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International Fund Allocation under Economic Policy Uncertainty Shock

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Abstract

This paper focuses on the impact of economic policy uncertainty on international asset allocation and international capital flows. Our results show that economic policy uncertainty shocks have a negative impact on the international asset allocation, which can be explained from the real economic activity channel and the expectation channel. We also explore a full fledge of country level heterogeneities about the economic policy uncertainty shocks on international asset allocation. Specifically, good institutional quality, transparent information, good information access to the international financial market and bilateral informational link help to alleviate the negative effect that economic policy uncertainty shock does to asset allocation. And a healthy public and external sector also help to alleviate the negative effect. While the importance of government in the economy amplifies the negative effect of economic policy uncertainty shocks to asset allocation.

JEL classification numbers: E44, G11, G15.
Keywords: Economic policy uncertainty, Global fund allocation, Institutional quality, Global imbalance.

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1. Introduction

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International capital flows have been bothering emerging markets (and even some developed small open economies) for many years. On the one hand, these countries need international capital to support growth and provide intertemporal insurance for consumption smoothing. On the other hand, international capital flows are volatile by nature, which may bring additional source of fluctuations to these economies.

International capital flows are influenced by a wide range of global and local factors: including global liquidity and global risk, country-specific institutional quality, country risk and macroeconomic fundamentals (Fratzscher, 2012). Although these factors have been successful in explaining some of the driving forces of international capital allocation, there still remains further issues to be explored. For instance, ever since 2008, the rising and wide-spreading of economic policy uncertainty (hereafter EPU) have been taken by macroeconomists to explain the post-crisis sluggish recovery of the economy. Yet the role of global and country-specific EPU in shaping international capital flows is far less investigated.

The objective of this paper is to fill this gap and bring EPU into the analysis of international asset allocation. First, we show that there is wide-spreading and long-lasting EPU shocks around the world since 2008. Actually, macroeconomists have been arguing that economic policy uncertainty plays an indispensable role in the post-crisis sluggish recovery (e.g. Fajgelbaum et al., 2017; Basu and Bundick, 2017). It conducts negative impacts to both real and financial activities: including investment, unemployment, output, productivity, foreign direct investment; and stock prices, option prices, exchange rates. Secondly, we are interested in the impact the EPU shocks do on international capital flows. In accordance with the literature on the role of EPU in business cycles, we find that EPU shocks significantly commands negative impact on international asset allocation. This mechanism mainly through the expectation channel, which would be elaborated in the mechanism explanation part later. Thirdly, we find huge cross-country heterogeneity in facing the EPU shock. Countries with better institutional quality, that are more open, and that are more informational linked with the fund source country (international financial markets) endure less negative effect. Countries with a firm public and external sector are also less affected. But the importance of public sector in the countries' economy gives an "enhancing effect" to the negative effect.

1.1 Background

This paper shows that economic policy uncertainty (whether independent from real economic uncertainty or not) should be included as a driving force of international capital flows, given the wide-spreading of policy uncertainty in recent years, and especially for those countries whose governments account for a large part of the GDP. Economic policy uncertainty influences capital flow mainly through two mechanism:

Firstly, policy uncertainty conducts negative effect on real variables such as investment and employment. Uncertainty depresses investment through the channel of real option effect: when uncertainty is high and when there exists adjustment cost for investment, there exist an option value of waiting, as explained by the string of literature of Bernanke (1983); Abel and Eberly (1994); Bloom et al. (2007). Similar to investment, hiring and firing activities face adjustment cost, too. So, the same wait-and-see effect of employment could also be generated in a standard model with uncertainty (Schaal, 2017). Since asset prices are reflection of future profitability of the economy, the state of real variables would then soon be reflected in asset prices and allocations. Consequently, investors will lower their positions in risky asset if uncertainty about future profitability rises.

Secondly, even without the real economic activity channel, the asset market alone may be sensitive to uncertainty shocks because of emotional factors, risk aversion, and expectation (Brogaard and Detzel, 2015). Reported uncertainty makes investors to re-evaluate their investment plan and adjust their positions in specific assets. In macroeconomic literature, expectation is a major channel for understanding business cycle fluctuation. Hence, we argue that EPU drives international capital flows mainly through the channel of expectations. Since newspaper could be viewed as a major channel through which international investors gain and update their expectations, a sudden spike of news-based uncertainty will certainly make them react to this change, even without real uncertainty shocks happens. Consequently, investors will lower position in that country if its economic policy uncertainty is reported to be high. This is in line with literature on expectation-driven business cycles.

1.2 Related Literature

Our research relates to several strings of literature. The first one is on the role of economic (policy) uncertainty plays in investment, consumption, employment and business cycle fluctuation, and asset prices including stock price, option price and exchange rate.

Literature has long been established that uncertainty about the future state will deter investment through real option effect: wait-and-see provides extra profit when uncertainty is high (Bernanke, 1983; Abel and Eberly, 1994; Bloom et al., 2007). Bloom et al. (2007) brought a comprehensive theoretical and empirical analysis on how economic uncertainty would influence investment. They introduced partial irreversibility of investment and the real option value of waiting, and find that firms

react less to positive demand shocks when uncertainty is high. Julio and Yook (2012) took convenience of elections to conduct a causal relationship of political uncertainty and domestic firm's investment behavior. Julio and Yook (2016) investigated the international FDI flow under political uncertainty shocks. On the labor side, Schaal (2017) find that an increase in volatility leads to a large rise in unemployment, which could be decomposed by a large increase in layoffs and a modest rise in hiring. Shoag and Veuger (2016) also find that state-level news-based economic uncertainty conducts negative impact on employment. Interestingly, they find pre-determined political institution serves as an amplification object for uncertainty shocks: national-uncertainty movements had a bigger impact on states with late budgets, formal budget deadlines, and lame-duck governors.

Recently, literature has been studying (policy) uncertainty's role in business cycle fluctuation. Fajgelbaum et al. (2017) embed endogenous uncertainty, interpreted as variance of agents' beliefs about the future economic fundamentals, into a standard business cycle framework and find that uncertainty makes recessions deeper and longer. Bloom et al. (2018) argue that recession could be better modeled with a first-moment shock (level shock) and a second-moment shock (uncertainty shock).

Brogaard and Detzel (2015) investigates the asset pricing implication of government economic policy uncertainty. They first give evidence that economic policy uncertainty and general economic uncertainty are at least partly orthogonal, thus leaving room for policy uncertainty to play a role in asset pricing, beyond general economic uncertainty. They find EPU commands a negative impact on contemporaneous stock returns but generates positive future excess returns, i.e. investors need a negative risk premium to compensate their risk-taking along with EPU shock.

Our research also contributes to literature studying international capital flows. Fratzscher (2012) conducts a comprehensive investigation on the factors that influence capital flows. These factors include global factors such as global liquidity, global risk, and country-specific factors such as institutional quality, country risk and macroeconomic fundamentals. Forbes and Warnock (2012) study the stylized patterns of international capital flows: surges, stops, flight, and retrenchment. They find global factors are the main ones that drive these episodes, contagion plays a minor role. In align with these literature and the wide-spreading economic policy uncertainty around the world, our research suggest policy uncertainty could also be included in the analysis of capital flows.

2. Data Description and Variable Construction

2.1 Identifying Economic Policy Uncertainty Shock

Our primary interest is how the variation of a country's economic policy uncertainty would affect international mutual fund allocation. To achieve that, we have to firstly identify cross-country comparable EPU shocks.

We utilize the economic policy uncertainty index (hereafter EPU index) developed by Baker et al. (2016). This EPU index covers 21 emerging and developed countries

with monthly frequency, and is normalized by setting the historical average to be 100. Unfortunately, the original EPU index is not cross-country comparable, as a normalized 100-average in each country doesn't mean that they actually have the same level of economic policy uncertainty in history. However, since we aim to conduct a cross-country analysis, cross-country comparability is a necessary element for our econometric specification. So, we generate a new measure: EPU shock, which is a dummy variable taking the value 1 if there is an EPU shock and 0 if otherwise. The identification method is elaborated as below.

For each country in our sample, we utilize the BBD's original EPU index to calculate the five-year rolling mean and five-year rolling standard deviation (forward 1 year and backward 4 years). We identify an "EPU shock = 1" if the original EPU index exceeds the five-year rolling mean, provided that the highest points of the original index exceeds 2-sigmma above the rolling mean. This method of identifying EPU shock is similar to Forbes and Warnock (2012), who utilized it to identify capital flow surge and sudden stop episodes. Besides, we also calculate the persistence of each EPU shock, which specifically refers to how many months each EPU shock endured. Table 1 and Figure 1 present the country and time distribution of our identified EPU shocks.

Table 1: Summary statistics of EPU shocks

Country	Numbers of Shocks	Average Persistence(month)
Australia	4	9.3
Brazil	5	5.4
Canada	4	7.3
Chile	4	8.5
China	3	10.7
France	5	8.4
Germany	6	4.7
Hong Kong	7	3.1
India	2	16
Ireland	4	2.5
Italy	4	8.8
Japan	4	13.5
Korea South	3	7.3
Mexico	2	5.5
Netherlands	4	8
Russian Federation	6	4.8
Singapore	5	7.8
Spain	6	4.2
Sweden	5	6.2
United Kingdom	5	13.8
United States	5	5.8

We argue that our measure of EPU shock (by above methods) is cross-country comparable. Julio and Yook (2016) use election events as measure of political uncertainty in each country, with the concerned variable election = 1 or 0. In essence, our measure is similar to theirs in describing if there is uncertainty shock, they both take the value 1 if there exist extreme uncertainty (which in their context is political uncertainty, and in our context is economic policy uncertainty).

Table 1 presents the summary statistics of EPU shocks by destination country. Both emerging economies and developed countries are frequently caught by EPU shocks. For example, for the off-shore financial center like Hong Kong and Singapore, our method identified 7 and 5 EPU shocks, it might be because that they are open by nature and their economic policies are easily affected by various uncertain outside factors. On the other hand, the average persistence of EPU shock in each country ranges from 2.5 months to 13.8 months. Interesting is that by our identification, the number of EPU shocks is negatively correlated with the average persistence of each shock. Figure 1 shows the time pattern of EPU shocks. As we can see, the number of countries got caught by EPU shocks is most in periods around the global financial crisis of 2008, the European debt crisis around 2012, and the latest period of 2016 figured by UK Brexit and Trump election.

The interpretation of EPU index and its derived EPU shock is that it reflects people's perception/expectation about economic policy uncertainty, as the original EPU index is the frequency of economic policy uncertainty reported on newspapers. It is some kind of a news shock and ex ante, in contrast with real economic uncertainty shock (e.g. TFP shock) and ex post.

Further, we use these fund-level indicators and in combination of country-level stock market returns to derive some other variables we are interested in: fund's overall skill as measured by alpha-value from capital asset pricing model (CAPM), fund's timing skill in each country, fund's financial condition as measured by last six/twelve months' injection from underlying investors. Specifically, these derived indicators come from following formulas:

$$\mathrm{NAV}_{i,t+j} = \beta_{it} \times \mathrm{comreturn}_{i,t+j} + \alpha_{it}, j = -11, \dots, 0 \tag{1}$$

$$\mathrm{Timing}_{ict} = \mathrm{COV}\left(\mathrm{weight}_{ic,t+j}, \mathrm{return}_{c,t+j+1}\right), j = -5, \dots, 0 \tag{2}$$

$$\mathrm{FinCondition}^1{}_{it} = \sum_{j=-5}^{0} \mathrm{injection}_{i,t+j} \tag{3}$$

$$\mathrm{FinCondition}^2{}_{it} = \sum_{j=-11}^{0} \mathrm{injection}_{i,t+j} \tag{4}$$

Where i is fund, t and j represent month, c is each destination country. Formula (1) is the standard CAPM equation, we use this equation to calculate α_{it}. $NAV_{i,t+j}$ is the return of fund i in month t + j, $comreturn_{i,t+j}$ is the composite market return that a fund face, which is calculated by taking the weighted average of destination countries' stock market return, the power is the fund's allocation weight in that country. We calculate αit of fund i at month t by estimating the last twelve months sample. Formula (2) is used to calculate fund i's timing ability in country c at month t, this measure calculates the covariance of fund's weight in one country and the next-period return of that country. The intuition is that if a fund allocates more weight to a country with next-period higher return, implicitly it can earn more because of catching the country's market return change in advance. Our measure of fund's timing ability is similar to Kacperczyk et al. (2014) and Kacperczyk et al. (2016).Formula (3) and (4) are used to calculate fund's financial condition by aggregating injection of the last twelve/six months from underlying investors. If a fund's financial condition is good, it may react less to economic uncertainty shocks, because it has stronger risk bearing ability.

2.2 International Mutual Fund and Fund Level Characteristics

Our micro-level international mutual fund data comes from EPFR data base, which has detailed information on funds' size, net asset value change (fund return), cash holding, fund's domicile country, investor's injection into and redemption out of each fund, and most importantly month-end asset each fund allocated into each country. EPFR is the most comprehensive data base that collects full set of international mutual funds which invest in different countries (mainly emerging markets). It has high frequency with daily, weekly, and monthly fund-level data available.

Table 2 and Table 3 presents the summary statistics about fund allocation weight in our sample countries. In Table 2, we present the summary statistics of fund allocation weight in each country, number of fund invested in each country, number of observations in our sample period.

Table 2: Summary statistics of weight and number of funds by destination country

Country	Mean	Std	Min	Max	# Funds	# obs
China	13.59	11.21	0.00	75.71	1,054	47,543
France	13.27	9.93	0.01	63.90	1,038	39,622
Germany	11.84	8.68	0.02	75.00	1,029	39,121
United Kingdom	16.26	10.97	0.00	55.63	1,028	36,952
Hong Kong	6.88	6.90	-0.15	68.90	1,026	42,254
Netherlands	5.27	3.86	-1.71	44.34	994	35,288
Spain	4.66	3.93	-0.37	60.21	961	32,045
Italy	3.93	3.18	-1.39	39.33	950	32,777
Korea South	11.16	7.63	0.00	43.30	875	42,335
Sweden	3.42	2.91	-0.10	38.75	849	27,524
India	7.29	5.54	-0.01	37.50	838	38,266
Singapore	4.27	4.43	0.00	44.40	817	30,409
Ireland	1.69	1.83	-0.58	15.56	746	20,739
Russian	14.95	20.32	0.00	90.60	742	31,115
Brazil	16.40	19.11	0.00	93.20	715	32,407
Australia	7.90	9.78	-9.68	65.60	704	22,706
Mexico	7.35	9.17	0.00	64.30	675	27,821
United States	28.74	22.03	-0.10	83.10	652	19,838
Japan	14.85	13.64	0.00	76.90	608	23,601
Chile	2.59	3.93	0.00	52.96	542	19,135
Canada	3.95	3.34	-1.11	29.81	496	15,303

In Table 3, we separately present the fund allocation weight and the dispersion of fund allocation weight in each country in both EPU shock period and non-EPU shock period. As can be seen, some countries—such as United States and China—earn a higher average allocation weight in EPU shock period, while other countries—such as Mexico and Brazil—earn a much lower average allocation weight in EPU shock period. There is great cross-country heterogeneity about reaction to EPU shock. United States earns a higher weight during EPU period because it is looked as the "safe heaven" by international investors, China also earns a higher weight during EPU period might be because of its growth potentials fully offset the negative impact uncertainty induces. On the contrary, for emerging

economies like Mexico and Brazil, inside instability, expropriation risk, and exchange risk might force international investor retrench their investment largely. We also compared the dispersion during EPU and non-EPU period, for most countries, the dispersion of international mutual fund drops along with EPU shock, which is consistent with the financial economics that covariance rises during depression. Because in depression or in EPU shock period, investors' expectations are more guided by aggregate information, and a big aggregate information that EPU shocks or depression conveys is a uniformly negative one.

Table 3: Summary statistics of weight and dispersion in EPU and non-EPU shock periods

	EPU Shock Period		**Non-Shock Period**		**Shock minus Non-Shock**	
Country	**Mean**	**Dispersion**	**Mean**	**Dispersion**	**Mean**	**Dispersion**
United States	31.17	21.43	28.30	22.11	2.87	-0.69
China	14.52	12.10	13.26	10.87	1.27	1.24
Hong Kong	7.42	7.09	6.79	6.87	0.63	0.22
Australia	8.11	9.31	7.84	9.90	0.27	-0.59
Netherlands	5.30	4.01	5.26	3.84	0.04	0.17
Japan	14.87	13.53	14.85	13.70	0.02	-0.17
Ireland	1.62	1.71	1.69	1.84	-0.07	-0.13
Canada	3.82	3.19	3.98	3.37	-0.16	-0.18
Chile	2.44	3.99	2.64	3.91	-0.20	0.08
Sweden	3.25	2.95	3.45	2.90	-0.20	0.06
France	13.10	9.32	13.31	10.06	-0.20	-0.75
Singapore	4.10	4.53	4.35	4.39	-0.25	0.14
Spain	4.41	4.05	4.72	3.90	-0.31	0.15
Germany	11.57	8.66	11.90	8.68	-0.33	-0.01
Russian	14.57	19.90	15.06	20.44	-0.49	-0.54
India	6.89	4.71	7.38	5.70	-0.50	-0.98
Korea South	10.73	6.76	11.23	7.76	-0.50	-1.00
Italy	3.49	2.75	4.05	3.27	-0.57	-0.52
U.K.	15.69	11.02	16.77	10.89	-1.07	0.13
Mexico	6.00	8.08	7.48	9.26	-1.48	-1.18
Brazil	11.82	16.01	18.01	19.84	-6.19	-3.83

2.3 Country Level Characteristics

Besides, we employ a full set of country characteristics variables as our controls and interaction terms in our econometric specifications. The summary statistics of these variables are presented in Table 4.

Return is the destination country's monthly stock market return, downloaded from CSMAR. ExChange is the monthly exchange rate change of destination country, and is taken from International Financial Statistics of IMF. These indicators are monthly frequency. QGDP Growth, GDP Share, and GDP per capita represent destination country's growth potential, market size, and development level respectively.

WGI is worldwide governance indicators provided by World Bank with annual frequency. Non−Corruption is country corruption index taking from transparency international, a non-government organization which focuses on evaluating each country's corruption degree each year. We introduce these two indicators to measure the institutional quality of our destination country.

KAOPEN is a measure of financial openness, the former is foreign portfolio investment as percent of GDP, and the latter is taken from Chinn and Ito's website[3]. Trade Open is country's trade volume relative to its GDP. FinDev is the financial development level taking from IMF website. These variables measure the overall informational accessibility of destination country to the international financial market. And we measure the bilateral informational link of fund domicile country and investment destination country through the following group of variables: Trade Link BI is bilateral trade volume (scaled by fund's domicile country GDP). We use it as an informational linkage proxy as trade brings information communication between two countries. Country Difference is a dummy variable which takes the value 1 if fund's domicile country and destination country both belong to the same country type (there are two types of countries here: developed countries and emerging markets), and take the value 0 when the domicile country and destination country are NOT the same type. Gov Expense and Gov Balance are the government expenditure and budget balance, which are simple measures of the importance and financial condition of the public sector in the economy. Reserves and CAB are foreign reserves and current account balance of destination country. Trade Balance BI is the trade balance fund's domicile country earns from the destination country. There variables measure the public sector's importance, public and external sector balance in the EPU shocked destination country.

[3] http://web.pdx.edu/~ito/Chinn-Ito_website.htm

Table 4: Summary statistics of country characteristics

Variables	Mean	Std	Min	Max
Return	0.58	5.80	-36.18	30.58
ExChange	0.20	3.06	-14.26	22.52
QGDP Growth	0.70	1.38	-5.22	21.70
GDP Share	3.74	5.16	0.26	27.63
GDP per capita	10.09	0.99	6.56	11.12
WGI	8.14	2.19	3.00	10.00
Non-Corruption	8.27	2.14	1.00	10.00
KAOPEN	0.82	0.28	0.17	1.00
Trade Open	97.21	100.35	21.32	442.62
FinDev	0.73	0.16	0.33	0.95
Trade Link BI	3.36	7.83	0.01	145.34
Country Difference	0.50	0.50	0.00	1.00
Gov Expense	35.51	11.30	13.68	65.10
Gov Balance	-2.10	3.64	-10.57	11.81
CAB	1.90	6.16	-9.68	26.06
Reserves	15.57	20.26	0.34	99.81
Trade Balance BI	0.44	5.22	-11.86	133.59

3. Econometric Specification and Results

3.1 Econometric Specification

Our benchmark regression considers how much on average international mutual funds would react to the destination country's EPU shock. We set our base line regression as follows:

$$\text{Weight}_{\text{ict}} = \beta_0 + \beta_1 \text{EPUShock}_{ct} + \beta_2 X + fe_{ic} + fe_t + \varepsilon_{\text{ict}} \quad (5)$$

As introduced above, $\text{weight}_{\text{ict}}$ is fund i's allocation weight into country c at month t. EPU Shock_{ct} is a dummy variable taking the value 1 if country c is in an economic policy uncertainty shock in month t, and 0 if otherwise.

Our controls X include a group of country-level variables—$\text{Return}_{\text{ct}}$, $\text{ExChange}_{\text{ct}}$, $\text{GDPGrowth}_{\text{ct}}$, $\text{GDPShare}_{\text{ct}}$, $\text{GDPpercapita}_{\text{ct}}$, $\text{FinOpen}_{\text{ct}}$, $\text{KAOPEN}_{\text{ct}}$, $\text{FinDev}_{\text{ct}}$, and a group of fund-level variables—$\text{fundsize}_{\text{it}}$, flow_{it}. We also include fund-country fixed effect and month fixed effect. Including fund-country fixed effect allows the explaining power of our model rise up to more than 0.90. The coefficient β_1 measures how much on average an EPU shock affects fund allocation weight, conditional on other factors as controlled. Coefficients γ_1, γ_2, γ_3 measure the influence of EPU shock and its persistence on fund allocation weight. We expect β_1 and γ_1, γ_2, γ_3 to be negative, as interpreted as that the EPU shock will depress

international fund's allocation into the EPU shocked country. Furthermore, the more persistent the shock is, the harsher the depressing effect.
Besides, we conduct alternative fixed effects and alternative measures of EPU shocks in our regression:

$$\text{Weight}_{\text{ict}} = \beta_0 + \beta_1 \text{EPUShock}_{ct} + \beta_2 X + fe_{ic} + fe_{it} + \varepsilon_{\text{ict}} \quad (6)$$

$$\text{Weight}_{\text{ict}} = \beta_0 + \beta_1 \text{EPUShock}_{ct} + \beta_2 X + fe_{cv} + fe_{it} + \varepsilon_{\text{ict}} \quad (7)$$

$$\text{Weight}_{\text{ict}} = \beta_0 + \beta_1 \text{Alt EPUShock}_{ct} + \beta_2 X + fe_{ic} + fe_t + \varepsilon_{\text{ict}} \quad (8)$$

In regression 6 and 7, we conduct alternative fixed effects by using fund-country fixed effect combining fund-month fixed effect, country-year fixed effect plus fund-month fixed effect. In regression 8, we use alternative measures of EPU shocks: e.g. Persistence_{ct} is the months that each EPU Shock lasts, and EPU Growth is the growth rate of original BBD EPU index.
Besides our baseline setting, we employ various extensions to test heterogeneity of the depressing effect across countries and funds. We employ the following econometric settings as our extensions:

$$\text{Weight}_{\text{ict}} = \delta_0 + \delta_1 \text{EPUShock}_{ct} + \delta_2 \text{EPUShock}_{ct} \times Interaction + \delta_3 Interaction + fe + \varepsilon_{\text{ict}} \quad (9)$$

We explore several groups of country and fund characteristics as the Interaction term. The first group of interactions is information variable, especially the institutional quality of the destination country including: worldwide governance indicators (WGI_{ct}), country non-corruption index ($\text{Non-Corruption}_{ct}$), de jure measure of financial openness (KAOPENct), trade openness (Trade Open_{ct}), financial development level (FinDev_{ct}), bilateral trade link (TradeLinki_{ct}). As is frequently mentioned in literature, information plays a non-ignorable role in international fund investment or international capital flow. For example, Broner et al. (2011) find that country crisis enhances information asymmetry of domestic and foreign investors, deteriorates foreign agents risk aversion, and thus induces quick retrenchment of capital flows. Choi et al. (2017) both use home-market investors' informational advantage to explain home bias of international asset allocation. In trade literature, institutional quality is considered as a comparative advantage when considering international trade and FDI. WGI and Transparency are our measures of institutional quality. We hope that the coefficients of EPUshock ·WGI and EPUshock ·Transparency to be positive, interpreted as a good institutional quality would alleviate the depression effect that EPU shock commands to fund allocation. FinOpen, kaopen and FinDev could be treated as of information transparency, information quality, and information accessibilities. If a country's macroeconomic, financial and corporate information is more accessible, we hope that the damage

(here is the depressed fund allocation weight) caused by EPU shock would be less. So, we also expect their coefficients to be positive. TradeLink and GeoDist are measures of bilateral informational link between domicile countries and destination countries.

Our second group of interactions is about the importance and soundness of the country's public and external sectors. These interactions include government expenditure as percent of GDP ($GovExpense_{ct}$), government budget balance as percent of GDP ($GovBalance_{ct}$), Reserves scaled by GDP ($Reserves_{ct}$), current account balance as percent of GDP (CAB_{ct}), fund's domicile country's trade balance on destination country scaled by domicile country's GDP (Trade Balance BI_{ict}). The more important government is in an economy which is proxied by GovExpense, more severe that EPU shock might influence the real economy and thus the international mutual fund allocation. On the other side, if the public sector is more healthy, measured by a stronger government budget balance, it might be that the negative influence of EPU shock on real economy and international fund allocation would be weaker. Furthermore, the recent decade has been a decade of frequently discussing global imbalances. We argue that as a long-term equilibrium outcome and as a big given reality, global imbalances may also help to explain international fund allocation. Specifically, we expect the global imbalances indicators—current account balance, bilateral trade balance (both are flows), official reserves (which is interpreted as stocks)—can influence the degree of EPU shock on international fund allocation. If the destination country is more external "balanced"—measured by both flows and stocks, the negative effect of EPU shock on fund allocation could be smaller. And if the fund domicile country earns a trade balance from the destination country, we expect the funds from it would have a stronger risker bearing ability when EPU shocks.

Our third group of interactions is from fund level. Specifically, we include fund's financial condition (as measured by last twelve/six months injection fincondition1it and fincondition2it), fund's overall investment skill (extracted from the standard CAPM αit), and fund's timing skill of destination country stock market (the covariance measure $Timing_{ict}$). We expect all these indicators to interact positively, that is, the existence of these factors will alleviate the EPU shock's depression effect on fund allocation, we'll see if the empirical test meet our expectation.

3.2 Baseline Results

In this section we present our baseline regression, the results are shown in Table 5. In all our regressions, we conducted OLS, using panel data, and with fixed effects. Column (1) and (2) are the baseline regression with fund-country and month fixed effect, without and with controls respectively. Including or not including controls doesn't change the negative impact EPU shocks does to international fund allocation. As column (2) shows, an EPU shock averagely causes international fund reduce a −0.53% of their position in the EPU shocked country, which is quantitatively large since our whole sample includes 1.5 trillion USD asset. Fund-

country and month fixed effects are included, adding fund-country fixed effect allows our model explaining power rise up to more than 0.90.

In column (3) and (4) we conduct the baseline settings with controls but with alternative fixed effects: column (3) uses fund-country and fund-month fixed effects, column (4) uses country-year and fund-month fixed effects. Column (5) and (6) use alternative measures of EPU shocks: namely EPU shock persistence (lasting months) and growth rate of original BBD index. Column (7) and (8) presents a subsample of active fund and index fund, as could be seen the Table, active fund react more to EPU shocks than index fund. Above all, alternative fixed effects, alternative measures of EPU shocks and alternative samples don't change the negative direction that EPU shocks conduct to international fund allocation. These results are in line with the literature that claims uncertainty shock (both real economic uncertainty and news-presented uncertainty) would depress risk asset prices and investor's position in risk asset (Pastor and Veronesi 2012; Pástor and Veronesi 2013; Kacperczyk et al. 2014; Kelly et al. 2016).

Table 5: Baseline results and robustness

	Baseline Results		Alternative Fixed Effects		Alternative Measures of EPU		Alternative Samples	
					Persistence	EPU Growth	Active Funds	Index Funds
VARIABLES	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
EPU Shock	-0.604***	-0.532***	-0.463***	-0.101***	-0.0486***	-0.0156***	-0.583***	-0.310***
	(0.0370)	(0.0315)	(0.0314)	(0.0270)	(0.00398)	(0.00503)	(0.0373)	(0.0475)
Return		0.033***	0.034***	0.028***	0.034***	0.035***	0.035***	0.021***
		(0.0012)	(0.0013)	(0.0014)	(0.0012)	(0.0013)	(0.0014)	(0.0022)
ExChange		-0.055***	-0.055***	-0.040***	-0.056***	-0.058***	-0.061***	-0.030***
		(0.00219)	(0.00215)	(0.00242)	(0.00223)	(0.00224)	(0.00256)	(0.00310)
QGDP Growth		0.103***	0.0713***	0.131***	0.105***	0.103***	0.131***	0.019***
		(0.00794)	(0.00746)	(0.00716)	(0.00810)	(0.00809)	(0.0102)	(0.00643)
GDP Share		0.443***	0.461***	0.417***	0.457***	0.403***	0.384***	1.069***
		(0.0802)	(0.0766)	(0.0725)	(0.0804)	(0.0799)	(0.0855)	(0.198)
GDP per capita		4.680***	5.922***	5.017***	4.614***	4.979***	5.050***	1.544***
		(0.389)	(0.457)	(0.314)	(0.391)	(0.392)	(0.436)	(0.485)
ka open		0.410	0.771	0.492	0.435	0.824	-0.0608	5.320***
		(0.620)	(0.612)	(0.618)	(0.624)	(0.626)	(0.648)	(2.022)
TradeOpen		0.0074***	0.0097***	0.0076***	0.0080***	0.0080***	0.0081***	0.0039
		(0.00181)	(0.00203)	(0.00182)	(0.00181)	(0.00182)	(0.00201)	(0.00258)
FinDev		-1.018	-0.0098	-0.626	-0.992	-1.359	-0.974	-0.711
		(1.040)	(0.845)	(1.021)	(1.038)	(1.045)	(1.116)	(1.570)
Fund Size		0.00662	-0.0161		0.00587	0.0147	-0.00549	0.0243
		(0.0376)	(0.0468)		(0.0375)	(0.0379)	(0.0436)	(0.0417)
Injection		-0.0004***	-0.0003***		-0.0004***	-0.0004***	-0.0007***	-0.00003
		(0.000140)	(0.000137)		(0.000140)	(0.000140)	(0.000231)	(0.00009)
Fund-Country	√	√	√		√	√	√	√
Month	√	√			√	√	√	√
Fund-Month			√	√				
Country-Year				√				
Observations	656,065	656,053	649,600	650,340	656,053	656,053	530,958	125,095
R-squared	0.934	0.939	0.941	0.554	0.939	0.938	0.929	0.978

Robust standard errors in parentheses, *** p<0.01, **p<0.05,*p<0.1

3.3 Extensions: Country Level Heterogeneity

While EPU shock and its persistence would depress international fund allocation weight in the shocked country, this depression effect is with huge heterogeneity across countries and funds. In this section we explore several kinds of country-level heterogeneities.

First, recent literature has stressed the importance of a country's institutional quality in determine international trade and cross-border FDI. There is literature claiming the relevance of information in mutual fund investment, these literatures include

literature on explaining home bias as an informational friction outcome, literature on explaining fund investment performance with its ability to catch aggregate shocks and stock-idiosyncratic shocks (Kacperczyk et al., 2014, 2016). Following these literatures, we empirically test if country level institutional quality and information quality/accessibility would affect international fund's reaction to EPU shock.

As is shown in Panel A of Table 6, column (1) and column (2) focus on institutional quality as interaction terms. Both columns show that institutional quality plays a positive role in affection "EPU shock & fund allocation" relation. Column (1) tells that a one decile upward shift of governance index (WGI) would influence the allocation weight under EPU shock by 0.06%, column (2) tells that a one decile upward shift of government clean index ($\text{Non} - \text{Corruption}$) would influence the allocation weight under EPU shock by 0.11%. Both relations are statistically significant at 1% level. These outcomes are quantitatively important since as show in Table 3 a standard deviation of WGI and $\text{Non} - \text{Corruption}$ is around 2, thus a standard deviation improvement in the country's governance alleviates EPU shocks by 0.12% and 0.22%, according to different measures of governance.

Column (3) to (6) are regression with informational variables as interactions. Column (3) tells that a 0.5 unit increase (note that the maximum value of KAOPEN is 1, and the minimum value is 0.17) in de jure measure of capital account openness will help to alleviate the EPU shock on average fund allocation weight by 0.25%. Column (4) shows that trade openness also help to alleviate the depression effect that EPU shocks does to international fund allocation. Column (5) and (6) say bilateral informational linkage, which is proxied by bilateral trade volume and domicile-destination country's EM or DM type, will also help to alleviate the negative effect. Our results are in line with literatures that focus on information linkage and informational transparency's role in asset allocation. More information make investor react less to uncertainty shocks.

Table 6: Extensions and heterogeneity

Panel A：Heterogeneity on institutional quality and information efficiency						
	WGI	**Non-Corruption**	**KAOPEN**	**TradeOpen**	**Trade Link BI**	**Country Difference**
	(1)	(2)	(3)	(4)	(5)	(6)
EPU Shock	-1.051***	-1.433***	-1.002***	-0.695***	-0.656***	-0.440***
	(0.110)	(0.111)	(0.0938)	(0.0443)	(0.0371)	(0.0367)
EPU Shock * Interaction	0.0661***	0.112***	0.594***	0.00177***	0.0416***	-0.206***
	(0.0123)	(0.0122)	(0.101)	(0.000221)	(0.00648)	(0.0535)
Interaction	0.0867	0.104**	0.0811	0.00790***	-0.0396***	1.958***
	(0.0545)	(0.0464)	(0.617)	(0.00182)	(0.00940)	(0.101)
Fund-Country	√	√	√	√	√	√
Month	√	√	√	√	√	√
Observations	656,053	656,053	656,053	656,053	636,696	656,053
R-squared	0.939	0.939	0.939	0.939	0.937	0.939
Panel B：Heterogeneity on public sector and external sector characteristics						
	Gov Expense	**Gov Balance**	**CAB**	**Reserves**	**Trade Balance BI**	
	(1)	(2)	(3)	(4)	(5)	
EPU Shock	-0.274***	-0.401***	-0.576***	-0.575***	-0.557***	
	(0.0742)	(0.0309)	(0.0348)	(0.0373)	(0.0319)	
EPU Shock * Interaction	-0.00702***	0.0416***	0.0185***	0.00352***	0.0481***	
	(0.00209)	(0.00797)	(0.00392)	(0.000906)	(0.0122)	
Interaction	0.0436***	0.117***	0.0381***	0.0555***	0.00671	
	(0.00995)	(0.0170)	(0.0124)	(0.0127)	(0.0144)	
Fund-Country	√	√	√	√	√	
Month	√	√	√	√	√	
Observations	656,053	656,053	656,053	613,843	636,696	
R-squared	0.939	0.939	0.939	0.941	0.937	

Robust standard errors in parentheses, *** p<0.01, **p<0.05,*p<0.1

Our second group of interactions is about the importance and soundness of the country's public and external sectors, as mentioned in the above econometric specification part. Panel B in Table 6 shows the regression results using these interactions. Qualitatively, column (1) tells that government's relevance in the economy—measured by its expenditure in percent of GDP—deteriorates EPU shock's depression effect on fund allocation. It is reasonable and meets our expectation, the more important a government is in the economy, and the more bad effects its policy uncertainty brings to real economic activity and financial markets. Quantitatively, since the mean value of government expenditure (scaled by GDP) is 35.51 percent, thus on average government's presence in economy brings $35.51 \times (-0.00702) = 0.25$ percent drop in international fund allocation weight. So, it is

quantitatively relevance. We also analyze the influence of government's budget balance. As column (2) shows, a 1% improvement in government's budget balance would temper EPU shock's influence by 0.033%, which is in line with our expectation.

The next three columns of Panel B in Table 6 is about global imbalances. Global imbalances is a frequently discussed issue in trade and international finance literature. While existing literature mainly focuses its attention on the determinants, sources and driving forces of global imbalances, we focus our attention on the consequences of global imbalances. As an immense phenomenon which dominates international trade and international capital flow for decades, global imbalances almost surely has its position in influencing international fund investment decisions at the micro level. Taking global imbalances as given and as an equilibrium outcome, Corte et al. (2016) use it to explain currency premium. Imbalanced country's currency would contain a negative risk premium in the exchange rate price, as a compensation to investors who bear extra risk related to external imbalances. Column (3) and (4) and (5) of Panel B in Table 6 verified our conjecture that a balanced external sector—both measured by flows and measured by stocks—would help to alleviate the negative effect EPU shock commands to fund allocation. Quantitatively, column (3) says that a 1 percent improvement in a country's current account balance would temper the negative "EPU shock to fund allocation effect" by 0.0185 percent. Column (4) tells that a ten percent increase in country's reserves-to-GDP ratio would help to alleviate the negative effect by 0.035 percent. Interestingly, column (5) indicates that if the domicile country earns 1 percent trade balance (scaled by domicile GDP) from the destination country, when EPU shock happens in the destination country, it would help to temper the negative effect of EPU shock by 0.0481 percent. All three measures of global imbalances are quantitatively relevant in alleviating the EPU shock's effect on international fund allocation, if we check the mean and standard deviation values of these indicators.

4. Conclusions

In this paper, we brought a comprehensive analysis on the role of economic policy uncertainty plays in international asset allocations and international capital flows. Our results show that EPU shocks, as measured by several different methods, command negative impact on international asset allocation. The mechanism could be explained from the real economic activity channel and the expectation channel: EPU shocks affect the future profitability of assets in specific country, thus depress asset prices and investors position on it; from the expectation channel, our measure of EPU shocks represents news that international investors gains to form and update their expectations, thus expectation alone can drive investors lower position on assets that exposure to EPU shocks.

We also explore a full fledge of country level heterogeneities about the EPU shocks on asset allocation.

Specifically, good institutional quality, transparent information, good information access to the international financial market, bilateral informational link help to alleviate the negative effect that EPU shock does to asset allocation. And a healthy public and external sector also help to alleviate the negative effect. While the importance of government in the economy gives an amplification to the negative effect of EPU shocks to asset allocation.

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