust to using either measure. The series are scaled by 100, and then demeaned.

Well-known alternatives including economic uncertainty measures of Jurado et al. (2015) or Ludvigson et al. (2021), activity measures such as Aruoba et al. (2009), monetary policy uncertainty measure of Husted et al. (2020), or trade policy uncertainty of Caldara, Iacoviello, Molligo, Prestipino and Raffo (2020) are U.S.-specific and construction of a global version of these measures is beyond the scope of this study. Caldara and Iacoviello (2022) and Londono, Ma and Wilson (forthcoming) provide several country-specific indexes for their geopolitical risk and real economic uncertainty measures, respectively. However, while trade uncertainty, geopolitical risk, real economic uncertainty, and economic policy uncertainty are undoubtedly related, they capture different types of uncertainty.[4] Thus, we remain focused on EPU in this study.

We collect monthly data for equity returns, relevant financial and accounting quantities, pricing factors and firm characteristics in the universe of the U.S. publicly traded companies in the NYSE/AMEX/NASDAQ exchanges from the merged Center for Research in Security Prices (CRSP), Compustat, Capital IQ, and other resources from Wharton research data services (WRDS) between January 1997 and May 2021. We access other macroeconomic and financial variables from FRED database maintained by Federal Reserve Bank of St. Louis, and authors' websites (such as Kenneth French and Robert Shiller, among others).

We investigate the relationship between foreign EPU and U.S. equity returns in two steps; first using predictive regressions and then studying the responses of financial and macroeconomic quantities to foreign EPU shocks. The first step requires the construction of a proxy for foreign economic policy uncertainty. The second step requires extraction of foreign EPU shocks. We describe the methods for construction of foreign economic policy uncertainty and extraction of shocks next.

2.1 Construction and economic significance of foreign EPU

Given the size of the U.S. economy, the centrality of U.S. financial markets, and the position of the U.S. dollar as the global reserve currency, we must address the weight of U.S.-related news in the

[4] The sample correlations between Caldara et al. (2020) TPU index and EPU^{US} and EPU^{G} are 0.37 and 0.57, respectively, in our sample. These correlations for Caldara and Iacoviello (2022) GPR index and EPU^{US} and EPU^{G} are 0.50 and 0.74, and these quantities for Londono et al. (forthcoming) REU index and EPU^{US} and EPU^{G} are 0.31 and 0.35.

construction and dynamics of EPU^G. Klößner and Sekkel (2014) and Shin, Zhang, Zhong and Lee (2018) show that there are significant economic policy spillovers from the United States to other countries. In particular, they show that U.S. economic policy uncertainty news contaminate EPU measurement abroad. In Table 1, we report that EPU^{US} and EPU^G are highly correlated, with a coefficient of correlation about 0.80. Thus, using both EPU^G and EPU^{US} in predictive regressions of cumulative stock returns leads to correlated regressor problems. We orthogonalize EPU^G and EPU^{US} by fitting the following regression model to data to address these issues:[5]

$$EPU_t^G = \kappa_0 + \kappa_1 EPU_t^{US} + \nu_t. \tag{1}$$

We rename the OLS regression residuals, $\hat{\nu}_t$, from fitting equation (1) to data "foreign EPU" or EPU$_t^F$. This variable captures the variation in EPU^G that is, by construction, uncorrelated with EPU^{US} at time t, but have a coefficient of correlation equal to 0.59 with EPU^G. Thus, orthogonalization is necessary to disentangle the effects of global and U.S. economic policy uncertainties. Table 2 reports the summary statistics of these measures. The constructed EPU^F measure is intended to be similar (in statistical properties) but linearly uncorrelated to EPU^{US}, as shown in the table. We note that all three EPU measures are considerably less persistent than long-term asset pricing variables commonly used for explaining future excess stock returns in empirical studies. For example, the first, fifth, and tenth-order autocorrelation coefficients for S&P500 price-earnings (P/E) ratios are 0.98, 0.95, and 0.80, respectively. Throughout the paper, we use EPU^F and demeaned values of EPU^{US} in the analysis.

Figure 1 displays the three EPU measures. As mentioned earlier, U.S. and global EPU measures are highly correlated and track each other closely. As the residual from the statistical model in equation (1), EPU^F is positive valued when EPU^G is greater than its fitted value implied by EPU^{US} and equation 1, and negative-valued when the reverse holds. We observe a significant negative spike in EPU^F corresponding to September of 2001. EPU^F remained in negative territory for the better part of the Global Financial Crisis (GFC) period. Notable positive spikes in EPU^F include November 2011 (negative developments related to the Euro Area Crisis) and November 2016 (the United States presidential election). EPU^F remained in positive territory from 2018 through late 2020 as, among other factors, trade tensions between the United States and its major trading partners rose. The bottom left panel of Figure 1 reports the histogram of EPU^F.

In Table 3, we present the estimates of standardized linear regressions of EPU measures on commonly used economic state variables capturing economic conditions for the United States and euro area. We use standardized variables, thus, the magnitudes of estimated coefficients translate into a beta-standard-deviation in EPU for every standard-deviation change in the explanatory

[5] One could also use ridge regressions or other solutions.

variable, all else equal. The estimated model is

$$EPU_t^* = \gamma_c^* + \sum_{i=1}^{I}\sum_{j=0}^{J} \gamma_j^{i,*} X_{t-j}^i + e_t^*, \tag{2}$$

where EPU_t^* is one of the three EPU measures, X_{t-j}^i are contemporaneous and lagged standardized variables, and e_t^* are error terms. We include VIX and option-implied volatility for Euro STOXX 50 index (VSTOXX), the spread between 10-year and 1-year U.S. Treasury bond and German bund yields (Spread), the spread between U.S. BBB and AAA non-financial corporate bond yields (default spread or Def.), the smoothed log price-dividend ratios ($\log(P/D)$) for S&P500 and EURO STOXX 600 indexes. We also include Federal Reserve Bank of Chicago's national activity index (CFNAI) and log values of the Baltic Dry Index (BDI), a shipping freight-cost index that acts as a bellwether for international merchandise trade. Table 3 reports the estimated slope parameters, $\hat{\gamma}_j$s, and their Newey and West (1987) standard errors in a multivariate regression of equation (2).[6] We report U.S.- and euro-area specific estimation results in Panels A and B of Table 3, respectively.

We find that the estimated slope parameters, $\hat{\gamma}_j$ for contemporaneous and up to 3-months lagged values of VIX and VSTOXX for EPU^{US} are positive-valued and significant. Other estimated $\hat{\gamma}_j$ for EPU^{US} that are statistically different from zero include U.S. and euro-area P/D ratios, German spreads, CFNAI, the BDI (negative-valued), and U.S. Treasuries' spread (positive-valued). For EPU^{G} (the middle of Table 3), we find statistically significant $\hat{\gamma}_j$ for U.S. default spread, U.S. P/D ratios, German term spreads, the BDI (negative-valued), and VIX (positive-valued). The bottom panel of Table 3 reports estimated $\hat{\gamma}_j$ for EPU^{F}. These parameters are statistically significant for U.S. default spread, U.S. P/D, VIX, VSTOXX, German spreads, the BDI (negative-valued), and CFNAI and euro-area P/D (positive-valued).

The negative relationship of all EPU measures with the BDI index is interesting and informative: when trade intensity rises (recedes), both domestic and foreign EPU measures decline (rise). This finding validates the results reported by Londono, Ma and Wilson (forthcoming) who document the strength of trade ties as a cross-country transmission channel for economic uncertainty. Negative relationships with P/D ratios imply that EPU^{F} is high (low) when times are "bad" ("good") either in the U.S. or abroad. This countercyclical dynamics of EPU^{F} may be behind the measure's predictive power for the time-series of U.S. equity returns, which we document later in the paper.

2.2 Construction of foreign EPU shocks

In our analysis, we are interested in the response of macro-financial quantities to foreign economic policy uncertainty shocks. The goal is to compute impulse-response functions for variables of

[6] Univariate results are available, but not reported.

interest, conditional on the realization of a positive shock or a sequence of positive shocks to the uncertainty measure: when the level of the uncertainty measure rises unexpectedly. The constructed EPU^F is quite persistent. As shown in Table 2, the values of its first and tenth autocorrelation coefficients are 0.89 and 0.71, respectively. Thus, the moves in EPU^F level values, albeit sizeable, are not shocks. As a result, we must extract the desired shocks from the economic policy uncertainty indexes. We use the method described in Diercks, Hsu and Tamoni (2024) for this purpose. This shock extraction procedure echoes many elements of EPU^F construction.

To recover foreign EPU shocks, we fit the data using the following vector auto-regressive (VAR) specification:

$$Y_t = A_0 + A_1 Y_{t-1} + \varepsilon_t^Y, \tag{3}$$

where Y_t is the vector of time-series data used for a sequential (or Cholesky) decomposition, with the following ordering of variables: EPU^G index, EPU^{US} index, the log of the MSCI ACWI (excluding the United States) index, and the federal funds rate. A_0 is a vectors of constants, A_1 is a matrix of coefficients, and ε_t^Y is the shocks matrix. We choose the lag-lengths for all variables in Y_{t-1} based on the Akaike information criteria (AIC), and treat the first column vector in $\hat{\varepsilon}_t^Y (= Y_t - \hat{Y}_t)$ as EPU^F shocks.[7]

The international orientation of our exercise and data limitations force us to choose a different set of variables compared to Diercks et al. (2024). First, instead of S&P500 index, we use MSCI ACWI (excluding the United States) index to account for foreign equity price movements. Second, since we must account for correlations between global and U.S. policy uncertainty measures, in addition to EPU^G, we also include EPU^{US} in the procedure. Third, since global measures of macroeconomic quantities such as unemployment or industrial production are not available, we can not include them in the procedure. Finally, we include the federal funds rate as a measure of monetary policy in the United States and an influential factor in setting the global cost of capital (see Miranda-Agrippino and Rey, 2020). The right-hand panels in the middle and the bottom rows of Figure 1 display these shocks and their histogram, respectively.

3 Aggregate and portfolio excess returns predictability

Throughout this section, we discuss predictability of U.S. broad equity index returns and those of portfolios constructed based on certain financial or economic characteristics by foreign economic policy uncertainty measure discussed above. To this end, we fit the following statistical model to

[7] The order of Cholesky decomposition assumes no feedback from EPU^G to EPU^{US}, which could not always be the case. Therefore, the results shown later could be viewed as lower bounds for the effect of EPU^F shocks.

the data:

$$r^i_{t,t+k} = \alpha^i + \beta^i_1 EPU^F_t + \beta^i_2 EPU^{US}_t + \sum_{j=1}^{J} \phi^i_j Z^j_t + \varepsilon^i_{t,t+k}, \tag{4}$$

where $r^i_{t,t+k}$ are the cumulative excess returns of an equity index or (value weighted) stock portfolio between times t and $t+k$ (k assumes values between 1 and 12, implying one month to one year ahead predictions) over 1-month U.S. Treasury Bill rate (henceforth, referred to as "returns" for brevity)[8], EPU^F_t is constructed as in Section 2.1, and EPU^{US}_t is the demeaned U.S. EPU measure of Baker et al. (2016), Z^j_ts are control variables (discussed below), and finally $\varepsilon^i_{t,t+k}$ is an error term. Since economic policy uncertainty indexes are ultimately measures of risk, we expect that estimated slope parameters for EPU^F and EPU^{US} in equation (4), $\hat{\beta}^i_1$ and $\hat{\beta}^i_2$, to be positive valued, as in the conventional Merton (1973)-style risk-return trade off relationship. To avoid look-ahead bias, we construct foreign EPU measure at time t with data available only up to time t for each step of the analysis.

Similar to Brogaard and Detzel (2015), We include the following control variables: the NBER recession indicator, 10-year over 1-year U.S. Treasury bond spreads, BBB - AAA corporate bond spreads, Shiller's (log) cyclically-adjusted aggregate P/E (CAPE) ratios, monthly changes in VIX option-implied volatility index (ΔVIX), monthly growth rates of the industrial production index (ΔIP_t), and the CFNAI index.[9] We also include two of Fama and French (1992) three factors: size (SMB) and value premium (HML), since market factor (CRSP value-weighted returns) is one of our test variables. Finally, we include Jegadeesh and Titman (1993) "momentum" and Jegadeesh and Titman (1993) and Chan, Jegadeesh and Lakonishok (1996) "reversal" factors.

If all $\phi_j = 0$, then we only observe the predictive power and the ability of EPU measures in explaining returns' variation. With either β_1 or β_2 set to zero, the model gauges the predictive power of either EPU^{US} or EPU^F. Ideally, we expect ε^i_ts to be *i.i.d.* standard normal. However, this is almost never the case in empirical research. Regression residuals demonstrate notable serial correlation and heteroscedasticity. To address this problem and similar to Bali et al. (2017) and Golez and Koudijs (2018), among others, we compute Newey and West (1987) heteroscedasticity and serial correlation-consistent (HAC) standard errors for the estimated parameters.[10]

[8] This specification implies a holding period of one month, rolled over to the next.

[9] The CFNAI series does not have a time-trend component. Other option-implied measures for headline equity price indexes in major economies exist. These indexes tend to closely co-move with VIX, see Table 1. As a result, and to save space, we only report results based on VIX as an alternative aggregate volatility proxy in this study.

[10] Since EPU measures are less persistent than typical long-term pricing variables such as P/E or P/D ratios (Section 2.1), we believe that Newey and West (1987) corrections to standard errors are sufficient to address the issues that arise from using overlapping returns, generated variables, and serially correlated or heteroscedastic residuals in predictive regressions. As noted in Section 3.2, using bootstrapped standard errors as an alternative remedy do not materially change our empirical findings.

3.1 Aggregate excess returns

As mentioned earlier, we expect that the increased interconnection of U.S. economy with the rest of the world should expose U.S. equities to sources of uncertainty stemming from abroad. If this assertion is true and a sufficiently large number of publicly traded and U.S.-listed firms are indeed exposed to foreign sources of economic policy uncertainty, then we should be able to detect predictive power for EPU^F–which measures policy uncertainty unrelated to U.S. news–for broad equity market index returns. Our goal in this section is testing this hypothesis. We show that EPU^F indeed has predictive power for the U.S. aggregate index excess returns, even after controlling for and in the presence of EPU^{US}. Thus, we complement and extend the findings of Pástor and Veronesi (2013) and Brogaard and Detzel (2015), who already establish EPU^{US}'s predictive ability. Both studies are based on aggregate index returns heavily populated by larger companies (S&P500 and CRSP value-weighted, respectively).

We report our findings in Table 4. As in previous studies, we investigate the predictability of value-weighted CRSP portfolio, comprising all traded stocks in the NYSE/AMEX/NASDAQ exchanges, and the S&P500 index returns, representing the largest U.S. corporations. We also study whether technology-heavy Nasdaq Composite and small cap-dominated Russell 2000 index returns are also predictable by EPU measures.[11] We only report slope parameters for the EPU measures in Table 4 to save space. We report estimated slope parameters for the two EPU measures in the presence of pricing factors discussed above (Z_t^js), and when ϕ_j are set to zero. The reason for the latter is two-fold: first, we want to observe any loss of statistical significance due to the presence of control variables, and second, we wish to gauge the ability of the two EPU measures in explaining the variations in cumulative index excess returns (the incremental adjusted R^2 between the model with controls and those without).

We first establish that EPU^{US} predicts S&P500 returns at $k = 2$ to 12 and CRSP value-weighted returns at $k = 2$ to 6 months ahead, confirming the findings of Pástor and Veronesi (2012) and Brogaard and Detzel (2015), respectively (not shown). We next fit equation (4) to data. In the presence of EPU^{US} and control variables listed above, we find statistically significant evidence that Nasdaq returns are predictable by EPU^F at $k \geq 6$ and for CRSP value-weighted and S&P500 returns at $k \geq 9$. Absent control variables but with EPU^{US} still present, these results generally hold, albeit at slightly lower significance levels. EPU^F predicts Russell 2000 returns only at $k = 12$, while these returns are predictable by EPU^{US} and estimated slope parameters are significant for $k \leq 9$ with controls variables. In general, we observe some weakening of EPU^{US} predictive power as k increases. This pattern is not present for EPU^F, which implies that the opposite might hold for

[11] Nasdaq Composite is a value-weighted index that tracks more than 3,000 firms traded on the Nasdaq Stock Market. The index is dominated by technology sector with about 50% weight, followed by consumer services and health care sectors with about 20 and 10% weights, respectively.

foreign policy uncertainty: that EPU^{US} and some control variables account for potential EPU^{F}'s predictability in shorter horizons, but their power dilutes notably as k increases. Another plausible explanation, which as we show later is also borne by our empirical findings, is that these somewhat long predictability horizons are indicative of EPU^{F} operating through the slower moving cash-flow channel of firms with statistically significant exposure to such risks. Since these effects take longer to appear in firms' financial or operational communications, there is a delay between their arrival and market's reaction, leading to the predictability patterns documented above.[12] The estimated Student-t statistics for these findings, especially for $k = 12$ exceed the threshold advocated by Harvey et al. (2015).

Adjusted R^2s increase in k uniformly. For predictive horizons where estimated $\hat{\beta}_1$ statistically different from zero, EPU^{F} and EPU^{US} together account for between 7 and 12.8 percent of variation in returns (Nasdaq at $k = 6$ and CRSP value-weighted at $k = 12$, respectively). These values are based on models with no control variables, and thus adjusted R^2s only gauge the ability of EPU measures in accounting for variations in returns. On balance, EPU^{F} contributes to about half of these adjusted R^2 values.

Estimated $\hat{\beta}_i$s for both EPU_t^{US} and EPU_t^{F} are generally positive-valued. These results are consistent with the intuition from Merton (1973)'s intertemporal capital asset pricing theory suggesting that investors demand positive expected return compensation for bearing risk and uncertainty.

Taken together, we summarize our findings as follows:

- Size may not be the sole determining factor. EPU^{F} predicts both CRSP and S&P500 returns. While S&P500 returns by construction represent the largest U.S.-listed companies, CRSP returns (while influenced by larger corporations) comprise the entire universe of publicly traded firms. Many large corporations are multinationals with significant international sales, links, and operations. But these companies also have the resources to hedge most global risks. We note that with control variables present, estimated $\hat{\beta}_2$s for Nasdaq returns are statistically not different from zero, while $\hat{\beta}_1$s are statistically different from zero for $k \geq 6$ regardless of control variable' presence. This observation means that EPU^{F} has notable predictive power for the broad but tech- and IPO-heavy Nasdaq Composite index. In addition, we have some evidence (albeit much weaker) that small-cap Russell 2000 returns might be predictable at longer horizons by EPU^{F}. Thus, we believe that EPU^{F} appears to predict returns for a non-negligible subset of medium-sized (or small) companies in the Unites States, implying notable exposure to global economic policy risks. We conduct a thorough search to identify the characteristics of companies that are affected by changes in foreign policy uncertainty in later sections.

[12] In contrast, as documented by Campbell and Ammer (1993) and Pindyck and Rotemberg (1993) among many others, the time required for discount rate shocks to affect prices are notably shorter.

- There are similarities and also intriguing differences in patterns of predictability between EPU^F and EPU^{US}. Based on similarities, they are both uncertainty factors that have predictive power for U.S. aggregate returns. However, based on their notable differences, especially with respect to prediction horizon k and their interactions with control variables mentioned above, they appear to operate in different horizons and affect different drivers of asset prices. These observations are in line with the findings of Pástor and Veronesi (2013) and Brogaard and Detzel (2015), and imply that EPU^F predicts longer-duration elements of asset prices. We investigate the channels responsible for this observation in subsequent sections.

- We find unambiguous, positive, and statistically significant risk-return trade off between current levels of economic policy uncertainty and future aggregate returns. Inclusion of common pricing factors does not weaken our results. The sign, size, and statistical significance of the estimated slope parameters are generally invariant to inclusion or exclusion of these factors.

3.2 Robustness checks for aggregate returns

We carry out tests to assess the robustness of predictive results discussed so far. Our results survive these tests and we thus conclude that EPU^F indeed predicts cumulative aggregate excess returns of headline U.S. equity market indexes. We discuss two primary robustness checks. We report these results in the Appendix.

First, a concern is using generated variables in predictive regressions. As constructed, EPU^F_t is a generated variable and its inclusion may lead to under-rejection of the null hypothesis that $\beta^i_1 = 0$. A common remedy is to use bootstrapped standard errors in constructing Student-t statistics, instead of Newey-West standard errors. We follow the methods discussed in Ruiz and Pascual (2002) and generate bootstrapped standard errors for predictive regressions. We find that the statistical significance of EPU measures' slope parameters do not change much, and that the estimated slope parameters for EPU^F, $\hat{\beta}^1_1$, continue to remain statistically different from zero.

Another reasonable concern is whether domestic pricing factor (such as size, value, or momentum) are adequate control variables in estimated models and whether predictive results are robust to the inclusion of international pricing factors. Since international factors are available for developed economies, we replace domestic Fama-French size, value premium, and momentum factors their developed-economy counterparts. Our predictive results are robust to the inclusion of developed-economy factors, and similar to the findings discussed in Section 3.1.

3.3 Portfolio excess returns

So far, we have established that EPU^F has predictive power for aggregate equity returns in the United States and this result is robust to the presence of various asset pricing factors. An important question is which assets are sensitive to fluctuations in foreign economic policy uncertainty? For example, Gulen and Ion (2015) and Greenland et al. (2019) show that higher EPU is associated with declines in corporate investments, while, as Hou et al. (2014) discuss, high-investment firms have better investment opportunities and higher future cash flows. These firms may be better positioned to withstand policy uncertainty shocks by adjusting their asset holdings or investment projects. At the same time, some of their investment opportunities are likely to be abroad, making them more exposed to foreign EPU shocks. Thus, a relevant question is whether (foreign) EPU affects future returns for high-investment firms more than returns for low-investment or financially constrained firms. In addition, firms with high foreign sales are more likely to see their current equity prices decline (and expected returns increase) in the face of a foreign EPU surge. The question than follows if the predictive relationship between foreign EPU and future returns of firms with high foreign sales is stronger than that for firms with low foreign sales.

We respond to these questions in this section. Our strategy is to use excess returns of portfolios, constructed along certain firm characteristics, over 1-month Treasury Bill rates to isolate features that signal stocks' sensitivity to EPU^F. To this end, we test whether foreign or domestic EPU measures predict portfolio returns at horizons up to 12 months ahead. In particular, we are interested in EPU measures' predictive power for particular segments of a portfolio–for example the top or the bottom terciles or quartiles. Thus, we investigate the properties of linear asset-pricing model presented in equation (4), fitting it to data where $r^i_{t,t+k}$ are returns on a particular portion–or leg–of a portfolio, or they are the difference between two such legs.

Given the findings discussed in Section 3.1, we sort all companies in CRSP/Compustat universe at the end of June of year t on the following firm characteristics or fundamental values: size, investment, capital expenditure on plant and equipment (CapEx) to price, cash-flow to price, and the ratio of foreign to total sales.[13] We consider both single-sorted portfolios constructed based on a single pricing factor (or fundamental) and double-sorted portfolios constructed on the intersection of two factors (primarily on size factor and on one of the factors listed above). We re-balance these portfolios at the end of June of year $t + 1$, following the methodology of Fama and French (1992). The control variables are the same as those in Sections 3.1. We do not report estimated ϕ^i_j parameters to save space, but they are available upon request. Tables 6 to 9 summarize our empirical findings.

Based on our findings presented in Section 3.1, we have established that policy uncertainty

[13] We also report results for the following factors in the Appendix: book-to-market ratio, operating profitability, and idiosyncratic volatility.

measures predict returns of equity indexes dominated by large corporations. Are these predictability results concentrated in large firms only? We first present the estimation results for the familiar size factor single-sorted portfolio returns in Table 5, that point to predictability for the top 30 percent portfolio returns, comprised of the largest companies by market valuation, by EPU^F for $k \geq 9$. The bottom 30 percent portfolio returns do not display such predictability by EPU^F, although EPU^{US} predicts both large and small company portfolio returns at $k \leq 9$ horizons. The difference between the low-30% and the high-30% size portfolios, the SMB returns indicating the size premium, are negatively predictable by EPU^F at all horizons (primarily a product of EPU^F loadings for small-size portfolio returns that are not statistically different from zero, and loadings for large-size portfolio returns that are). EPU^{US} has statistically significant and positive-valued loadings for SMB portfolio returns for $k = 6$ or 9.

We next turn to portfolios formed on investments introduced by Hou et al., 2014 and defined as the change in total assets from the fiscal year ending in year $t-2$ to the fiscal year ending in $t-1$, divided by $t-2$ total assets. This is a broad definition of investments. We study capital-expenditure-based portfolios separately. High-investment firms have better investment opportunities, greater appetite to acquire assets, and higher expected future cash flows. They may be better positioned to withstand policy uncertainty shocks by adjusting their asset holdings or investment projects. At the same time, some of their investment opportunities are likely to be abroad, making the firms more exposed to changes in foreign EPU. In comparison, low-investment companies may have less room to adjust their assets and projects in response to domestic EPU shocks. On the flip side, low-investment firms are also less likely to have investment projects abroad and thus less susceptible to foreign EPU shocks.

We report the results for investment portfolios in Table 6 with the findings for single-sort investment portfolio returns available on the first three columns and the results for double-sorted investment and size (to isolate the effects of firm size) portfolio returns displayed in the last three columns. Estimated slope parameters for EPU^F are positive-valued and statistically significant at horizons $k \geq 9$ for the top 30% single-sorted investment portfolios and for portfolio returns of large and high-investment firms. EPU^F does not predict bottom 30% single-sort and small/low investment portfolio returns. For six months and above horizons, the differences between EPU^F loadings of low- and high-investment portfolio returns are negative and statistically significant, since the EPU^F loading for low-investment portfolio returns is not statistically different from zero, while that of high-investment portfolio is positive-valued and significant. In contrast, for the same horizons, the differences between EPU^{US} loadings of low- and high-investment portfolio returns are positive and statistically significant, primarily driven by relatively high loading of low-investment portfolios.

In the face of higher EPU^F, high-investment firms may need to partially adjust investments and thus give up a portion of their future cash flows. As a result, current equity prices (expected returns) would decrease (increase) more for high-investment portfolios. On the other hand, low-investment firms are not affected by higher EPU^F, as a result, their current equity prices and expected returns remain little changed. In contrast, when faced with a domestic EPU shock, high-investment firms can adjust their assets and positions to partially smooth the shock, while low-investment firms tend to be constrained in that regard, and as a result, their current equity prices (expected returns) would decrease (increase) more than higher-investment portfolios.

We now turn to capital expenditure-based portfolio returns. Greenland et al. (2019) document the negative impact of an increase in economic policy uncertainty on investments and exports for a panel of 14 countries (including the United States).[14] In their influential study, Gulen and Ion (2015) convincingly establish a robust, negative relationship between changes in U.S. EPU level and firm-level capital investment, CapEx, with this relationship being stronger for firms with a larger share of irreversible investments and firms the revenues of which are more dependent on government spending. We next examine the relationship between measures of U.S. and foreign EPU and future returns of high- and low-CapEx firms. A priori, we expect to find patterns similar to those for portfolios formed on broader investment measure considered above.

We investigate the role of corporate capital and plant investments in driving the relationship between EPU^F and equity returns by forming single-sorted portfolios (on CapEx) and double-sorted portfolios (on size and CapEx). The construction of these portfolios closely follows the Fama-French approach. The value of investment on plant and equipment, CapEx, is available from Compustat annual schedules. We aggregate end of June of the year t CapEx values for firms reporting positive values over the period in the cross-section of the Compustat universe. We then normalize the aggregated values by dividing them by the aggregate market capitalization of reporting firms. We form two sets of portfolios. We start with three single-sorted portfolios: below 30^{th} percentile, between 30^{th} and 70^{th} percentile, and above 70^{th} percentile and follow with six double-sorted portfolios formed on size (below and above the median) and CapEx (top and bottom 30% and the middle 40%). We then fit equation (4) using CapEx portfolio returns and report the results in Table 7. EPU^{US} predicts CapEx portfolio returns for $k \leq 3$, and EPU^F does so for $k > 6$. In contrast to our null hypothesis, we find larger loadings for low-CapEx returns compared to high-CapEx. EPU^F predictive results are sensitive to size sorting, and are not detected for small, low-CapEx portfolio returns. In contrast to investment portfolio returns discussed earlier, EPU^{US} only predicts CapEx portfolio returns, both high and low, for $k \leq 3$ and does not predict the differences in returns. Statistically significant estimated slope parameters are positive valued.

Predictability of portfolio returns sorted on investments and CapEx imply that higher EPU,

[14] Londono et al. (forthcoming) also document that rising real economic uncertainty negatively affects macroeconomic quantities, such as industrial production, both domestically and internationally, corroborating the results of Greenland et al. (2019).

both foreign and domestic, results in declines (increases) in equity returns (premia) for a sizable–due to their link to physical private corporate investment–economically significant subset of U.S. companies. The predictability operates in different horizons for domestic and foreign EPU measures, but it is present for both EPU measures and across investment and CapEx characteristics. In Section 4 we show that through this EPU^{F} transmits to the real economic quantities through cash flow-related channels, where investment is a prominent variable.

But what can we say about financially constrained firms? Do firms' cash flows indicate sensitivity of equity returns to changes in foreign EPU? When EPU^{F} is high, do investors require higher expected excess returns to hold stocks with low cash flows relative to stocks with high cash flows? We address this issue by studying predictability of portfolio returns constructed on cash-flow factor (CFP), studied by many including Fama and French (1992) and Ball et al. (2016).[15] Our empirical findings are available on Table 8. In this exercise, predictability is largely confined to single-sort portfolio returns on CFP factor, and we observe the by now familiar pattern of weakening EPU^{US}/strengthening EPU^{F} predictive power as k increases, but primarily for the low-CFP portfolio returns. EPU^{F} does not have predictive power for either segment of double-sorted CFP/size portfolio returns shown in the table, and EPU^{US}'s predictive power dissipates as k increases. In other words, low cash-flow to price (a sign of financial constraints) firms are sensitive and their returns are affected by changes in EPU^{F}. Less constrained firm are not affected by EPU^{F} shocks, and once we sort on size and CFP, this predictability vanishes.

It is natural to test whether there is a predictive relationship between EPU^{F} and stock returns for firms with significant foreign activity. Such firms earnings are likely to be more exposed to foreign EPU and, when EPU^{F} is high, investors may require higher expected excess returns to hold stocks of such firms compared to stock returns of firms with low foreign exposure. That said, it is difficult to construct a satisfactory measure of foreign exposure that quantifies the myriad ways that a company might be exposed to risks stemming from abroad. In a first attempt, we use foreign sales as a starting point. CRSP/Compustat reports foreign sales for a notable portion of U.S.-based firms. Similar to CapEx, firms voluntarily disclose their foreign sales information on a quarterly basis, and thus reporting gaps exist. We use the ratio of foreign sales to total sales to normalize the data at firm level, then aggregate the data and build single-sorted and double-sorted portfolios as we did for CapEx earlier.

We report our empirical findings for fitting returns on foreign sales portfolios in Table 9. EPU^{US} predicts foreign sales portfolio returns for $k \leq 6$, while EPU^{F} predicts the returns for $k \geq 9$. The pattern of decreasing predictive power for EPU^{US} and increasing power for EPU^{F} as k increases is observable here too. The predictability of low foreign sales portfolio disappears once we we sort

[15] Additional analysis based on the related concept of operating profitability of the firm–studied by Ball et al. (2015) and Novy-Marx (2013)–is available in the Appendix.

stocks on both foreign sales and size. The following observations may explain this phenomena: A subset of firms may not have a large foreign sales share, but they may have other links (through dependence on foreign-sourced intermediate goods and services, funding, etc.) to the rest of the world that generates this predictability, or there might be a subset of large firms that may not have significant foreign sales, but due to their size, they may be susceptible to policy shifts that affect their suppliers, subsidiaries, etc. Thus once we control for size, this predictability vanishes. These two narratives are not mutually exclusive.

Summarizing our findings in this section, we observe that:

- Stock returns of firms that accumulate more assets (higher investment factor), have higher CapEx, and have relatively larger foreign sales shares with respect to their total sales are more sensitive to EPU^F changes. Among such firms, all else equal, larger firms' returns are more sensitive to changes in EPU^F level.
- Firms that have lower cash flow to price ratios are more sensitive to EPU^F changes.
- In many instances, we observe a distinct pattern of predictability, where EPU^{US}'s predictive power declines and that of EPU^F rises as k increases, with EPU^{US} predictability generally concentrated in $k \leq 6$ and that of EPU^F in $k \geq 9$.

4 Transmission channels for foreign EPU shocks

Thus far, we have established that measures of foreign and U.S. economic policy uncertainty have predictive power for aggregate market index returns, as well as returns for various portfolio sorts and return horizons, in the United States. In the next step, we study the channels for transmission of foreign policy uncertainty shocks to aggregate equity returns, as well as whether responses of macro-financial variables to EPU^F shocks confirm such channels.

We use local projections (LP), pioneered by Jordà (2005) and an increasingly popular method for the estimation of responses of macro-financial variables or their components to various shocks, including uncertainty shocks. Among others, Diercks et al. (2024) use LP to recover impulse-responses (IR) of macro-financial variables subject to uncertainty shocks–including EPU shocks–in a closed-economy setting. In Jordà (2005), the LP model is presented as:

$$y_{t+k} = \alpha(k) + \beta(k)\varepsilon_{x,t} + \sum_{i=1}^{P} \gamma(k) w_{t-i} + u_{(k)t+k}, \tag{5}$$

where $\varepsilon_{x,t}$ are shocks to variable x_t and extracted in an intermediate step, w_{t-i} are lagged control variables, $u_{(k)t+k}$ are *i.i.d.* errors, and $\alpha(k), \beta(k)$ and $\gamma(k)$ are parameters to be estimated.

Compared to traditional VAR, LP yields more flexible impulse-responses since it imposes weaker assumptions on the dynamics of the data, and strikes a balance between efficiency and robustness to model misspecification. However, the nonparametric nature of LP causes a notable efficiency cost, and in practice, the LP estimator may suffer from excessive variability. Barnichon and Brownlees (2019) address this issue in their smooth local projections (SLP) method. The SLP fitted model, as presented in Barnichon and Brownlees (2019), follows

$$y_{t+k} \approx \sum_{j=1}^{J} a_j B_j(k) + \sum_{j=1}^{J} b_j B_j(k) \varepsilon_{x,t} + \sum_{i=1}^{P} \sum_{j=1}^{J} c_{ij} B_j(k) w_{t-i} + u_{(k)t+k}, \tag{6}$$

where y_{t+k} are responses of the variable of interest to a shock, $\varepsilon_{x,t}$ are shocks to x_t as in equation (5), w_{t-1} are lagged explanatory variables that could include lagged values of the responding variable (y_{t-i}), $u_{(k)t+k}$ are *i.i.d.* shocks, $B_j(k)$ is a set of B-spline basis functions, a_j and b_j are sets of scalar parameters. In the context of this study, $\varepsilon_{x,t} = \varepsilon_{EPU^F,t}$ where $\varepsilon_{EPU^F,t}$ are EPU^F shocks extracted using the VAR specification described in Section 2.2 and obtained from fitting equation (3) to data. If the following relationships hold,

$$\sum_{j=1}^{J} a_j B_j(k) \approx \alpha(k), \sum_{j=1}^{J} b_j B_j(k) \approx \beta(k), \text{ and } \sum_{j=1}^{J} c_j B_j(k) \approx \gamma(k),$$

then equation (6), introduced by Barnichon and Brownlees (2019), is approximately the same as equation (5), proposed by Jordà (2005).

We use the procedures shared by Barnichon and Brownlees (2019) to generate smooth impulse-response functions for the desired variables and recover their respective confidence intervals.

4.1 Transmission of EPU^F shocks to equity return components and other financial variables

What are the channels of transmission for EPU^F shocks to aggregate equity returns? Brogaard and Detzel (2015) show that EPU^{US} does not have predictive power for aggregate dividend growth rates at various predictive horizons. They further argue that, at least partially based on this result, EPU^{US} shocks affect equity prices through the discount factor channel and not through the cash-flow channel. Basu and Bundick (2017) introduce a New Keynesian general equilibrium model that produces a decline in policy rates in response to uncertainty shock, matching empirical patterns. Interest rates are among commonly-used predictors of stock returns. Early studies (e.g. Campbell, 1987) suggest that high interest rates generally predict low excess equity returns. Campbell and Ammer (1993) and Bernanke and Kuttner (2005) provide additional discussions of monetary policy, discount rates, and their transmission to equity prices. Thus, both empirical and theoretical evidence support the hypothesis that domestic uncertainty shocks elicit a monetary policy response that affects discount rates, and thus transmits to equity prices.

However, it is less likely that changes in economic policy uncertainty abroad consistently and materially affect U.S. monetary policy, policy rates, and discount rates. To the best of our knowledge, such mechanism has not been documented in the literature.[16] Yet, we have shown throughout the paper that EPU^F has predictive power for various U.S. broad equity market index and portfolio returns. Thus, a plausible alternative channel of transmission could be through cash flows. We investigate this assertion in two steps.

We first decompose monthly S&P500 returns into cash flow and discount rate news, following Campbell and Shiller (1988b,a), by fitting excess returns, long-run log price-dividend ratios, and CAPE in a standard VAR system, recovering the news using a Cholesky decomposition. Figure 2 displays the responses of these cash flow and discount rate news to a one-standard deviation shock in EPU^F. It is immediately clear that the responses of these quantities to EPU^F shocks are muted and statistically not different from zero for the first 5 months. Starting in the sixth month, they both demonstrate statistically significant responses that last until about the 10^{th} month. However, their responses move in opposite directions with cash flow responses first dropping notably in the 6^{th} month, and then rising; and the discount rate response–while statistically significant–is muted, rises a bit around the 6^{th} month, and then declines. Taken together, this figure points to both the reaction of equity prices to changes in EPU^F and the timing of predictability to be rooted in the more sizable changes in cash flow news.

As a robustness check, we carry out the same exercise using Cenesizoglu and Ibrushi (2023) decomposition of S&P500 returns, based on a different set of variables in the fitted VAR.[17] The results have the same general contours seen in Figure 2, but confidence intervals, especially for discount rate news, are a bit wider. That said, the same general patterns–including significant responses at the sixth month–are present. Since the Campbell and Shiller (1988b,a) decomposition of equity returns does not directly yield equity premia embedded in prices, we also study the response of Cieslak and Pang (2021) hedging and common premium news of S&P500 returns to EPU^F shocks. We find that the responses of hedging and common premium news to EPU^F shocks are generally muted and not statistically different from zero. This finding provides additional support for the claim that foreign economic policy uncertainty affects U.S. equity prices through cash flows, and not through discount rates or premia.

This result shows that in addition to the discount rate transmission channel documented by Brogaard and Detzel (2015) for domestic EPU, there is a complementary channel for transmission

[16] In fact, studies such as Miranda-Agrippino and Rey (2020) forcefully argue the opposite, claiming that U.S. monetary policy affects the global cost of capital, leverage levels of global financial intermediaries, the provision of domestic credit globally, international credit flows, and foreign financial conditions.

[17] We thank the authors for generously sharing their data.

of foreign policy uncertainty shocks to asset prices that operates through cash-flow news and over longer horizons. Thus, our findings in an open-economy setting with foreign uncertainty shocks, resemble those documented by Chen, Da and Zhao (2013) who emphasize a significant role for cash flow news (also over longer horizons).

Next, we investigate whether responses of select financial and macro economic variables to EPU^F shocks lend further support to the cash-flow transmission channel. Figure 3 reports the SLP responses of a select and important set of financial variables to EPU^F shocks. The variables are: aggregate, year on year dividend growth rates for S&P500 index (from from Robert Shiller's website), four-quarter average of stock repurchases to assets ratio (from Capital IQ), year-on-year changes in aggregate commercial and industrial (C&I) loans, 1-Year U.S. Treasury bond yields, federal funds rates, and the broad dollar index (all from FRED data bank at Federal Reserve Bank of St. Louis). The first three variables proxy stocks' cash flows or reflect on firms' investment opportunities, while the last three variables are related to discount rates as they represent various measures of interest rates or a variable directly affected by cross-country interest-rate differentials (the value of the U.S. dollar.)

Starting on the top left, we note the statistically significant decline in dividend growth rates. Dividend growth rates decline for up to four months after the shock's arrival. The size of this decline is small, about 0.10 percentage point–we do not expect a foreign uncertainty shock to have an outsize effect on U.S. dividend distributions–but statistically significant. This negative response of dividend growth is consistent with the cash-flow channel for the transmission of foreign EPU shocks to U.S. equities. Thus, as mentioned earlier, this finding complements and extends Pástor and Veronesi (2013) and Brogaard and Detzel (2015). The response of stock repurchases to assets ratio, albeit small at about 0.04 percent, is immediate after the arrival of the shock, persistent, and statistically significant for about 5 months. It implies that a non-negligible number of firms would reduce distributions to shareholders in the form of stock repurchases when faced with a positive EPU^F shock. Similarly, the growth of C&I loans (middle row, left-hand side) slows by as much as 0.4 percentage point for up to about 4 months, indicating reluctance of firms to add leverage. Taken together, these three responses point to firms' precautionary motives, with firms reducing investor payouts and borrowing for new projects in response to unexpected increases in EPU^F, potentially depressing future cash flows. We revisit this issue and its implications in Section 4.2.

The response of 1-Year Treasury bond yields to an EPU^F shock is muted and statistically insignificant for the first 8 months after the shock. It then turns negative between months 6 and 11, by as much as 8 basis points, before turning insignificant again. An EPU^F shock does not elicit statistically significant responses from Federal Funds rates or the broad dollar index (the bottom row on Figure 3), in line with the claim that foreign uncertainty shocks do not materially impact U.S. monetary policy. This result is in line with the conclusions of well-established studies such as

Miranda-Agrippino and Rey (2020).

4.2 Transmission of EPU^F shocks to real variables

Thus far, we have proposed a plausible transmission channel for foreign policy uncertainty shocks to U.S. equity returns though cash flows. We now turn to macroeconomic variables and examine whether their responses to EPU^F shocks are consistent with those of stock prices and the cash-flow news transmission channel. We focus on the following variables: year-on-year changes in quarterly-adjusted real gross domestic private investment series (from U.S. Bureau of Economic Analysis), annualized changes in aggregate CapEx expenditure,[18] the ratio of aggregate CapEx expenditures to total assets (both from Capital IQ), seasonally adjusted, monthly unemployment rate (from U.S. Bureau of Labor Statistics), and finally the log values of total number of employees reported by corporations (from Capital IQ). We consider the responses of variables from national accounts (investments and unemployment rate) and from aggregated firm level data (CapEx and the number of people on payroll). We previously documented that EPU^F predicts future stock returns through cash flow channel. Investment (capital) and employment (labor) are likely to have implications for firms' future cash flows. Therefore, we ask the question of whether EPU affects these variables.

The SLP responses of macroeconomic and aggregate corporate series discussed above are available on Figure 4. Using year-on-year real investment growth rates, top left panel, we find statistically significant declines, by as much as 1 percentage point, between 3 and 7 quarters after the EPU^F shock. Investment growth rises after 9 quarters. This plot shares many features with investment response plot reported by Basu and Bundick (2017), confirming a similar empirical response of investments to uncertainty shocks and possibly similar general-equilibrium mechanisms. Given that gross private investment is measured at national level, we investigate the sources of these declines in investment growth by looking at corporate capital expenditures. The top right panel on Figure 4 shows the response of aggregate corporate CapEx growth to an EPU^F shock. This response is statistically significant and negative valued, ranging between -1 to slightly below -2 percentage points for up to about 7 quarters after the shock. In addition, we find out that in response to an EPU^F shock, the ratio of CapEx expenditure to total assets declines by as much as 0.04 percentage point (a notable number) between 2 and 10 quarters after the shock. The declines in this interval are statistically different from zero.

An EPU^F shock does not elicit statistically significant responses from either national unemployment rate (middle row, on the right) or (log) total number of employees reported by the corporate sector (the bottom figure). These observations indicate some reluctance by the corporate sector to adjust their workforce, in the United States, in response to uncertainty shocks abroad. Thus, the

[18] Similar to other voluntarily furnished corporate data, these series are lumpy, have notable gaps, and volatile. Thus we use aggregated and 4-quarter smoothed series for analysis.

transmission channel appear to be through adjustments in capital expenditure and investments, rather than labor. It also provide additional support for the presence of precautionary delays in investment in the presence if uncertainty shocks, documented in this study as well as in Gulen and Ion (2015). These delays, given the corporate sector's reluctance to adjust labor, are likely to be driven by potentially higher degree of investment irreversibility by firms that delay investment.

All in all, our findings in Section 4.1 and here regarding the statistically significant declines in variables associated with future cash flows (dividend growth, share buybacks, and demand for C&I loans, corporate CapEx expenditure and private investment) in response to an adverse EPU^F shock are consistent with our finding that EPU^F affects future equity returns through cash-flow components.

5 Concluding remarks

Financial economic literature has established that measures of domestic economic policy uncertainty transmit to financial asset prices and affect a variety of financial decisions in the United States. In particular, influential studies such as Pástor and Veronesi (2012, 2013) and Brogaard and Detzel (2015) have established that domestic EPU has both significant time-series predictive power for U.S. aggregate stock returns and is a priced factor in the cross-section of returns. With the rising interconnectedness of the United States economy and financial markets with the rest of the world, a significant number of American companies face risks that stem from economic policies abroad. Focusing on this salient feature of the U.S. economy, we show that foreign EPU has significant predictive power for market-wide equity index excess returns and for a notable number of factor-based portfolio returns. In particular, we show that firms with higher capital expenditure, foreign sales, investment, as well as low cash flow firms are sensitive to changes in foreign EPU.

In addition, we investigate transmission channels of foreign EPU shocks to U.S. equity returns. Studies that focus on the impact of EPU on asset prices suggest that discount rates are the main transmission channel of EPU shocks. Given that notable domestic uncertainty shocks generally result in policy responses that affect investors' discount rates, this is a plausible narrative. These studies generally do not find a significant role for the cash-flow news channel as a transmission conduit from policy uncertainty shocks to equity prices. In contrast, we find that foreign EPU shocks operate through cash-flow news channel, they do not affect discount rates or equity premia, and that aggregate credit demand and investment outlays respond significantly toa an adverse foreign EPU shock. Taken together, our results extend the existing literature and establish that foreign EPU is an economically significant uncertainty factor.

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Table 1: Growth, Volatility, and Economic Policy Uncertainty Measure Correlations

GDP Growth (Quarterly, SA)	U.S.	Euro Area	Germany	U.K.	Japan	
U.S.	1.0000	0.9029	0.8339	0.9302	0.7369	
Euro Area		1.0000	0.9248	0.9505	0.7727	
Germany			1.0000	0.8842	0.7787	
U.K.				1.0000	0.7592	
Japan					1.0000	
Realized Volatility	U.S.	Euro Area	Germany	U.K.	Japan	
U.S.	1.0000	0.7679	0.6942	0.7252	0.6305	
Euro Area		1.0000	0.7789	0.8372	0.5968	
Germany			1.0000	0.8238	0.5042	
U.K.				1.0000	0.5035	
Japan					1.0000	
Option-Implied Volatility	U.S.	Euro Area	Germany	U.K.	Japan	
U.S.	1.0000	0.8896	0.9277	0.9394	0.7116	
Euro Area		1.0000	0.9681	0.9501	0.7403	
Germany			1.0000	0.9306	0.7276	
U.K.				1.0000	0.6466	
Japan					1.0000	
EPU	U.S.	Euro Area	Germany	U.K.	Japan	Global
U.S.	1.0000	0.6715	0.7332	0.4332	0.4637	0.8050
Euro Area		1.0000	0.8764	0.8734	0.4058	0.8502
Germany			1.0000	0.6564	0.3969	0.8414
U.K.				1.0000	0.2753	0.7096
Japan					1.0000	0.4302
Global						1.0000

This table reports correlations between GDP growth rates for the United States, euro area, Germany, the United Kingdom, and Japan; correlations between realized and option-implied volatility measures for the United States, euro area, Germany, the United Kingdom, and Japan; and correlations between EPU indexes for the United States, euro area, Germany, the United Kingdom, Japan, and the global EPU.

Table 2: Summary statistics of demeaned EPU measures

Panel A: EPU Summary Statistics			
	EPU^{US}	EPU^{G}	EPU^{F}
Std Dev (%)	15.66	23.34	13.85
Skewness	1.60	1.56	1.07
Kurtosis	6.67	5.57	4.26
AR(1)	0.83	0.91	0.89
AR(5)	0.64	0.80	0.82
AR(10)	0.48	0.68	0.71
Panel B: EPU Correlations			
	EPU^{US}	EPU^{G}	EPU^{F}
EPU^{US}	1.00	0.80	$-1.41e^{-16}$
EPU^{G}		1.00	0.59
EPU^{F}			1.00

The top panel in this table reports summary statistics of demeaned U.S., global, and foreign EPU measures. We report sample standard deviations, skewness, and kurtosis values. AR(p) values reports p^{th} autocorrelation values. These autocorrelation values are statistically different from zero at the 95% confidence level or better. The bottom panel reports sample correlations between demeaned U.S., global, and foreign EPU measures.

Table 3: EPU Measures and Macro-Financial Variables

		Panel A: U.S.-specific variables				Panel B: Global and foreign variables				
		VIX	Spread	log(P/D)	CFNAI	VSTOXX	Spread	log(P/D)	BDI	Adj. R^2(%)
EPU^{US}	Contemp.	0.58***	0.28**	-2.05***	-0.13	0.47***	-0.49**	-1.40**	-0.24***	39.77
		(4.18)	(2.64)	(-5.36)	(-0.81)	(3.82)	(-2.44)	(-2.19)	(-3.55)	
	lag =1	0.58***	0.27**	-2.02***	-0.31*	0.46***	-0.50**	-1.50**	-0.22***	39.82
		(3.93)	(2.55)	(-5.13)	(-1.76)	(3.57)	(-2.57)	(-2.59)	(-3.23)	
	lag = 3	0.42**	0.26**	-1.64***	-0.27**	0.36***	-0.49**	-1.58***	-0.18**	28.08
		(2.65)	(2.39)	(-3.61)	(-2.27)	(3.22)	(-2.67)	(-3.06)	(-2.54)	
	lag = 6	0.21	0.24**	-1.36**	-0.27**	0.20*	-0.50**	-1.55**	-0.13*	18.53
		(1.56)	(2.08)	(-3.00)	(-2.32)	(1.71)	(-2.98)	(-3.28)	(-1.65)	
	lag = 9	0.24*	0.15	-1.52**	-0.13	0.14	-0.39**	-1.66***	-0.05	13.95
		(1.70)	(1.30)	(-2.86)	(1.03)	(1.10)	(-2.43)	(-3.48)	(-0.70)	
EPU^{G}	Contemp.	0.37**	0.12	-2.62***	-0.06	0.14	-0.73***	-0.48	-0.39***	44.71
		(3.02)	(1.06)	(-6.49)	(-0.40)	(1.12)	(-3.92)	(-0.75)	(-5.64)	
	lag =1	0.42***	0.12	-2.71***	-0.13	0.15	-0.74***	-0.58	-0.38***	46.61
		(3.15)	(1.03)	(-6.64)	(0.84)	(1.09)	(-4.08)	(-0.97)	(-5.46)	
	lag = 3	0.25*	0.11	-2.45***	-0.08	0.04	-0.72***	-0.62	-0.36***	39.02
		(1.73)	(0.91)	(-5.78)	(-0.75)	(0.32)	(-4.21)	(-1.09)	(-4.87)	
	lag = 6	0.07	0.08	-2.28***	-0.09	-0.08	-0.67***	-0.58	-0.33***	34.15
		(0.52)	(0.64)	(-5.43)	(-0.87)	(-0.61)	(-4.36)	(-1.05)	(-4.43)	
	lag = 9	0.06	0.02	-2.35***	-0.04	-0.12	-0.56***	-0.68	-0.30***	29.64
		(0.36)	(0.16)	(-4.77)	(-0.47)	(-0.90)	(-3.85)	(-1.25)	(-4.13)	
EPU^{F}	Contemp.	-0.06*	-0.07	-0.66***	0.03	-0.16***	-0.23***	0.44**	-0.13***	45.86
		(-1.73)	(-1.59)	(-3.50)	(0.78)	(-3.34)	(-5.32)	(2.74)	(-5.60)	
	lag =1	-0.03	-0.07	-0.73***	0.08**	-0.15**	-0.22***	0.43**	-0.13***	46.05
		(-0.86)	(-1.56)	(-3.84)	(2.44)	(-3.11)	(-5.19)	(2.65)	(-5.54)	
	lag = 3	-0.06	-0.07	-0.76***	0.09**	-0.16***	-0.21***	0.44**	-0.14***	48.16
		(-1.44)	(-1.60)	(-4.18)	(2.73)	(-3.36)	(-5.09)	(2.57)	(-5.27)	
	lag = 6	-0.06*	-0.07*	-0.79***	0.08**	-0.16***	-0.18***	0.44**	-0.15***	47.27
		(-1.83)	(-1.66)	(-4.67)	(2.21)	(-3.45)	(-4.18)	(2.36)	(-5.38)	
	lag = 9	-0.10**	-0.07	-0.76***	0.04	-0.16***	-0.17***	0.44**	-0.17***	47.30
		(-2.53)	(-1.46)	(-4.93)	(0.78)	(-3.46)	(-3.64)	(2.27)	(-6.20)	

This table reports slope parameter estimates obtained from regressing standardized U.S. and global EPU measures of Baker et al. (2016) and the foreign EPU measure described in Section 2.1, on contemporaneous and lagged values of U.S. and European macroeconomic and financial variables. The variables are option implied volatilities (VIX and VSTOXX), 10-over-1 year U.S. and German sovereign spreads (Spread), Robert Shiller's log dividend-price ratio for S&P500 index and the equivalent for EURO STOXX 600 index, U.S. and euro-area growth rates of industrial production indexes (ΔIP), Chicago Fed national activity index (CFNAI), and log values of Baltic Dry Index (BDI). We report Student-t statistics based on Newey and West (1987) HAC-consistent standard errors in parenthesis. *, **, and *** represent rejection of the null hypothesis that $\beta_i = 0$ at 10, 5, and 1 percent confidence levels, respectively. The last column reports adjusted R^2s.

Table 4: Index-level predictability

Lags		CRSP	S&P500	NASDAQ	Russell 2000
	EPU^F	0.46	0.54	4.28	-0.16
		(0.27)	(0.33)	(1.65)	(-0.06)
$k = 3$	EPU^{US}	4.79***	4.46***	3.36	5.30**
		(2.83)	(2.77)	(1.65)	(2.35)
	Adj. R^2(%)	19.62	19.04	15.55	10.96
	EPU^F	2.73	2.43	11.01***	1.26
		(0.97)	(0.91)	(3.01)	(0.33)
$k = 6$	EPU^{US}	7.00**	6.60***	3.59	8.83**
		(2.26)	(2.65)	(1.10)	(2.24)
	Adj. R^2(%)	25.87	26.61	26.93	21.01
	EPU^F	6.28**	5.72**	18.00***	3.99
		(2.19)	(2.13)	(3.52)	(1.64)
$k = 9$	EPU^{US}	8.83*	8.20**	3.25	10.72*
		(1.94)	(1.90)	(0.69)	(1.81)
	Adj. R^2(%)	32.85	32.76	29.73	25.23
	EPU^F	11.36***	10.57***	25.25***	7.68*
		(3.43)	(3.47)	(3.92)	(1.68)
$k = 12$	EPU^{US}	7.27	6.80*	1.83	9.44
		(1.55)	(1.51)	(0.38)	(1.59)
	Adj. R^2(%)	39.54	39.33	33.75	31.38

This table reports slope parameters for EPU_t^{US} and EPU_t^F from fitting equation (4) to data. We use excess returns from CRSP value-weighted portfolio, S&P500, NASDAQ, and Russell 2000 indexes over the 1-month T-Bill rate. Our control variables are NBER recessions, 10-Year minus 1-year Treasury spread, BBB - AAA corporate spread, (the log value of) Shiller's aggregate cyclically adjusted PE ratio (CAPE), changes in VIX, Chicago Fed's CFNAI, growth rate of industrial production index, Fama-French size (SMB), market-to-book ratio (HML), momentum, and long-term reversal factors. Value of k ranges between 1 to 12 months ahead. We report Student-t statistics, based on Newey and West (1987) HAC-consistent standard errors in parentheses. *, **, and *** represent rejection of the null hypothesis that $\beta_i = 0$ at 10, 5, and 1 percent confidence levels, respectively.

Table 5: Predictability of portfolio returns formed on size

		Single-sort size		
		High 30	Low 30	SMB
	EPU^F	0.34	-2.47	-2.81**
		(0.20)	(-1.02)	(-2.11)
$k = 3$	EPU^{US}	4.65***	7.26***	2.61
		(2.66)	(2.93)	(1.58)
	Adj. R^2 (%)	14.80	13.73	17.81
	EPU^F	2.73	-1.59	-4.32*
		(0.93)	(-0.37)	(-1.77)
$k = 6$	EPU^{US}	6.49**	10.33**	3.84*
		(2.09)	(2.30)	(1.69)
	Adj. R^2 (%)	21.17	11.30	15.35
	EPU^F	6.21*	-0.26	-6.47*
		(1.91)	(-0.06)	(-1.94)
$k = 9$	EPU^{US}	8.09*	14.71**	6.62**
		(1.74)	(2.06)	(2.00)
	Adj. R^2 (%)	25.08	13.47	19.41
	EPU^F	10.87***	3.47	-7.40*
		(2.95)	(0.62)	(-1.83)
$k = 12$	EPU^{US}	6.40	12.37	5.98
		(1.29)	(1.55)	(1.36)
	Adj. R^2 (%)	30.85	17.99	22.07

This table reports slope parameters for U.S. and foreign EPU measures in equation (4), where the dependent variables are returns for portfolios formed on Fama and French size (market value) factor. Our control variables are NBER recessions, 10 minus 1-year U.S. Treasury spreads, BBB - AAA corporate spread, (the log value of) Shiller's aggregate cyclically adjusted PE ratio (CAPE), changes in VIX, Chicago Fed's CFNAI, growth rates of the U.S. industrial production index, momentum, and long-term reversal factors. Student-t statistics, based on Newey and West (1987) HAC-consistent standard errors are in parentheses. *, **, and *** represent statistical significance at 10, 5, and 1% confidence levels, respectively.

Table 6: Predictability of portfolio returns formed on investment and size/investment

		Single-sort investment			Double-sort size and investment		
		High 30	Low 30	LMH	Big/Hi Inv.	Small/Lo Inv.	SL-BH Inv
	EPU^F	0.49	-0.45	-0.95	0.61	-2.91	-3.52**
		(0.25)	(-0.28)	(-0.83)	(0.31)	(-1.20)	(-2.55)
$k = 3$	EPU^{US}	4.38**	5.02***	0.64	4.26**	6.28***	2.02
		(2.28)	(2.92)	(0.94)	(2.22)	(2.67)	(1.42)
	Adj. R^2 (%)	19.53	17.88	22.79	19.14	26.45	37.48
	EPU^F	4.47	-0.06	-4.53**	4.70	-3.27	-7.97***
		(1.42)	(-0.02)	(-2.10)	(1.50)	(-0.70)	(-2.87)
$k = 6$	EPU^{US}	5.27	7.76**	2.49*	5.01	9.42**	4.41*
		(1.50)	(2.59)	(1.88)	(1.44)	(2.07)	(1.96)
	Adj. R^2 (%)	25.66	20.06	22.14	26.28	18.60	28.81
	EPU^F	9.48**	2.28	-7.20**	9.82***	-2.73	-12.55***
		(2.69)	(0.83)	(-2.42)	(2.76)	(-0.58)	(-3.39)
$k = 9$	EPU^{US}	6.21	10.15**	3.94**	5.74	13.67*	7.92**
		(1.21)	(2.35)	(2.13)	(1.13)	(1.94)	(2.40)
	Adj. R^2 (%)	30.65	26.60	20.96	30.93	20.88	31.21
	EPU^F	16.16***	6.24**	-9.92***	16.62***	0.63	-15.99***
		(3.76)	(2.01)	(-2.76)	(3.82)	(0.12)	(-3.77)
$k = 12$	EPU^{US}	3.28	9.08**	5.80**	2.73	10.85	8.11*
		(0.62)	(2.07)	(2.45)	(0.52)	(1.44)	(1.82)
	Adj. R^2 (%)	35.72	31.03	24.01	35.49	23.94	33.98

This table reports slope parameters for U.S. and foreign EPU measures in equation (4), where the dependent variables are returns for portfolios formed on the investment factor of Hou et al. (2014), and size and investment factors. Our control variables are NBER recessions, 10 minus 1-year U.S. Treasury spreads, BBB - AAA corporate spread, (the log value of) Shiller's aggregate cyclically adjusted PE ratio (CAPE), changes in VIX, Chicago Fed's CFNAI, growth rates of the U.S. industrial production index, Fama and French HML, excess market returns, momentum, and long-term reversal factors. Student-t statistics, based on Newey and West (1987) HAC-consistent standard errors are in parentheses. *, **, and *** represent statistical significance at 10, 5, and 1% confidence levels, respectively.

Table 7: Predictability of portfolio returns formed on Size/Capital Expenditures

		Single-sort CapEx			Double-sort size and CapEx		
		High 30	Low 30	LMH	Big/Hi CapEx	Small/Lo CapEx	SL-BH
	EPU^F	-0.35	-0.70	-0.36	-0.31	-1.65	-1.34
		(-0.22)	(-0.27)	(-0.27)	(-0.19)	(-0.72)	(1.22)
$k = 3$	EPU^{US}	4.14**	5.44**	1.29	4.14**	5.37***	1.23
		(2.31)	(2.45)	(1.43)	(2.31)	(2.61)	(1.15)
	Adj. R^2 (%)	19.44	20.00	18.13	19.56	22.91	18.16
	EPU^F	1.20	2.68	1.48	1.29	-0.41	-1.70
		(0.50)	(0.66)	(0.69)	(0.97)	(-0.11)	(0.90)
$k = 6$	EPU^{US}	4.44	4.86	0.42	4.43	5.37	0.94
		(1.42)	(1.17)	(0.26)	(1.43)	(1.37)	(0.57)
	Adj. R^2 (%)	27.36	17.74	13.10	27.56	14.79	14.35
	EPU^F	4.41*	7.94*	3.53	4.53*	2.64	-1.88
		(1.88)	(1.75)	(1.30)	(1.93)	(1.09)	(0.76)
$k = 9$	EPU^{US}	-0.12	-0.92	-0.80	-0.11	1.04	1.14
		(-0.04)	(-0.19)	(-0.30)	(-0.03)	(0.21)	(0.37)
	Adj. R^2 (%)	35.21	25.52	18.90	35.33	21.67	17.64
	EPU^F	8.19***	13.02**	4.83	8.33***	5.74	-2.58
		(2.96)	(2.38)	(1.42)	(3.02)	(1.25)	(0.83)
$k = 12$	EPU^{US}	-1.68	-2.94	-1.26	-1.65	0.13	1.78
		(-0.48)	(-0.53)	(-0.35)	(-0.47)	(0.02)	(0.42)
	Adj. R^2 (%)	38.46	28.18	16.09	38.51	24.46	15.94

This table reports slope parameters for foreign and U.S. EPU measures in equation (4) where the dependent variables are returns for portfolios formed on capital expenditure to market capitalization ratio (CapEx) and size and CapEx. Control variables are SMB, HML, momentum, long-term reversal, NBER recessions, 10-Year over 2-year Treasury spreads, BBB - AAA corporate spreads, (the log value of) Shiller's aggregate cyclically adjusted PE ratio (CAPE), changes in VIX, Chicago Fed's CFNAI, and changes in the IP index. Student-t statistics, based on Newey and West (1987) HAC-consistent standard errors are in parentheses. *, **, and *** represent statistical significance at 10, 5, and 1% confidence levels, respectively.

Table 8: Predictability of portfolio returns formed on cash flow to price and size/cash flow to price

		Single-sort CFP			Double-sort size and CFP		
		High 30	Low 30	HML	Big/Hi CFP	Small/Lo CFP	BH-SL
	EPU^F	-1.95	0.32	-2.28*	-1.78	-1.64	-0.14
		(-1.07)	(0.18)	(-1.78)	(-0.98)	(-0.77)	(-0.12)
$k = 3$	EPU^{US}	3.74**	4.71***	-0.98	3.63**	5.74***	-2.11**
		(2.24)	(2.62)	(-1.16)	(2.18)	(2.81)	(-2.41)
	Adj. R^2 (%)	19.23	19.06	29.31	18.86	24.01	31.74
	EPU^F	-4.24	3.48	-7.73***	-4.02	-0.52	-3.50*
		(-1.18)	(1.26)	(-2.77)	(-1.12)	(-0.13)	(-1.86)
$k = 6$	EPU^{US}	6.40*	6.08**	0.32	6.26*	8.64**	-2.38*
		(1.84)	(2.07)	(0.21)	(1.81)	(2.16)	(-1.68)
	Adj. R^2 (%)	18.21	27.78	29.99	19.64	17.34	26.27
	EPU^F	-5.45	7.83***	-13.28***	-5.16	1.21	-6.37**
		(-1.32)	(2.75)	(-3.28)	(-1.25)	(0.29)	(-2.52)
$k = 9$	EPU^{US}	8.60	7.47*	1.12	8.29	12.33**	-4.04**
		(1.54)	(1.88)	(0.44)	(1.48)	(2.00)	(-2.29)
	Adj. R^2 (%)	19.30	33.94	26.76	21.31	21.14	28.28
	EPU^F	-4.52	13.57***	-18.09***	-4.21	5.18	-9.38***
		(-0.99)	(4.06)	(-3.83)	(-0.91)	(1.11)	(-2.74)
$k = 12$	EPU^{US}	6.44	6.14	0.31	5.99	9.69	-3.70
		(1.02)	(1.48)	(0.08)	(0.94)	(1.47)	(-1.36)
	Adj. R^2 (%)	22.82	36.76	28.68	25.21	24.98	24.37

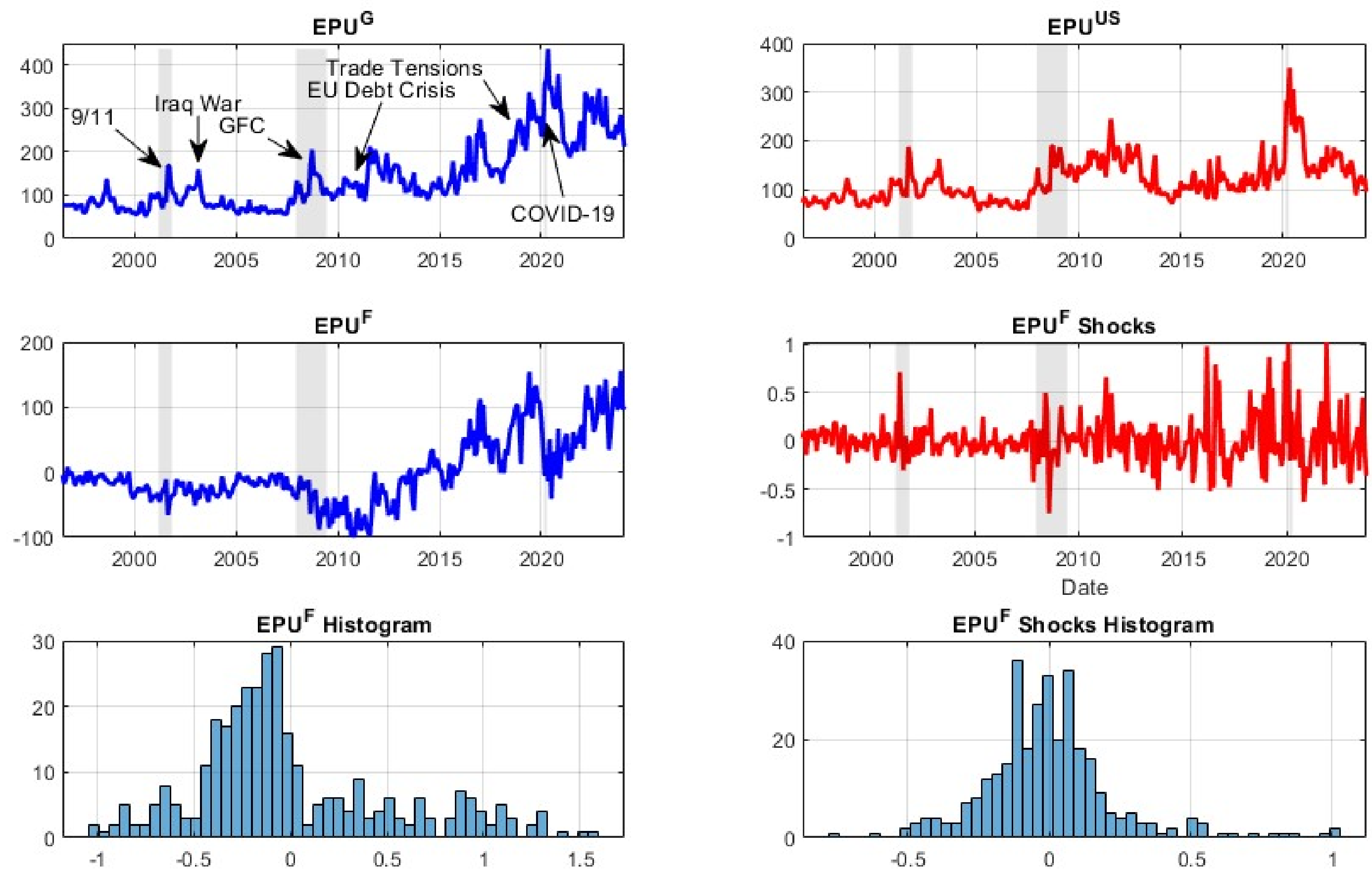
This table reports slope parameters for U.S. and foreign EPU measures in equation (4), where the dependent variables are returns for portfolios formed on cash flow to price ratio and size and cash flow to price ratio. Our control variables are NBER recessions, 10 minus 1-year U.S. Treasury spreads, BBB - AAA corporate spread, (the log value of) Shiller's aggregate cyclically adjusted PE ratio (CAPE), changes in VIX, Chicago Fed's CFNAI, growth rates of the U.S. industrial production index, Fama and French HML, excess market returns, momentum, and long-term reversal factors. Student-t statistics, based on Newey and West (1987) HAC-consistent standard errors are in parentheses. *, **, and *** represent statistical significance at 10, 5, and 1% confidence levels, respectively.

Table 9: Predictability of portfolio returns formed on Size/Foreign Sales

		Single-sort foreign sales			Double-sort size and foreign sales		
		High 30	Low 30	LMH	Big/Hi FS	Small/Lo FS	SL-BH
	EPU^F	-0.13	-0.78	-0.65	-0.03	-2.15	-2.12
		(-0.08)	(-0.45)	(-0.69)	(-0.02)	(-0.98)	(-2.05)
$k = 3$	EPU^{US}	5.04**	6.08***	1.04	5.03**	6.04**	1.01
		(2.55)	(3.36)	(1.46)	(2.56)	(2.54)	(0.98)
	Adj. R^2 (%)	18.72	21.48	5.46	18.77	20.92	27.22
	EPU^F	2.20	0.57	-1.63	2.39	-1.59	-3.97
		(0.90)	(0.21)	(-1.01)	(0.98)	(-0.47)	(-2.25)
$k = 6$	EPU^{US}	5.53*	7.81**	2.29	5.54*	6.91	1.37
		(1.40)	(2.58)	(1.54)	(1.70)	(1.60)	(0.77)
	Adj. R^2 (%)	26.13	26.14	11.13	26.85	15.52	21.32
	EPU^F	6.02***	4.06	-1.77	6.27***	1.14	-5.13
		(2.67)	(1.51)	(-1.07)	(2.80)	(0.36)	(-2.25)
$k = 9$	EPU^{US}	0.88	5.86	4.98**	0.95	2.15	1.20
		(0.30)	(1.53)	(2.37)	(0.33)	(0.49)	(0.39)
	Adj. R^2 (%)	36.61	31.32	17.17	37.23	26.16	26.92
	EPU^F	10.20***	7.78**	-2.20	10.53***	4.49	-6.04
		(3.83)	(2.52)	(-1.19)	(3.97)	(1.18)	(-2.20)
$k = 12$	EPU^{US}	-0.88	6.27	7.14***	-0.78	0.58	1.37
		(-0.28)	(1.52)	(2.78)	(-0.25)	(0.12)	(0.36)
	Adj. R^2 (%)	39.40	32.06	25.26	39.84	28.01	30.20

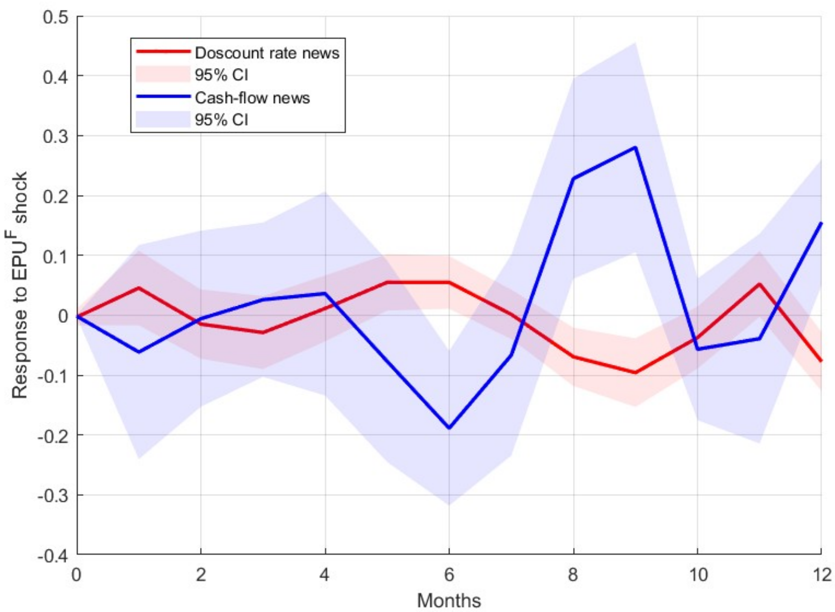
This table reports the estimated slope parameters for foreign and U.S. EPU in equation (4) where the dependent variables are returns for portfolios formed on foreign sales to total sales ratio and foreign sales to total sales ratio/size. Control variables are SMB, HML, momentum, long-term reversal, NBER recessions, 10-Year over 2-year Treasury spreads, BBB - AAA corporate spreads, (the log value of) Shiller's aggregate cyclically adjusted PE ratio (CAPE), changes in VIX, Chicago Fed's CFNAI, and changes in the IP index. Student-t statistics, based on Newey and West (1987) HAC-consistent standard errors are in parentheses. *, **, and *** represent statistical significance at 10, 5, and 1% confidence levels, respectively.

Figure 1: U.S., Global, and Foreign EPU Comparison



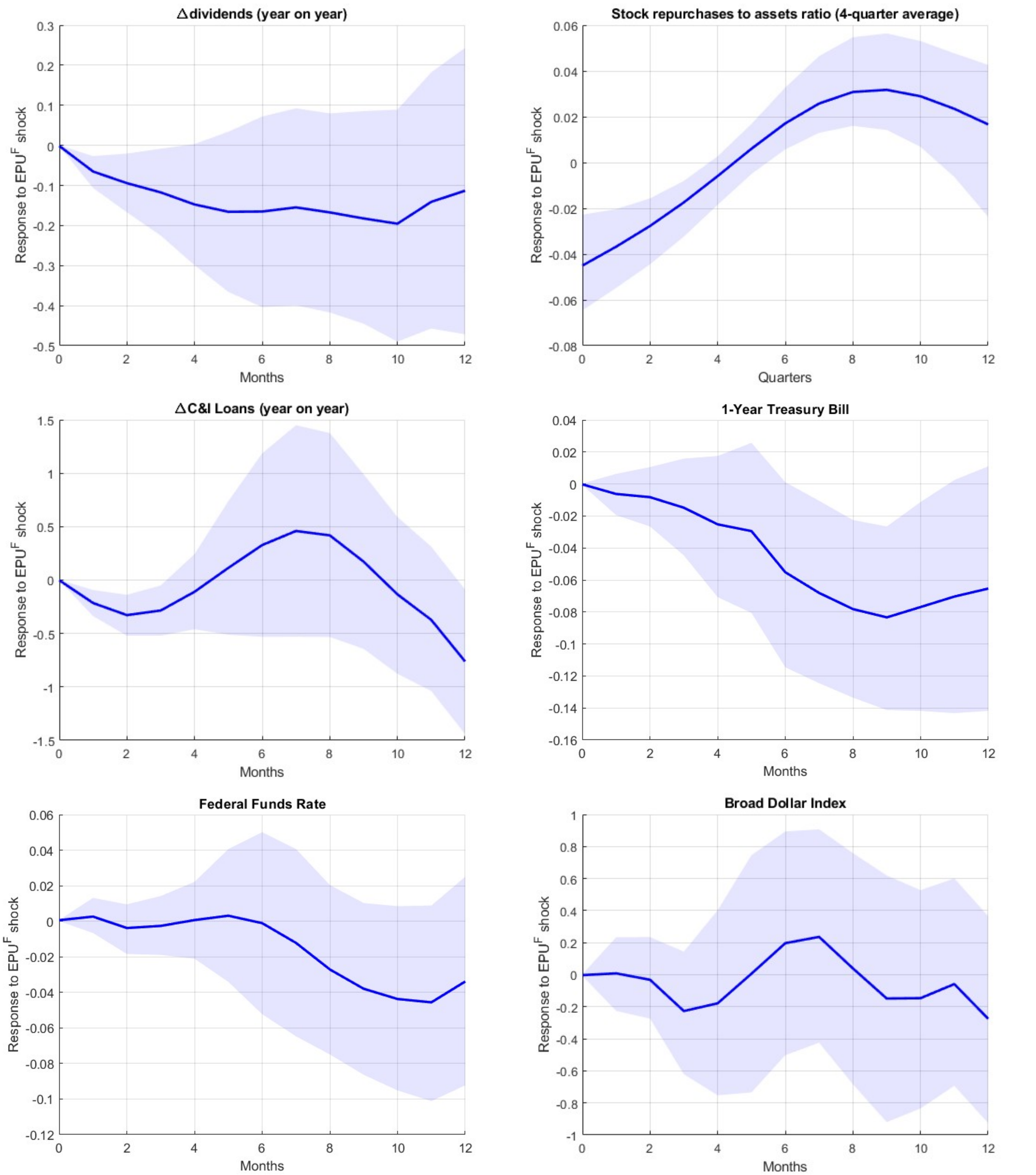
This figure plots Baker et al. (2016) global and U.S. indexes, the constructed foreign EPU measure, and extracted foreign EPU shocks from January 1997 to March 2024. Shaded areas are NBER recessions. The bottom panel displays the histogram of EPU^F and extracted EPU^F shocks.

Figure 2: Responses of cash flow and discount rate news to EPU^{F} shocks



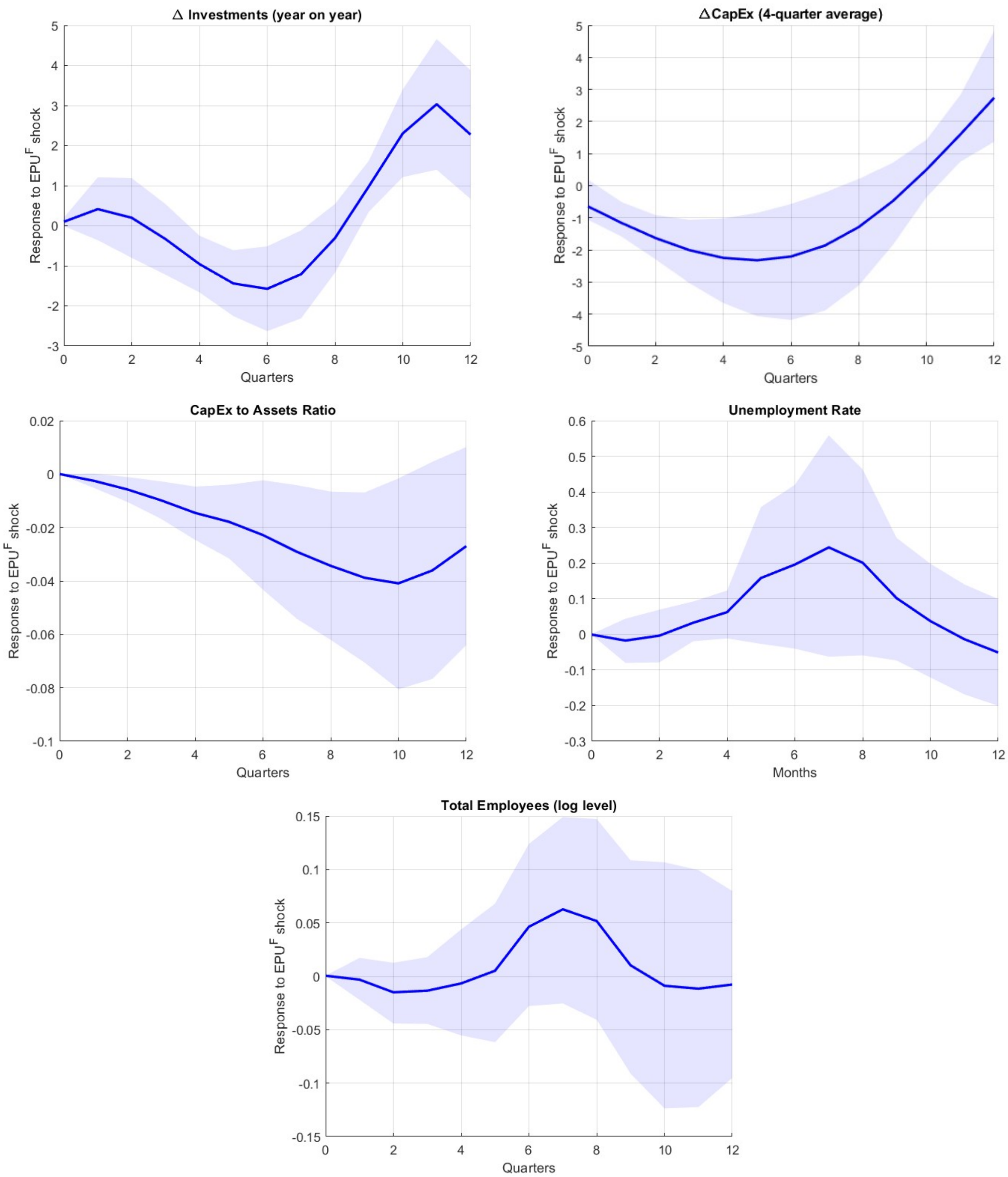
The figure plots the responses of cash flow (blue) and discount rate (red) news, extracted from S&P500 index returns using Campbell and Shiller (1988a,b) method, to EPU^{F} shocks, based on Barnichon and Brownlees (2019) smooth local projection (SLP) method. Shaded areas represent their respective 95% confidence bands.

Figure 3: EPU^F shocks and financial variable responses



This figure plots responses of cash flow (blue) and discount rate (red) news, extracted from S&P500 index returns using Campbell and Shiller (1988b,a) method, to EPU^F shocks. The responses are based on Barnichon and Brownlees (2019) smooth local projection (SLP) method and shaded areas represent their respective 95% confidence bands.

Figure 4: EPU^F shocks and macroeconomic variable responses



This figure plots responses of cash flow (blue) and discount rate (red) news, extracted from S&P500 index returns using Campbell and Shiller (1988b,a) method, to EPU^F shocks. The responses are based on Barnichon and Brownlees (2019) smooth local projection (SLP) method and shaded areas represent their respective 95% confidence bands.