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## International capital market frictions and spillovers from quantitative easing

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# International Capital Market Frictions and Spillovers from Quantitative Easing

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# International Capital Market Frictions and Spillovers from Quantitative Easing

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## Abstract

This paper analyzes the impact of large-scale, unconventional asset purchases by advanced country central banks on emerging market economies (EMEs) during 2008–2014. I show that there was substantial heterogeneity in the way EME currency, equity, and long-term sovereign bond markets were impacted by these purchases. Drawing on the gravity-in-international-finance literature, I show evidence that the degree of economic integration between EMEs and advanced countries is able to explain some of the observed heterogeneity in how these asset prices were affected. This result is robust to considerations of the domestic monetary policy, exchange-rate regime, and capital control policies in EMEs. Furthermore, I show that the size and direction of asset price movements in EMEs depended both on the type of assets purchased and on whether it was the US Federal Reserve or other advanced country central banks engaging in the purchases.

**Keywords:** emerging markets, unconventional monetary policy, gravity

**JEL Classification Numbers:** E4, E5, F3

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# 1 Introduction

Throughout 2008–2014 several advanced economies engaged in unconventional monetary policy in response to the global financial crisis. These policies consisted primarily of forward guidance and large scale purchases of unconventional assets by central banks. The US Federal Reserve (the Fed) implemented the first and the largest of such programs, followed by the Bank of England (BOE), the Bank of Japan (BOJ), and the European Central Bank (ECB).<sup>1</sup> Recent research has shown that these unconventional monetary policy programs had substantial international spillovers to emerging market economies (EMEs). In particular, following the Fed’s implementation of forward guidance and announcements of their program of large scale asset purchases (LSAPs), many EMEs saw a rise in foreign capital inflows, a rise in equity prices, a fall in sovereign yields, a real appreciation of currencies, and an increase in non-financial corporate debt.<sup>2</sup> More recently, the Fed’s retreat from unconventional policy has been associated with nominal exchange-rate depreciations and stock market contractions in EMEs.<sup>3</sup>

In this paper I add to the existing research by identifying and explaining the heterogeneous impact of LSAPs on currency, equity, and sovereign debt prices in a large sample of EMEs, over the entire length of the program. In the central findings of the paper, I show that some of the cross-country variation in EME asset prices following the Fed’s LSAPs can be explained by the degree of capital market frictions (or conversely, the degree of economic integration) between EMEs and the US. I then extend the analysis by contrasting these spillovers with those from the BOE and BOJ’s unconventional asset purchase programs. Throughout both analyses, I examine whether the type of assets purchased by the Fed, BOE, or BOJ played a role in the magnitude of the purchases’ impact on EME asset prices.

The paper proceeds as follows. Section 2 describes my contributions to the literature on international spillovers of unconventional monetary policy. Section 3 discusses my method and data. Section 4 discusses results related to spillovers from the Fed’s LSAPs. Section 5 analyzes spillovers to EMEs from the BOE and BOJ asset purchase program. Section 6 reports several robustness exercises, and section 7 concludes.

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<sup>1</sup>Here I am referring to unconventional policies enacted specifically to combat the great recession or global financial crisis of 2008–2009. The BOJ also conducted quantitative easing programs during their extended period of low inflation in the 1990s and 2000s.

<sup>2</sup>See Lo Duca, Nicoletti, and Martinez (2014), Fratzscher, Duca, and Straub (2013), and speech by S. Honkapohja, Bank of Finland June 9 2014, among others.

<sup>3</sup>See Aizenman, Binici, and Hutchison (2014) and Eichengreen and Gupta (2014).

## 2 Research Context

Much of the existing research on the international transmission of the Fed’s unconventional monetary policy has studied the impact of asset purchase *announcements* or forward guidance statements on foreign financial markets. This work is generally conducted via event studies that examine the effect of such announcements and statements over a very short window of time (typically 30 minutes–48 hours), and finds that the Fed’s actions did influence foreign markets.<sup>4</sup> My method departs from these studies in several important ways: first I examine the transmission of the Fed’s *actual* asset purchases to EMEs, second I look at the spillovers to EMEs over the medium-term (up to 5 years), and finally I study the spillovers from similar asset purchase programs in the UK and Japan.

Most closely related to my work is the study by Fratzscher, Duca, and Straub (2013), who also analyze the impact of LSAPs from 2007–2010 on advanced and emerging countries.<sup>5</sup> They find both announcements and actual purchases of assets triggered an increase in non-US investment, particularly into EME equities, and find little evidence that capital-account policies or fixed exchange-rate regimes insulated countries from these spillovers. Moore, Nam, Suh, and Tepper (2013) and Lim, Mohapatra, and Stocker (2014) also look at spillovers from unconventional Fed policy over the medium- to long-term, finding these policies were associated with an increase in foreign ownership of EME debt and a reduction in EME sovereign yields.

My analysis differs from these studies along several dimensions. Most importantly, I explicitly document the cross-country heterogeneity in the spillovers to EME markets from the Fed’s LSAPs. Then, I show that this heterogeneity can be explained based on what I refer to as the degree of capital market frictions (or conversely the degree of integration) between individual EMEs and the US, instead of based on domestic capital control or exchange-rate policies alone.<sup>6</sup> This explanation is very intuitive: countries that have fewer impediments

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<sup>4</sup>See Neely (2010), Bauer and Neely (2014), Chen, Filardo, He, and Zhu (2012), Alpanda and Kabaca (2014) and Gilchrist, Yue, and Zakrajsek (2014), among others, for the international spillovers from LSAP and forward guidance announcements, and Eichengreen and Gupta (2014) and Dahlhaus and Vasishtha (2014) for the international spillovers from LSAP tapering announcements.

<sup>5</sup> These authors also look at the effect of LSAP announcements, in addition to actual asset purchases. Their foreign country variables of interest are exchange-rates, sovereign yields, equity markets, and portfolio equity and debt flows. Their data on portfolio flows consists of a small subset of all portfolio flows from the US to each country in their sample.

<sup>6</sup>My method is similar to that of Ehrmann and Fratzscher (2009) who explain monetary policy transmission by measuring a country’s real and financial integration with the US over the 1994–2004 period. Unlike mine, their analysis was based on conventional US monetary policy when interest rates were not at the zero lower bound.

to cross-border investment with the US should have larger bilateral investment flows; these countries could be described as having closer economic ties or being more integrated with the US. Then, Fed policies that influence US economic conditions, and thereby influence investor decisions, should have greater spillover effects on these more integrated countries. For example, one could easily imagine Mexico — whose economy is highly integrated with the US — experiencing greater spillovers from Fed policy action compared to Indonesia — whose economy is much less integrated with the US. I also consider the role domestic monetary policy in EMEs played in offsetting the impact from the Fed’s LSAPs, which has often been overlooked in existing literature. Finally I consider the entire LSAP program (2008–2014) rather than only subsamples of it.

My motivation for studying the cross-country heterogeneity in the effect of the Fed’s LSAPs, and for looking to the degree of integration between EMEs and the US as an explanation for it, arises from two sources. First, a consistent finding throughout this literature is that domestic capital and exchange-rate policies had a limited role in reducing the international transmission of US LSAPs during the crisis. Second, studies such as Ehrmann and Fratzscher (2009) have found that real integration with foreign countries was important in determining the transmission of US monetary policy in the pre-crisis years.<sup>7,8</sup> In order to identify the degree of integration or capital market frictions between the US and foreign countries, I draw on the literature on gravity models in international finance. Originally based on the gravity in international trade models, this literature identifies exogenous variables that both measure the degree of capital market frictions (often also referred to as information frictions) across countries and have strong explanatory power in the observed size and direction of bilateral capital flows and portfolio positions. In their original work Portes and Rey (2005) and Portes, Rey, and Oh (2001) showed that these exogenous measures of capital market or information frictions, referred to as “gravity variables”, can explain bilateral financial transactions and portfolio holdings at least as well as they can explain bilateral trade flows.<sup>9</sup> These variables typically include distance, hours equity markets overlap,

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<sup>7</sup>Ehrmann and Fratzscher (2009) also find that financial integration with the US was *not* a determinant of the transmission of conventional US monetary policy.

<sup>8</sup>Also closely related to this literature is Berkel (2007), who showed financial market development and information asymmetries are significant determinants of international portfolio holdings, while capital controls are not.

<sup>9</sup>Many other studies later confirmed the robustness of their results. See Lane and Milesi-Ferretti (2008), Fidora, Fratzscher, and Thimann (2007), Faruquee et al. (2004), and Berkel (2007) for static models, and Vermeulen (2013), Coeurdacier and Guibaud (2011), Ahrend and Schwellnus (2012), Forbes (2010), Chitu, Eichengreen, and Mehl (2013), and Pierucci, Pericoli, and Ventura (2013) for panel models, among many others. See Okawa and Van Wincoop (2012), Martin and Rey (2004), Obstfeld and Rogoff (2001), and Coeurdacier (2009) for theoretical gravity in international finance models.

indicators of contiguous physical borders, common currency, common legal histories, common colonial histories, and free trade agreements, among many others. I conjecture that because foreign monetary policy is transmitted through international capital flows, these exogenous measures of economic integration should also explain why certain countries are more affected by foreign monetary policy than others. In fact, I will show that even after accounting for domestic controls on foreign capital and investment, exchange-rate policies, and domestic monetary policy, the degree of economic integration between the US and EMEs can still partly explain the cross-country variation in how EME asset prices responded to LSAPs.

A limited number of studies take an approach similar to mine, analyzing international spillovers from the US during the great recession in the context of the degree of integration vis-à-vis the US. Unlike mine, these studies do not look directly at the impact on EME asset prices. Galstyan and Lane (2013) show that the size of pre-crisis bilateral holdings, geographical distance, common language, the level of trade, and common institutional linkages help explain patterns of foreign investment during and immediately after the crisis. Milesi-Ferretti and Tille (2011) show that the magnitude of retrenchment in capital flows across countries is linked to the degree of international financial integration. Other studies look at how unconventional US monetary policy influenced foreign business cycles and growth rates, with mixed results. Hausmann-Guil, van Wincoop, and Zhang (2014) show that countries more closely tied to the US had business cycle and growth rates more synchronized with the US during the financial crisis. Kalemli-Ozcan, Papaioannou, and Perri (2013) show that financial linkages may or may not predict the degree of business cycle synchronization, depending on how they are defined. Rose and Spiegel (2010, 2011) show no link between financial integration and transmission of the 2008–2009 financial crisis from the US. Finally, as noted above, Ehrmann and Fratzscher (2009) show that real, but not financial, integration can explain the international transmission of US monetary policy between 1994–2004.<sup>10</sup>

The final contributions I make in this paper are to contrast the international transmission of the Fed’s LSAPs with large scale unconventional asset purchase programs by the BOE and the BOJ, and to look at whether certain components of these asset purchase programs had a greater affect on the magnitude of the transmission to EME asset prices. I find that the BOE asset purchases were associated with similar movements in EME asset prices as those of the Fed, while those by the BOJ were not. This suggests that it was not only the

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<sup>10</sup>The authors measure real linkages as bilateral trade flows, geographic distance, volatility of exchange-rates vis-à-vis the US, GDP correlation, plus several other similar variables. Financial linkages are measured as bilateral portfolio investment, bank flows, and FDI investment vis-à-vis the US.

considerable influence of the US economy on foreign markets affecting EME asset prices, but also that there was a component of international portfolio rebalancing occurring after central bank purchases were executed in the US and the UK. Finally, I examine whether the type of asset purchased played a role in how EME markets were affected. I find that across all three central banks purchases of government bonds were associated with larger movements in EME asset prices than any other type of asset purchase.

## 3 Empirical Method and Data

### 3.1 Statistical Method

My approach to the empirical analysis, which describes and explains the relationship between the Fed’s LSAPs and EME exchange rates, equity prices, and sovereign yields, proceeds in three steps.

First, I regress each asset price on the Fed’s LSAPs, with all series defined in log-differences, for each country. Second, I estimate a panel fixed effects regression to find the average impact of LSAPs on the three EME asset prices of interest, looking in particular at which components of aggregate LSAPs were associated with the largest changes in EME asset prices. Third, I show that bilateral capital market frictions are able to explain some of the cross-country variation observed in step one, based on the method in step 2 combined with the gravity in international finance models.

In the first step I regress each of the log difference of the exchange-rate ( $s_{i/\$,t}$ ), equity prices ( $p_{it}$ ), and long-term, local currency sovereign bond yield ( $r_{it}$ ) on the log difference in LSAPs ( $lsap_t$ ), for each country in my sample.<sup>11</sup> Using  $y_{it} \in \{s_{i/\$,t}, p_{it}, r_{it}\}$  to denote EME asset prices for country  $i$  at time  $t$ , the regression specification for each country is:

$$\Delta \ln(y_{it}) = \alpha_i^y + \beta_i^y \Delta \ln(lsap_t) + \sum_{j=1}^J \zeta_{ij}^y \Delta \ln X_{j,it} + e_{it}^y, \quad (1)$$

where I include  $J$  control variables,  $X_{j,it}$ , meant to capture other country-specific or global factors that could possibly impact asset prices. The CBOE VIX index (lagged), the US Treasury bill rate (lagged), and the S&P 500 return (lagged) are all included to capture both

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<sup>11</sup>It is common in the literature to estimate gravity models in logs, which is based on the original theoretical gravity in international trade derivation of these models. Further, I find that the series I am studying contain a unit root, so I use the first difference of the log series to ensure stationarity.



the difference in returns in the US relative to EME countries as well as general volatility in global stock markets during this period (which I assume to be closely related to volatility in the US stock market). I also include the log of domestic stock market capitalization (in levels) to capture the ability of foreigners to invest in each EME. Finally, I include a control for domestic monetary policy meant to capture the degree to which the monetary authorities in EMEs were able to offset undesired movements in their currency, equity and debt markets due to large capital inflows (outflows) following the Fed’s LSAPs (tapering). I use the monetary base as a proxy for domestic monetary policy, and in a robustness check I use the monetary-policy-related interest rate. In both cases I instrument the monetary policy variable by its lagged value to avoid potential endogeneity between monetary policy decisions and exchange-rates and equity and debt markets. Equation (1) is estimated by two-stage least squares (2SLS) to incorporate this instrument.

Following estimation of equation (1) for each country and dependent variable  $y_{it}$ , I determine whether the Fed’s LSAPs had a heterogeneous impact across countries by testing the null and alternative hypotheses:

$$\begin{aligned} H_0 : \beta_i^y &= \beta^y \quad \forall i \\ H_1 : \beta_i^y &\neq \beta^y \text{ for at least one } i \end{aligned} \tag{2}$$

That is, I test whether the estimated impact of an increase in LSAPs on asset price  $y_{it}$ , denoted by coefficient  $\hat{\beta}_i^y$ , is equal across countries.

The second step in the analysis estimates the average impact of the Fed’s LSAP program on EMEs. I will use this average as a baseline to study whether a particular component of the LSAPs was driving the spillovers to EME asset prices, then to gauge the degree to which capital market frictions, as proxied by the exogenous gravity variables, explain the cross-country variation in LSAPs’ spillovers. The empirical specification closely resembles the individual country analysis. I again use 2SLS, in this case to estimate a panel fixed effects model:

$$\Delta \ln(y_{it}) = \alpha^y + \chi_i^y + \beta^y \Delta \ln(lsap_t) + \sum_{j=1}^J \zeta_j^y \Delta \ln X_{j,it} + \sum_{l=1}^L \psi_l^y K_{l,it} + e_{it}^y \tag{3}$$

for  $y_{it} \in \{s_{i/\$,t}, p_{it}, r_{it}\}$ , where  $\chi_i$  are country-fixed effects that capture cross-country differences that are constant over time.<sup>12</sup> The  $J$  control variables,  $X_{j,it}$ , are defined as in the

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<sup>12</sup>Note that because the independent variable  $lsap_t$  is constant across countries, and especially when time-

one-country model above. I include  $L$  additional control variables,  $K_{l,it}$ , that capture the domestic exchange-rate regime and intensity of capital controls. Fixed exchange rate regimes and capital controls are policies that are typically implemented as a way to limit surges or sudden stops of capital flows and maintain more stable macroeconomic conditions within a country. By controlling for these policies I identify the impact of the Fed's LSAPs on EMEs that were not offset by such domestic controls.

I also estimate equation (3) replacing aggregate asset purchases ( $lsap_t$ ) with each of its three major components: purchases of long-term US Treasury bills ( $tr_t$ ), purchases of mortgage backed securities ( $mbs_t$ ), and purchases of other liquid assets ( $lq_t$ ) (primarily currency swaps and federal agency debt). This step allows me to determine whether different types of assets purchased by the Fed impacted EMEs differently, which will provide an interesting cross-country comparison when I later study the BOE and BOJ asset purchase programs.

The third step in the empirical analysis examines whether the degree of bilateral capital market frictions, or integration, between EMEs and the US is able to explain the cross-country variation in asset price changes observed in the first step of my analysis. To do this, I augment the panel fixed-effects model to include an interaction term between LSAPs and gravity variables, which act as proxies for capital market frictions between countries. Equation (3) now becomes:

$$\begin{aligned} \Delta \ln(y_{it}) = & \alpha^y + \chi_i^y + \beta^y \Delta \ln(lsap_t) + \sum_{g=1}^G \gamma_g^y (\Delta \ln(lsap_t) \times z_{g,i}) \\ & + \sum_{j=1}^J \zeta_j^y \Delta \ln X_{j,it} + \sum_{l=1}^L \psi_l^y K_{l,it} + e_{it}^y \end{aligned} \quad (4)$$

for  $y_{it} \in \{s_{i/\$,t}, p_{it}, r_{it}\}$ . I use a total of  $G = 7$  time-invariant gravity variables, denoted by  $z_{g,i}$ . Equation (4) is again a panel fixed effects model estimated by 2SLS, where all control variables are defined as in equation (3). I estimate (4) first for each gravity variable individually (*i.e.* for  $G = 1$ , seven times), then for all gravity variables simultaneously. The gravity variables,  $z_{g,i}$  are defined such that a larger value indicates a *higher* degree of integration with the US (or lower capital market frictions). The gravity variables I include are physical distance, average bilateral trade to GDP, and dummy variables for free-trade agreements, overlapping trading hours, common language, common hemisphere, and shared

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invariant gravity variables are added to the model, the inclusion of both country and time fixed effects results in a highly collinear model. Control variables for the VIX and S&P 500 are meant to control for at least some of the factors that would otherwise be accounted for in a time fixed effect.

border. These are variables commonly used in the gravity in international finance literature, and are summarized in columns (1)–(7) of table 1 and defined in detail in section 3.2.

The specification in (4) weights the impact of LSAPs by the degree of bilateral capital market frictions between the US and each EME. Thus, if the coefficient estimates  $\hat{\gamma}_g^y$  on the gravity-LSAP-interaction variables are jointly statistically different from zero, I can conclude that capital market frictions explain some of the cross-country variation in the impact of LSAPs on EME asset prices. Note also that under this interaction specification the total impact of LSAPs on each of the EME asset price variables will be equal to its total marginal effect:

$$\frac{\partial \Delta \ln(y_{it})}{\partial \Delta \ln(lsap_t)} = \beta^y + \sum_{g=1}^G \gamma_g^y z_{g,i}.$$

Finding  $\hat{\beta}^y$  and  $\hat{\gamma}_g^y$  of the same sign will indicate that greater (less) integration with the US (a larger (smaller) value of  $z_{g,i}$ ) increases (decreases) the impact from the Fed’s LSAP, while  $\hat{\beta}^y$  and  $\hat{\gamma}_g^y$  of opposite signs will indicate that greater (less) integration decreases (increases) the impact from the Fed’s LSAP.

In equation (4), I control only for bilateral gravity variables between the US and EMEs. This implicitly assumes that it is primarily US investors who are reacting to Fed policy changes by shifting their investments from the US to EMEs. If the observed shifts in EME asset prices are caused by capital inflows from non-US foreign investors, then these US-based gravity variables may have little explanatory power.<sup>13</sup> However, because the US stock market represents over 30 percent of the world markets, it is likely that a large share of funds that were taken out of advanced economies and put into EME equity or debt did originate from the US.<sup>14</sup>

## 3.2 Data

I use monthly data from December 2008 to February 2014, corresponding to all rounds of quantitative easing by the Fed. Given data availability for the EME-based variables, my sample contains 21 EMEs: Bulgaria, Brazil, Chile, Colombia, Czech Republic, Hong Kong, Hungary, Indonesia, India, Korea, Mexico, Malaysia, Nigeria, Philippines, Poland, Russia,

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<sup>13</sup>On the other hand, it is also possible that the true  $z_{g,i}$  gravity variables are correlated with capital inflows from non-US countries into EMEs.

<sup>14</sup>Source: World Bank World Development Indicators database.

Singapore, Thailand, Turkey, and South Africa. Table 1 provides summary statistics on EME gravity variables and asset price volatility, which I discuss in detail below.

LSAP data are end-of-period monthly series from the Federal Reserve of St. Louis *Federal Reserve Economic Data* (FRED). I generate the series of total LSAPs by taking the sum of reported holdings of US Treasury Securities maturing over 5 years (not seasonally adjusted), mortgage-backed securities (all maturities, not seasonally adjusted), central bank liquidity swaps of all maturities, Federal Reserve agency debt securities (all maturities), and other loans (all maturities).<sup>15</sup> Figure 1a plots the Fed’s unconventional asset holdings over the sample period.

All data on EME asset prices is taken from *Datastream*. I define exchange-rate returns with the local currency to US dollar (USD) nominal exchange-rate, so a negative change in the exchange-rate represents a currency appreciation for the EME and a depreciation for the US.<sup>16</sup> I use the Thompson Reuters Government Benchmark ten-year bid yields (which are local currency ten-year sovereign bond yields) for the long-term sovereign yield series. I use the *Datastream* equity market index as a measure of country-level equity market prices. All three asset price series are reported at the weekly frequency, which I convert to monthly using the end-of-period value to be consistent with trade and asset purchase data series. These series are plotted in figure 2, where we observe a general appreciation of currencies, a rise in equity prices, and a fall in yields throughout the sample period.

I use gravity variables which are common to the gravity-in-international finance literature to measure the degree of capital market frictions between EMEs and the US. I take the variable for distance, defined as one divided by the log distance (km) between the US and each EME country from the *CEPII* database (Head and Mayer (2014)). I take the variables for language, border, and hemisphere from Rose and Spiegel (2010).<sup>17</sup> Language is a dummy variable equal to one if one of the primary languages spoken in the country is english, border is a dummy variable equal to one if the country shares a border with the US, north is a dummy variable equal to one if the country is located in the northern hemisphere. I create two additional dummy variables that are common in the literature but not available (or not

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<sup>15</sup>Results are robust to including only purchases of Treasury bills with 10-year or longer maturity.

<sup>16</sup>Many studies use real exchange-rates rather than nominal. Given the high correlation between nominal and real, I do not expect the results to be substantially altered by this decision. In their related study, Ehrmann and Fratzscher (2009) show explicitly that using nominal versus real exchange-rates does not alter the estimated spillovers of US monetary policy to foreign country currencies.

<sup>17</sup>Data is available at <http://faculty.haas.berkeley.edu/arose/RecRes.htm>

up-to-date) in the *CEPII* or Rose and Spiegel (2010) datasets. The first is a dummy variable for whether the trading hours of the main stock market in each EME overlap with the trading hours of the New York Stock Exchange (NYSE).<sup>18</sup> The second is a dummy variable for free-trade agreements between the US and the EMEs. I also include countries that are in the process of negotiating a free-trade agreement with the US, as they are very likely to already have strong economic ties. This data is from the World Trade Organization (WTO). Finally, I use data from the IMF’s *Direction of Trade Statistics* (DOTS) to generate a variable equal to the average ratio of bilateral trade (exports plus imports) with the US to GDP over the sample period. I normalize exports and imports by domestic annual GDP (which is converted from national currency to USD using the exchange-rate series).<sup>19</sup>

Numerous control variables are included in the specification, as noted in the previous section. Stock market capitalization is from the World Bank *World Development Indicators*. Because this series is available only at annual frequency, I assume the stock market capitalization is constant for each month within a year. The VIX index of market volatility is from the Chicago Board Options Exchange. I convert the daily close value of the VIX index to a monthly series using the end-of-period value. The final US-based control variables I include are the US Treasury bill yields and the S&P 500 index; both series are from the FRED database.

I control for domestic monetary policy using either the monetary base or the policy-related interest rate. Data for the monetary base is from the IMF’s International Financial Statistics (IFS). Several countries do not have monetary base data available, in which case I use M2. The monetary-policy rate data is also from the IFS, when available. Certain countries do not report a monetary policy related interest rate and for these countries I used the deposit rate, also from the IFS. The IFS does not have data on either the monetary policy related interest rate or the deposit rate for Poland, so I use the repurchase agreement rate which is the official interest rate offered to commercial banks by the National Bank of Poland. Data for the reverse repo rate in India, which is the official monetary policy interest rate for India, is taken directly from the Reserve Bank of India. All monetary policy rate data

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<sup>18</sup>I have also run the analysis using the actual number of hours stock markets overlap with the NYSE. The results for this specification are statistically insignificant. This indicates that, for example, being open for 2 hours versus six hours with the NYSE makes no difference in the degree to which US policy affects a market. However, the difference between being open at least for some time when the NYSE is open does make a difference. Hausmann-Guil *et al.* (2014) find similar threshold results.

<sup>19</sup>GDP is not available at a monthly frequency, and many countries in the sample do not report GDP at the quarterly frequency either. For this reason, I normalize all monthly trade data by the corresponding annual value of GDP.

are at monthly frequency.<sup>20</sup>

The additional control variables in the panel analysis for exchange-rate regime and capital controls are taken from the IMF’s *Annual Report on Exchange Arrangements and Exchange Restrictions* (AREAER) and the Fernandez, Klein, Rebucci, Schindler, and Uribe (2015) database on capital controls (which itself is based on the AREAER). I generate the exchange rate variable as a dummy variable equal to one if a country has a flexible exchange-rate regime. I consider “flexible” to include countries with exchange-rate regimes classified by the AREAER as “Free Floating”, “Floating”, or “Other Managed Arrangement”. All other classifications, including “Pegged exchange-rate Within Horizontal Bands”, “Crawl-Like Arrangement”, “Crawling Peg”, “Stabilized Arrangement”, “Conventional Peg”, “Currency Board”, and “No Separate Legal Tender”, are classified as “non-flexible”. The Fernandez *et al.* (2015) dataset provides 57 indices of capital controls for a panel of 100 countries over the period 1995–2013. Control indices are for both inflow and outflow controls for ten different asset categories, and several aggregate control indices. I use two indices of capital controls: the aggregated capital inflow and outflow control indices. These aggregates are calculated as an average of the level of controls in the ten asset categories for capital inflows and outflows, respectively. The indices take on a value between zero and one, with one being interpreted as representing a greater intensity of controls. Because the panel ends in 2013, I extend the 2013 values for 2014. Given that my dataset extends only to February 2014, it seems reasonable to assume few capital control measures changed in these two months. The benefit of using this dataset is that the time variation in the variables allow me to capture new controls implemented throughout the financial crisis period (albeit at a very low frequency).

In the final section of my analysis I study the impact of the BOE and BOJ’s large scale asset purchase programs, using asset holding data directly from the BOE and BOJ websites. While the largest unconventional asset purchases by the BOE were of gilts, in 2008 and early 2009 the BOE purchased a number of different types of assets. I define the BOE’s unconventional asset holdings as the sum of the amounts outstanding of: sterling short-term market operations with BOE counter-parties, sterling long-term operations with BOE counter-parties, sterling ways and means advances to Her Majesty’s (HM) government, bonds and other securities acquired via market transactions, and other assets, where the “other assets” category is primarily gilts. The BOJ’s asset purchases were similarly varied. I define the BOJ asset holdings as the sum of the amounts outstanding of: foreign currency assets, fi-

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<sup>20</sup>In the case of India, the monetary policy reports are not necessarily reported at a monthly frequency. I generate a monthly series by filling in monthly rates with the last available rate.

nancing and treasury bills, Japanese government bonds, loans by funds-supplying operations against pooled collateral, receivables under resale agreement, commercial paper, corporate bonds, pecuniary trusts, asset backed securities, gold, cash, deposits with agents, loans and discounts, and other assets. From late 2011 onwards, purchases of Japanese government bonds made up the majority of the BOJ’s asset purchases. Figures 1b and 1c plot the balance sheet data for each central banks over the sample period.

When studying the international transmission of the BOE and BOJ asset purchase program to EME asset prices, I measure all gravity variables noted above relative to the UK or Japan. These variables are available from the same sources as the US-based variables. I do not include controls for the US Treasury rate, the S&P 500, or the VIX. Instead, I use the U.K. ten-year sovereign yield and the Japanese ten-year government yield. These series are from the FRED database.

## 4 International Spillovers from the Fed LSAPs

Economic theory suggests that conventional monetary policy easing in the US should increase the flow of funds out of US assets and into foreign assets offering a relatively higher rate of return. This flow of funds should thereby cause an appreciation of currencies and higher asset prices in these foreign countries. In this section I show that the QE component of the Fed’s unconventional monetary policy was correlated with an appreciation of currencies and a rise in equity and debt prices in EMEs, in the same fashion expected from conventional monetary policy. I further show that while this was true on average, there was substantial heterogeneity in the magnitude of these appreciations across countries, and that this variation can be partially explained by the degree of bilateral capital market frictions between EMEs and the US.

### 4.1 Country-Specific Impact of LSAPs

The cross-country heterogeneity in asset price movement throughout the sample period can be observed by the differences in cross-country asset price variation reported in columns (8)-(10) of table 1, and graphically in the path of asset prices over the sample period depicted in figure 2. I formally estimate the country-specific impact of LSAPs and test whether this variation is statistically significant by estimating equation (1). Results are reported in table 2, with the dependent variable the log difference exchange rate, log difference equity prices, and log difference sovereign bond yields in columns (1), (2), and (3), respectively. The full

set of control variables are included in all regressions, but are not reported in table 2.

All countries are estimated to have experienced a currency appreciation following the Fed’s LSAPs. In the majority of cases this appreciation was both economically large and statistically significant: a one percent increase in LSAPs was associated with a currency appreciation of up to 0.73 percent. Given that LSAPs increased by over 300 percent in the sample period, these predicted appreciations are substantial for many EMEs.<sup>21</sup> Furthermore the magnitude of the predicted appreciation exhibits substantial variation across countries. I formally test the statistical significance of this variation with an  $F$ -test for coefficient equality across countries. The  $p$ -values of this test are reported in the bottom panel of table 2, column (1). I strongly reject the null hypothesis that all countries experienced an equivalent appreciation of their currencies.

The Fed’s LSAPs were also associated with a large and significant rise in equity prices across countries. Again, we observe substantial heterogeneity in the magnitude of these prices increases and strongly reject coefficient equality. Finally, we observed that LSAPs were associated with lower sovereign yields in most countries. While the coefficient estimates are not statistically significant in many cases, coefficient equality across countries is still strongly rejected. This suggests that despite being less affected by LSAPs compared to equities and currencies, there remained substantial heterogeneity in how yields reacted across countries to LSAPs.

## 4.2 Average Impact of LSAPs

Having established that the Fed’s LSAPs were associated with significant and heterogeneous increases in EME asset prices, I exploit the panel aspect of my data and estimate the cross-country average change in EME asset prices associated with an increase in LSAPs. I will use this average as a baseline to study whether a particular component of the LSAPs was driving the spillovers to EME asset prices, then to gauge the degree to which capital market frictions explain the cross-country variation in LSAPs’ spillovers.

The average impact of LSAPs on EME asset prices is estimated using equation (3). I also re-estimate equation (3) replacing the aggregate LSAP variable with each of its three components — Treasury securities, mortgage backed securities, and other liquid assets. Table 3 reports the estimation results. As in the individual country regressions, the Fed’s LSAPs

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<sup>21</sup>As one would expect, countries with fixed exchange-rates (*e.g.* China and Hong Kong) observed no change in their exchange rate, but did see large changes in equity and debt prices.



were associated with large and statistically significant currency appreciation, a rise in equity prices, and a fall in sovereign yields (columns (1), (3), and (5)) on average. A one percent rise in LSAPs is estimated to have appreciated EME currencies by 0.35 percent, raised equity prices by 0.59 percent, and decreased sovereign yields by 0.35 percent.

Columns (2), (4), and (6) of table 3 show that changes in currency and equity prices were associated almost entirely with purchases of US government Treasuries. The decrease in long-term bond yields, on the other hand, was primarily driven by the Fed’s purchases of other liquid asset, with purchases of mortgage backed securities having an offsetting effect. In addition to indicating that the type of asset purchased matters for the degree to which EME markets were affected, these estimates also say something about timing. As figure 1a indicates, the Fed purchased a large amount of federal agency debt and currency swaps before and during the first few months of the sample period. After late 2008, the Fed sold almost all of these assets. Purchases of Treasury assets, on the other hand, started later and continued throughout the entire sample period. In fact, when the months of QE1 (December 2008 to March 2010) are dropped from the estimated sample period, the impact of aggregate LSAPs on EME bond yields is smaller and no longer statistically significant. However, in this reduced sample there continues to be a large and statistically significant effect of LSAPs on EME currencies and equity prices, which also continues to be driven by purchases of Treasury securities.<sup>22</sup>

Finally, the estimated coefficients on the control variables in table 3 are of interest. In particular, domestic monetary policy in EMEs does not appear to have played a role in offsetting the spillovers from the Fed’s LSAPs. This is consistent with existing evidence on the pro-cyclicality of EME monetary policy.<sup>2324</sup> Controls for flexible exchange rate regimes and capital inflow controls indicate that these types of domestic policies were also not useful in offsetting spillovers from foreign monetary policy. This too is consistent with recent evidence.<sup>25</sup> These results motivate my approach of asking whether capital market frictions can, instead of (or in addition to) domestic policies, explain the cross-country variation

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<sup>22</sup>Results from this exercise are not reported. If the “tapering talk” period (April 2013–onwards) is excluded from the sample the magnitude of all estimates are larger and they continue to have similar level of statistical significance as in table 3.

<sup>23</sup>See McGettigan, Moriyama, Ndela Ntsama, Painchaud, Qu, and Steinberg (2013) for a review of the cyclicity of EME monetary policy over time.

<sup>24</sup>As a robustness exercise, I replace the monetary base with the policy rate for the monetary policy variable. The results are qualitatively unchanged. Table A1 of the Appendix reports results using the policy rate for the estimation of equation (4), which corresponds to the analysis in the following section.

<sup>25</sup>See Eichengreen and Gupta (2014), Rey (2015), and Fratzscher et al. (2013), among others, for evidence that capital controls and fixed exchange rates do not prevent monetary policy and business cycle spillovers.

in the spillovers of LSAPs. I continue to control for domestic monetary policy, exchange rate regime, and capital controls in the remainder of the analysis to ensure that I do not overestimate the impact of US monetary policy on EME asset prices.

### 4.3 Capital Market Frictions and the Impact of LSAPs

To determine whether the observed heterogeneity in EME asset price movement following LSAPs, as reported in section 4.1, can be explained in part by the degree of bilateral capital market frictions between EMEs and the US, I estimate equation (4) for all gravity variable discussed in section 3. Recall these variables act as exogenous proxies for capital market frictions. These estimates are reported in tables 4–6 for each dependent variable: log difference in exchange rate, log difference in equity prices, and log difference in sovereign yields, respectively. Columns (1)–(7) of the tables report regression estimates for each gravity-LSAP interaction variable individually, and column (8) for all gravity-LSAP interaction variables estimated simultaneously.

The estimates in table 4 show evidence that capital market frictions can explain some of the variation in the observed EME currency appreciations following the Fed’s LSAPs. The negative coefficient estimates on the gravity-LSAP interaction variables, the  $\hat{\gamma}_g^s$  from equation (4), indicate that countries with *fewer* capital market frictions experienced a *larger* appreciation of their currency.<sup>26</sup> When all gravity-LSAP variables are considered simultaneously, as in column (8), I am interested in whether these are jointly able to explain any of the variation in exchange rate appreciation across countries. The formal hypothesis test is:

$$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0 \quad (5)$$

$$H_1 : \gamma_g^s \neq 0 \text{ for at least one } g.$$

As discussed in section 3, I am also interested in whether or not the total marginal effect of LSAPs on exchange rates was significantly different from zero. This can also be tested by the formal hypothesis test that the  $\hat{\beta}^s$  and  $\hat{\gamma}_g^s$  coefficients are jointly equal to zero:

$$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0 \quad (6)$$

$$H_1 : \beta^s \neq 0 \text{ or } \gamma_g^s \neq 0 \text{ for at least one } g.$$

I conduct nine hypothesis tests in total: one test of (5) for equation (4) when all gravity

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<sup>26</sup>Note however, that when all measures of capital market frictions are considered together, the sign on the bilateral trade to GDP variable is reversed.

variables are included in the regression simultaneously, seven tests of hypothesis (6) for each estimate of equation (4) with a single gravity variable, and one hypothesis test of (6) for the estimate of equation (4) when all gravity variables are included in the regression simultaneously. The  $\chi^2$  and  $p$ -values corresponding to these tests are reported in the bottom panel of table 4. In all cases the hypotheses are strongly rejected. Rejection of hypothesis (5) suggests that capital market frictions are able to explain some of the exchange rate appreciation associated with LSAPs, while rejection of hypothesis (6) suggests that the total marginal effect of the Fed’s LSAPs was greater for those economies with fewer capital market frictions relative to the US.

To further understand what the sign and magnitude of these coefficient estimates mean, it is useful to look at an example of how these fitted values predict exchange rates to adjust following a rise in LSAPs. Using equation (4), with the fitted values from column (8) of table 4, and the value of the gravity variables in table 1, we can calculate how, all else equal, a one percent rise in LSAPs is predicted to change the exchange rate for any country in the sample. For example, Mexico — the country with the least capital market frictions relative to the US — is predicted to experience a 0.43 percent appreciation of the peso following a one percent rise in LSAP, while Indonesia — a country with relatively more capital market frictions relative to the US — is predicted to experience only a 0.19 percent appreciation of the rupiah. Note also that these estimates correspond closely to the heterogeneity observed in table 2, where the estimated impact of a one percent rise in LSAPs on the Mexican peso was 0.61 percent, and on Indonesian rupiah was 0.18 percent.

Table 5 reports results from regressing the change in equity prices on the Fed’s LSAPs, the set of gravity interaction terms, and controls. Like the impact of LSAPs on currencies, countries with lower capital market frictions appear to have seen larger increases in their equity prices. This result is less consistent across individual gravity variable regressions compared to table 4, but the gravity-LSAP interaction variables are jointly statistically significant and the total marginal effect of the LSAPs and the interaction terms are also jointly significantly different from zero in all cases. Drawing again on the example of Mexico and Indonesia, a one percent rise in LSAPs predicts an increase in equity prices in Mexico by 0.82 percent and in Indonesia by only 0.56 percent. This demonstrates that the degree of integration does appear to matter for the size of equity price adjustment.

Finally, while a rise in LSAPs was associated with a fall in EME sovereign yields, there is mixed evidence that individual measures of capital market frictions are able to explain

the heterogeneity in how yields were affected in EMEs, as reported in table 6. Jointly the gravity-interaction variables are statistically significant and the total marginal effect of LSAPs is also significantly different from zero. The sign and magnitude of the coefficients further indicate that those countries with fewer capital market frictions relative to the US observed a larger decrease in their sovereign bond yields. Note that the lesser role of capital market frictions in explaining spillovers to sovereign yields individually appears to be offset by the much greater role of capital controls estimated in table 6, which was not observed in the regressions of equity prices on LSAPs and was much smaller in the regression of exchange rates on LSAPs. Concluding with the same example as above of the total role of gravity variables in the impact of LSAPs on EME yields, Mexico is predicted to see a fall in yields of 0.37 percent, and Indonesia of 0.13 percent.

Overall, the results presented in tables 4–6 indicate that, after controlling for domestic monetary, capital control, and exchange-rate policies, there remains a portion of the spillovers from the Fed’s LSAPs that can be explained by the degree of bilateral capital market frictions between EMEs and the US. In particular, those countries with the least frictions vis-à-vis US are predicted to have experienced larger currency appreciations and rises in equity prices, on average. These results are also robust to replacing the monetary base as a proxy for monetary policy with the policy-related interest rate, estimates from this exercise are reported in table A1 of the Appendix.

## 5 BOE and BOJ Asset Purchase Programs

Like the Fed, the BOE and BOJ responded to the global financial crisis and tightening of global financial conditions in early 2009 by engaging in unconventional quantitative easing programs.<sup>27</sup> My objective is to determine whether these asset purchase programs were associated with movements in EME asset prices similar to those following the Fed’s LSAPs, and the role capital market frictions played in the magnitude of these movements. Figures 1b and 1c show the balance sheet composition of the BOE and BOJ for the sample period. Both the BOE and the BOJ balance sheets were comprised primarily of purchases of government bonds, with a variety of other types of assets in much smaller quantities. I group these “non-government” debt assets into a single category for analysis purposes.

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<sup>27</sup>Fawley and Neely (2013) provide a comprehensive review of the differences in the Fed’s, the BOE, and the BOJs asset purchase programs, as well as a detailed breakdown of the types of assets purchased by each central bank.

Regression estimates of the log difference of each the three EME asset prices — exchange rates (relative to either the UK pound sterling or Japanese yen), equity prices, and bond yields — on the log difference of each of the BOE and BOJ asset purchases and their components, are reported in table 7. Note that this is the UK and Japanese counterpart to equation (3), and includes the appropriate control variables as discussed in section 3.2. Given the results in section 4.2 indicate there was substantial impact on EME asset prices from the LSAPs, I also control for the Fed’s LSAPs in all regression estimates for the BOE and BOJ. Estimates in table 7 suggest that the BOE’s asset purchase program was associated with a large and statistically significant increase in equity prices and fall in sovereign bond yields. The BOJ’s asset purchases were associated with currency *depreciation* and a *fall* in equity prices, which stands in contrast to the impact from the Fed’s purchases.

Purchases of UK and Japanese government debt were associated with the largest spillovers to EME equity prices and exchange rates, supporting the evidence found in table 3 of section 4.2. Furthermore, as in the Fed’s case, the BOE’s purchases of non-government debt was associated with a larger fall in EME sovereign debt yields. In all cases the magnitude of the coefficient estimate on the BOE and BOJ’s purchases is substantially smaller than in the case of the Fed’s LSAPs, indicating that overall EME asset prices reacted much less strongly to non-US central bank asset purchase programs.

## 5.1 Capital Market Frictions and BOE, BOJ Asset Purchases

Tables 8–10 report estimation results from regressing EME asset prices on BOE purchases and purchases interacted with gravity variables. Tables 11–13 estimate the same for BOJ purchases. These are estimated in an identical fashion to the US case (via equation (4)), but with gravity and control variables measured relative to the U.K. and Japan, and an additional control for the Fed’s LSAPs.

Similar to the impact from the Fed’s LSAPs, the degree of capital market frictions relative to the UK is able to explain the variation in how EME exchange rates, equity prices, and sovereign yields responded to the BOE asset purchases. This is indicated by the rejection of the null hypothesis that the gravity-LSAPs interaction terms are jointly equal to zero when all gravity variables are included when regressing each of the three asset prices on all gravity-BOE purchase interaction terms simultaneously. The sign of the interaction coefficients is also the same as the sign on the non-interacted BOE purchases in most cases. In contrast, it does not appear that the degree of capital market frictions relative to Japan

is able to explain variation in equity prices or yields following purchases by the BOJ.<sup>28</sup>

Overall, the results suggest that on average EMEs were substantially less affected by non-US asset purchase programs. In the case of the BOE purchases, however, countries with fewer capital market frictions vis-à-vis the UK did experience relatively larger changes in their asset prices. The degree of capital market frictions between EMEs and Japan, on the other hand, seems to have had no relation to how asset prices were impacted by BOJ purchases.

## 6 Robustness

The Appendix contains results for several robustness exercises that ensure the results presented thus far do not depend on the choice of variables. The first set of robustness checks adds actual financial flows from EMEs as an additional gravity variable. It is likely that such flows are highly endogenous to asset price changes in EMEs following LSAPs, and as noted in section 2, much of the literature has shown they are not good predictors of the international transmission of business cycles or monetary policy. Additionally, according to the gravity literature in international finance, the gravity variables I have used in the previous sections are meant to be exogenous proxies for explaining these flows. Thus, by using these exogenous gravity variables in my analysis I have already captured the component of financial flows that is explained by time-invariant capital market frictions between countries. In any case, I include financial flows to my list of gravity variables in this section to determine whether they hold any additional power to explain the cross-country variation in EME asset price changes following LSAPs.

The second robustness check I conduct includes controls for macroeconomic fundamentals in EMEs. It is possible that countries with sounder macroeconomic fundamentals — for example, that were not in a recession themselves, had stable inflation, or that purchased or held large quantities of foreign exchange reserves — were less affected by US LSAPs. I include several measures of these macroeconomic conditions to ensure the results found so far are not inadvertently capturing the variation in the state of the domestic macroeconomy across EMEs.

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<sup>28</sup>One could say capital markets frictions can weakly explain the variation in yields, as the null that the interaction coefficients are jointly equal to zero can be weakly rejected.

## 6.1 Bilateral financial flows

In Appendix table A2 I replace the exogenous proxy variables with measures of actual bilateral financial flows. I measure EME-US bilateral financial flows as the average annual ratio of bilateral equity and debt flows to GDP in the pre-sample period, 2001–2007. This avoids endogeneity between contemporaneous asset prices and capital flows. Data is from the IMF’s CPIS database. Results from estimating equation (4) with the additional financial flow variable are reported in columns (1)–(3) of table A2. As a second robustness check, I also measure financial flows from EMEs to the whole world. This measure is more indicative of EMEs’ general access to financial markets, rather than their direct financial relationship with the US. These results are reported in columns (4)–(6) of table A2.

Bilateral financial flows to the US, along with other bilateral capital market friction proxy variables, appear to add some explanatory power to the cross-country variation in equity price and sovereign yield changes following LSAPs, as indicated by the  $p$ -values at the bottom of columns (1)–(3) in table A2. Aggregate financial flows from EMEs appear to hold much less explanatory power for the variation in asset price changes. In fact, I can only weakly reject the hypothesis that all gravity variables, including aggregate financial flows, do not hold any explanatory power in sovereign yield changes following LSAPs (as indicated by the  $p$ -value for join gravity variable significance in column (6)). That financial flows do not add considerable explanatory power in the cross-country variation of asset prices is consistent with existing literature, as discussed in section 2.

## 6.2 Macroeconomic fundamentals

As a third robustness exercise I control for several macroeconomic fundamentals in EMEs. I include the inflation rate, measured as the monthly change in consumer price index (CPI), the monthly change in the unemployment rate, and the monthly change in official reserve assets as additional controls in estimating equation (4).<sup>29</sup> Results are reported in table A4. Due to the highly collinear nature of the data, I drop the common border-LSAP dummy variable. In all cases the results are not qualitatively changed from the baseline results of tables 4–6. That is, once controlling for macroeconomic fundamentals in EMEs, the degree of capital market frictions between the US and EMEs — as proxied by the exogenous gravity variables — are still able to explain some of the variation in asset price movement following

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<sup>29</sup>Data is from the IFS database, all at monthly frequency. Not all countries have all data series available: unemployment data is unavailable for China, India, Indonesia, Mexico, Nigeria, Philippines, South Africa, Bulgaria after April 2013, and data is intermittent for Singapore. The full panel is available for CPI and reserve series.

LSAPs.

## 7 Conclusion

This paper has shown that the Fed’s LSAP program from 2008–2014 was associated with large and statistically significant currency appreciations, decreases in long-term local currency sovereign yields, and increases in equity markets across a large sample of EMEs. The degree to which individual EME asset prices were affected, however, displayed substantial heterogeneity. I show that much of the heterogeneity in currency, equity, and debt prices can be explained by the degree of capital market frictions between EMEs and the US, measured using exogenous gravity variables. This is true even after controlling for exchange-rate regimes, capital control policies, and domestic monetary policy in EMEs.

An analysis of the international spillovers from the BOE and BOJ’s asset purchase programs showed that these programs were associated with much smaller changes in EME asset prices. The degree of integration between EMEs and the U.K. is, however, able to explain some of the cross-country variation in EME asset price movement. BOJ asset purchases, on the other hand, appear to have had an opposite effect on EME asset prices compared to the Fed’s and BOE purchases, with the degree of capital market frictions unable to explain the variation in asset-price impacts.

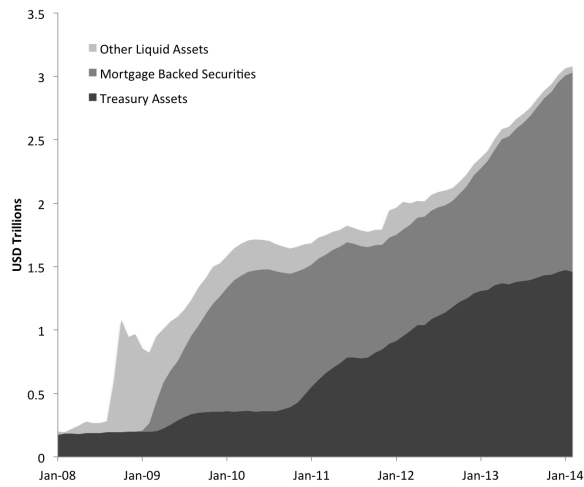
Finally, I have shown that the type of asset purchased by all advanced country central banks was an important determinant for how EME asset prices were affected. It was primarily purchases of long-term government bonds that were associated with EME asset price movements, while other types of assets had little to no effect on EME prices.

My results here have important policy implications for EME and advanced country central banks. Recently, governments and central banks in EMEs along with international policy institutes have pressed advanced countries to consider the international implications of their unconventional monetary policy actions. My results suggest that policy makers in EMEs can better anticipate and plan for the impact they will observe following action by foreign central banks, if they know in advance the types of assets advanced country central banks are purchasing and how integrated they are with these countries. Furthermore, if advanced country central banks are able to stimulate their economies with purchases of assets other than government bonds, when at the zero lower bound, then they should do so in order to limit international spillovers from their actions.

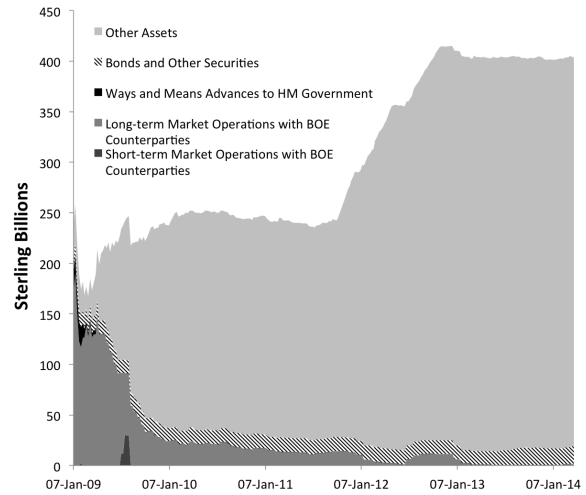


Figure 1: Central Bank Unconventional Asset Holdings

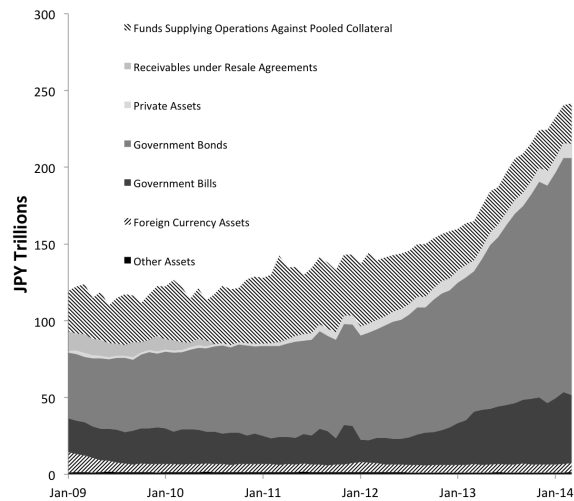
(a) Federal Reserve



(b) Bank of England

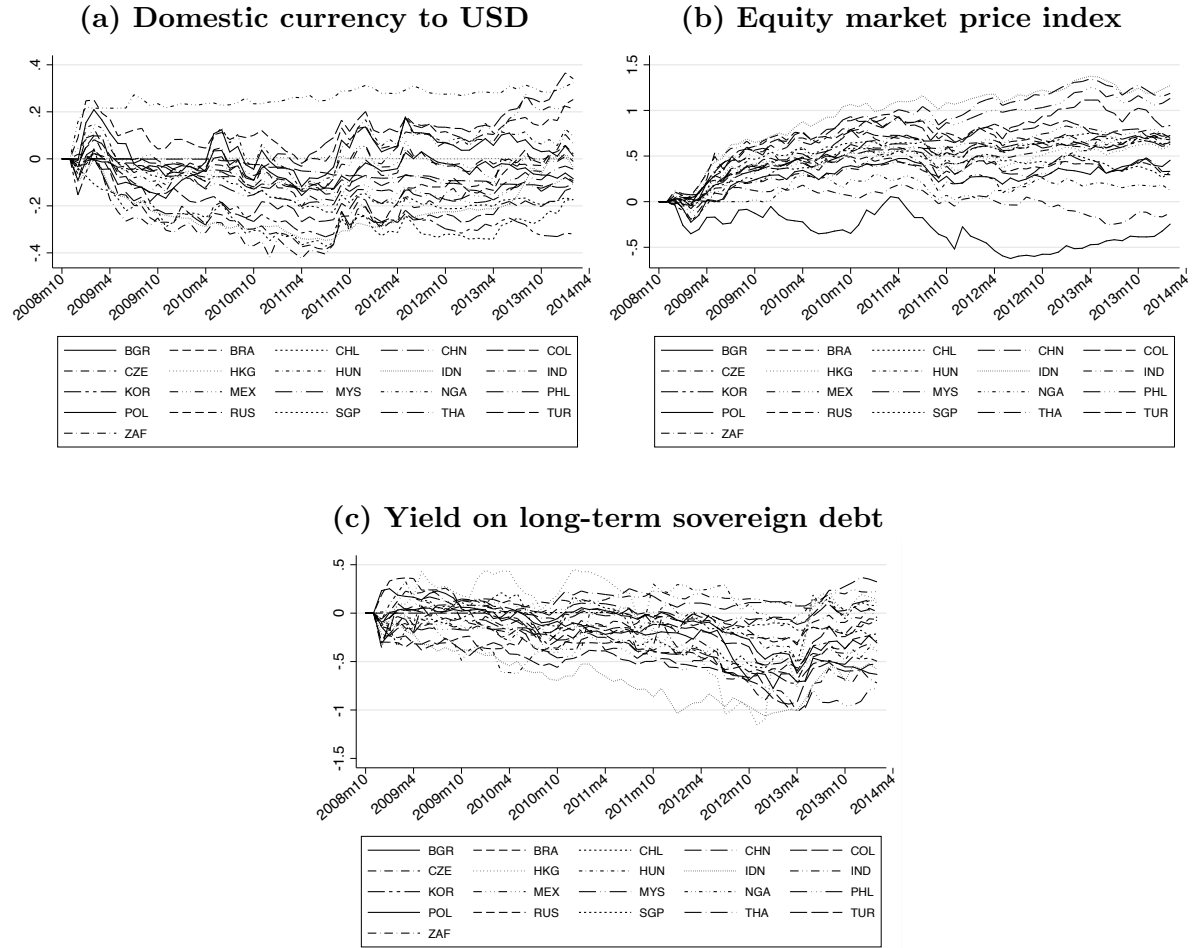


(c) Bank of Japan



Source: Federal Reserve of St. Louis, *FRED*; Bank of England; Bank of Japan.

Figure 2: Cumulative Change in Asset Prices



Note: Log of each series is taken, and normalized to zero on November 2008. See table 1 for country code legend. Source: Datastream and author's calculations.

Table 1: Summary Statistics

Country	Code	Gravity Variables							Asset Price Volatility		
		Distance	FTA	Trading	Language	North	Border	$\overline{Trade}/GDP$ (%)	$\sigma^2_{\Delta lns}$	$\sigma^2_{\Delta lnp}$	$\sigma^2_{\Delta ln r}$
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Bulgaria	BGR	7.59	1	0	0	1	0	9.12	11.65	59.44	48.9
Brazil	BRA	7.69	1	1	0	0	0	22.21	16.56	20.2	37.63
Chile	CHL	8.27	1	1	0	0	0	75.64	11.27	17.23	28.83
China	CHN	10.99	0	0	0	1	0	48.57	0.22	49.96	16.16
Colombia	COL	4.02	1	1	0	1	0	82.49	11.61	17.89	30.18
Czech Rep	CZE	6.57	1	1	0	1	0	18.07	18.15	24.66	88.68
Hong Kong	HKG	12.97	0	0	1	1	0	224.85	0.02	29.4	307.23
Hungary	HUN	7.01	1	1	0	1	0	19.75	29.36	42.05	64.02
Indonesia	IDN	16.18	1	0	0	0	0	26.95	7.98	30.53	56.24
India	IND	11.76	0	0	1	1	0	25.11	9.56	40.58	31.09
Korea	KOR	11.07	1	0	1	1	0	65.34	16.29	25.87	38.14
Mexico	MEX	3.37	1	1	0	1	1	328.33	11.01	17.05	30.01
Malaysia	MYS	15.13	1	0	0	1	0	108.65	4.79	9.72	28.67
Nigeria	NGA	8.49	0	1	0	1	0	64.89	6.38	28.29	83.46
Philippines	PHL	13.68	0	0	0	1	0	53.67	3.11	21.71	46.31
Poland	POL	6.86	1	1	0	1	0	8.75	25.09	32.76	34.12
Russia	RUS	7.52	0	1	0	1	0	11.54	17.36	35.6	37.17
Singapore	SGP	15.35	1	0	1	1	0	187.9	4.2	24.12	110.51
Thailand	THA	13.94	0	0	1	1	0	81.57	3.04	31.41	78.27
Turkey	TUR	8.07	0	1	0	1	0	20.19	10.99	49.77	41.1
South Africa	ZAF	12.58	1	1	1	0	0	33.62	22.08	13.39	22.61

Source: CEPII (Head and Mayer (2010, 2013)), IMF’s Direction of Trade Statistics, Rose and Spiegel (2010) (via Andrew Rose’s website), and author’s calculations. “Distance” measures the physical distance between two countries, “FTA” is equal to one if there was a free trade agreement between the US and each country during at least one year of the sample period or a free trade agreement in the negotiation stages, “Trading” is a dummy variable equal to one if the operating hours of the primary stock market in the country overlap with the New York Stock Exchange operating hours, “Language” is a dummy variable equal to one for english speaking countries, “North” is a dummy variable equal to one if country is in the Northern Hemisphere (*i.e.* same Hemisphere as the U.S.), “Border” is a dummy variable equal to one if the country shares a common border with the US, “ $\overline{Trade}/GDP$ ” is calculate as the average ratio of bilateral exports plus imports with the US to domestic GDP over the period November 2008–September 2014. See section 3 for details.

**Table 2: Country-Specific Impact of Fed LSAPs**

Dependent Var:	$\Delta \ln(s_{it})$ (1)		$\Delta \ln(p_{it})$ (2)		$\Delta \ln(r_{it})$ (3)	
	$\hat{\beta}_i^s$	(se)	$\hat{\beta}_i^p$	(se)	$\hat{\beta}_i^r$	(se)
BGR	-0.815	(0.59)	1.601**	(0.77)	-0.500	(0.91)
BRA	-0.306**	(0.13)	0.480**	(0.20)	-0.108	(0.22)
CHL	-0.102	(0.10)	0.119	(0.16)	0.897***	(0.22)
CHN	-0.012	(0.02)	0.963***	(0.18)	-0.580	(0.47)
COL	-0.584**	(0.23)	-0.006	(0.15)	0.012	(0.18)
CZE	-0.407**	(0.16)	0.813***	(0.22)	-0.567	(0.41)
HKG	-0.013	(0.02)	0.498	(0.32)	-0.486	(0.93)
HUN	-0.577*	(0.31)	0.764***	(0.22)	-0.806*	(0.48)
IDN	-0.356***	(0.13)	0.464*	(0.26)	-0.869***	(0.33)
IND	-0.175	(0.21)	0.640**	(0.29)	-0.365	(0.41)
KOR	-0.672***	(0.13)	0.430***	(0.16)	-0.268	(0.27)
MEX	-0.614***	(0.23)	0.613***	(0.19)	-0.941	(0.66)
MYS	-0.324	(0.25)	0.801	(2.11)	-0.322	(1.78)
NGA	-0.047	(0.14)	0.526	(0.37)	-1.126	(0.86)
PHL	-0.086	(0.10)	0.161	(0.17)	0.106	(0.33)
POL	-0.725***	(0.21)	0.809***	(0.19)	-0.447***	(0.17)
RUS	-0.530***	(0.19)	0.588**	(0.26)	-0.400	(0.30)
SGP	-0.238**	(0.10)	0.466***	(0.17)	0.024	(0.45)
THA	-0.075	(0.16)	0.107	(0.22)	-0.494	(0.42)
TUR	-0.369**	(0.15)	0.745**	(0.29)	-11.862	(503.48)
ZAF	-0.418*	(0.23)	0.508***	(0.19)	-0.580**	(0.24)
$N^\dagger$	63		63		63	
Controls	Yes		Yes		Yes	
$H_0: \beta_i = \beta$						
$\chi^2(21):$	90.49		40.37		39.45	
$p$ -value:	0.00		0.00		0.00	

Robust standard errors in parentheses, \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Each coefficients represents the  $\hat{\beta}_i^y$  coefficient for country  $i$  from the estimation of equation (1):

$$\Delta \ln(y_{it}) = \alpha_i^y + \beta_i^y \Delta \ln(lsap_t) + \sum_{j=1}^J \zeta_{ij}^y X_{ijt} + e_{it}$$

for  $y_{it} \in \{s_{i/\$,t}, p_{it}, r_{it}\}$ . Countries are denoted in the first column. Control variables  $X_{ijt}$  include: the lag of the log difference VIX index, the log of stock market capitalization, and the log difference monetary base in the EME country (instrumented by its first lag), the lag of the log difference US Treasury yield, and the lag of the log difference S&P 500 return. Regressions are estimated via two-stage least squares.  $^\dagger N$  is the number of observations in each individual country regression, with the following exceptions: Thailand has 56 observations for bilateral exchange rate, Turkey has 49 observations for sovereign yields, and Nigeria has 53 observations for equity market price index. The sample period is from December 2008 – February 2014.

**Table 3: Impact of Fed LSAP Purchases on EME Asset Prices**

Dependent Variable:	$\Delta \ln(s_{i/\$,t})$		$\Delta \ln(p_{it})$		$\Delta \ln(r_{it})$	
	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta \ln(lsap_t)$	-0.350*** (0.05)		0.592*** (0.06)		-0.352*** (0.10)	
$\Delta \ln(tr_t)$		-0.277*** (0.04)		0.479*** (0.04)		0.027 (0.06)
$\Delta \ln(mbs_t)$		0.007*** (0.00)		0.007 (0.00)		0.020** (0.01)
$\Delta \ln(lq_t)$		0.001 (0.01)		0.002 (0.02)		-0.020 (0.02)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.057 (0.07)	0.031 (0.07)	0.063 (0.07)	0.064 (0.09)	0.218 (0.18)	0.173 (0.19)
$\ln(\text{Stock Market Cap}_{it})$	-0.004 (0.01)	-0.021*** (0.01)	0.031*** (0.01)	0.045*** (0.01)	0.012 (0.01)	-0.015 (0.01)
$\Delta \ln(\text{VIX}_{t-1})$	0.020*** (0.01)	0.033*** (0.01)	-0.066*** (0.01)	-0.073*** (0.01)	0.050*** (0.01)	0.070*** (0.02)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.011 (0.01)	0.012 (0.01)	-0.079*** (0.02)	-0.093*** (0.02)	0.151*** (0.03)	0.126*** (0.02)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.109*** (0.03)	0.229*** (0.03)	-0.090** (0.04)	-0.214*** (0.05)	0.177*** (0.06)	0.243*** (0.08)
Exchange Rate Regime	-0.000 (0.00)	-0.001 (0.00)	0.002 (0.00)	0.000 (0.00)	-0.002 (0.01)	-0.009 (0.01)
Capital Inflow Controls	-0.006 (0.02)	-0.012 (0.01)	-0.018 (0.02)	-0.001 (0.03)	0.009 (0.02)	0.001 (0.03)
Capital Outflow Controls	0.029** (0.01)	0.027* (0.01)	-0.015 (0.02)	0.000 (0.02)	0.107*** (0.02)	0.090*** (0.02)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1316	1276	1313	1273	1309	1269
$R^2$	0.11	0.14	0.17	0.16	0.06	0.06
$F$ -Statistic (1st Stage)	17.01	18.70	21.71	23.87	14.30	15.28

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistic reports the  $F$ -statistic for the first stage of 2SLS.  $R^2$  is from the second stage. The sample period is from December 2008 – February 2014.

**Table 4: Impact of U.S. LSAP Purchases on EME Exchange Rates**

Dependent Variable: $\Delta \ln(s_{i/\$,t})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta \ln(lsap_t)$	-0.048 (0.15)	-0.209*** (0.08)	-0.239*** (0.07)	-0.360*** (0.05)	-0.346*** (0.09)	-0.346*** (0.05)	-0.404*** (0.06)	-0.111 (0.13)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(lsap_t)$	-0.638** (0.28)							0.396 (0.27)
$\text{FTA}_{US,i} \times \Delta \ln(lsap_t)$		-0.221** (0.09)						-0.278*** (0.06)
$\text{Trading}_{US,i} \times \Delta \ln(lsap_t)$			-0.203** (0.08)					-0.216*** (0.07)
$\text{Language}_{US,i} \times \Delta \ln(lsap_t)$				0.038 (0.11)				-0.194*** (0.06)
$\text{North} \times \Delta \ln(lsap_t)$					-0.005 (0.10)			-0.256*** (0.09)
$\text{Border}_{US,i} \times \Delta \ln(lsap_t)$						-0.086* (0.05)		-0.616*** (0.17)
$\left(\frac{\text{Trade}_{US,i}}{\text{GDP}_i}\right) \times \Delta \ln(lsap_t)$							0.077 (0.06)	0.220*** (0.05)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.056 (0.07)	0.058 (0.06)	0.052 (0.07)	0.058 (0.06)	0.057 (0.07)	0.058 (0.07)	0.051 (0.06)	0.040 (0.06)
$\ln(\text{Stock Market Cap}_{it})$	-0.004 (0.01)	-0.005 (0.01)	-0.003 (0.01)	-0.004 (0.01)	-0.004 (0.01)	-0.005 (0.01)	-0.004 (0.01)	-0.003 (0.01)
$\Delta \ln(\text{VIX}_{t-1})$	0.020*** (0.01)	0.020*** (0.01)	0.020*** (0.01)	0.020*** (0.01)	0.020*** (0.01)	0.020*** (0.01)	0.020*** (0.01)	0.020*** (0.01)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.011 (0.01)	0.011 (0.01)	0.011 (0.01)	0.011 (0.01)	0.011 (0.01)	0.011 (0.01)	0.011 (0.01)	0.010 (0.01)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.109*** (0.03)	0.109*** (0.03)	0.109*** (0.03)	0.109*** (0.03)	0.109*** (0.03)	0.109*** (0.03)	0.109*** (0.03)	0.109*** (0.03)
Ex.Rate Regime	-0.001 (0.00)	0.000 (0.00)	-0.001 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.000 (0.00)	-0.001 (0.00)
Capital Inflow Controls	-0.005 (0.02)	-0.003 (0.02)	-0.006 (0.02)	-0.006 (0.02)	-0.006 (0.02)	-0.006 (0.02)	-0.007 (0.02)	-0.007 (0.02)
Capital Outflow Controls	0.026** (0.01)	0.028** (0.01)	0.026** (0.01)	0.028** (0.01)	0.029** (0.01)	0.029** (0.01)	0.028** (0.01)	0.029** (0.01)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1316	1316	1316	1316	1316	1316	1316	1316
$R^2$	0.12	0.12	0.12	0.11	0.11	0.11	0.12	0.15
$H_0 : \beta^s = \gamma_g^s = 0$								
$\chi^2(2) :$	85.94	83.62	68.90	53.88	51.36	58.54	475.60	
$p\text{-value} :$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$								
$\chi^2(8) :$								660.50
$p\text{-value} :$								0.00
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$								
$\chi^2(7) :$								111.59
$p\text{-value} :$								0.00
$F\text{-Statistic (1st Stage)}$	17.06	16.79	17.48	16.81	17.02	17.01	17.33	17.31

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag. “ $F$ -statistics (1st stage)” reports the  $F$ -statistic for the first stage of 2SLS.  $R^2$  is from the second stage.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(lsap_t)$  and interaction terms. The sample period is from December 2008–February 2014.

**Table 5: Impact of U.S. LSAP Purchases on EME Equity Prices**

Dependent Variable: $\Delta \ln(p_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta \ln(lsap_t)$	0.469* (0.24)	0.587*** (0.07)	0.615*** (0.09)	0.613*** (0.09)	0.443*** (0.09)	0.581*** (0.07)	0.612*** (0.08)	0.757* (0.46)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(lsap_t)$	0.260 (0.55)							-0.616 (1.28)
$\text{FTA}_{US,i} \times \Delta \ln(lsap_t)$		0.008 (0.11)						0.104 (0.14)
$\text{Trading}_{US,i} \times \Delta \ln(lsap_t)$			-0.045 (0.12)					-0.083 (0.17)
$\text{Language}_{US,i} \times \Delta \ln(lsap_t)$				-0.069 (0.09)				0.011 (0.14)
$\text{North} \times \Delta \ln(lsap_t)$					0.185* (0.11)			0.271** (0.14)
$\text{Border}_{US,i} \times \Delta \ln(lsap_t)$						0.236*** (0.06)		1.061** (0.52)
$\left(\frac{\text{Trade}_{US,i}}{\text{GDP}_i}\right) \times \Delta \ln(lsap_t)$							-0.028 (0.07)	-0.240* (0.13)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.063 (0.07)	0.063 (0.07)	0.061 (0.07)	0.062 (0.07)	0.062 (0.07)	0.060 (0.07)	0.065 (0.07)	0.061 (0.07)
$\ln(\text{Stock Market Cap}_{it})$	0.031*** (0.01)	0.031*** (0.01)	0.031*** (0.01)	0.031*** (0.01)	0.031*** (0.01)	0.031*** (0.01)	0.031*** (0.01)	0.031*** (0.01)
$\Delta \ln(\text{VIX}_{t-1})$	-0.066*** (0.01)	-0.066*** (0.01)	-0.066*** (0.01)	-0.066*** (0.01)	-0.066*** (0.01)	-0.066*** (0.01)	-0.066*** (0.01)	-0.066*** (0.01)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	-0.079*** (0.02)	-0.079*** (0.02)	-0.079*** (0.02)	-0.079*** (0.02)	-0.079*** (0.02)	-0.079*** (0.02)	-0.079*** (0.02)	-0.079*** (0.02)
$\Delta \ln(\text{S\&P 500}_{t-1})$	-0.090** (0.04)	-0.090** (0.04)	-0.090** (0.04)	-0.090** (0.04)	-0.090** (0.04)	-0.090** (0.04)	-0.090** (0.04)	-0.090** (0.04)
Ex.Rate Regime	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.003 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)
Capital Inflow Controls	-0.018 (0.02)	-0.018 (0.02)	-0.018 (0.02)	-0.018 (0.02)	-0.016 (0.02)	-0.018 (0.02)	-0.018 (0.02)	-0.014 (0.02)
Capital Outflow Controls	-0.014 (0.02)	-0.015 (0.02)	-0.016 (0.02)	-0.014 (0.02)	-0.017 (0.02)	-0.015 (0.02)	-0.015 (0.02)	-0.019 (0.02)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1313	1313	1313	1313	1313	1313	1313	1313
$R^2$	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18
$H_0 : \beta^p = \gamma_z^p = 0$								
$\chi^2(2) :$	100.50	99.20	89.07	210.64	99.91	89.96	1085.24	
$p\text{-value} :$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$								
$\chi^2(8) :$								1676.86
$p\text{-value} :$								0.00
$H_0 : \gamma_1^p = \dots = \gamma_G^p = 0$								
$\chi^2(7) :$								85.84
$p\text{-value} :$								0.00
$F\text{-Statistic (1st Stage)}$	21.80	21.66	22.55	21.64	21.77	21.70	22.23	22.93

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag. “ $F$ -statistics (1st stage)” reports the  $F$ -statistic for the first stage of 2SLS.  $R^2$  is from the second stage.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(lsap_t)$  and each interaction term. The sample period is from December 2008–February 2014.

**Table 6: Impact of U.S. LSAP Purchases on EME Sovereign Bond Yields**

Dependent Variable: $\Delta \ln(r_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta \ln(lsap_t)$	-0.517** (0.23)	-0.522*** (0.08)	-0.381*** (0.09)	-0.346*** (0.13)	-0.114 (0.30)	-0.351*** (0.10)	-0.406*** (0.11)	-1.082*** (0.37)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(lsap_t)$	0.350 (0.46)							2.103*** (0.65)
$\text{FTA}_{US,i} \times \Delta \ln(lsap_t)$		0.263** (0.12)						0.115 (0.13)
$\text{Trading}_{US,i} \times \Delta \ln(lsap_t)$			0.057 (0.16)					-0.196 (0.19)
$\text{Language}_{US,i} \times \Delta \ln(lsap_t)$				-0.019 (0.16)				-0.056 (0.16)
$\text{North} \times \Delta \ln(lsap_t)$					-0.297 (0.29)			-0.448 (0.30)
$\text{Border}_{US,i} \times \Delta \ln(lsap_t)$						-0.023 (0.08)		-1.435*** (0.51)
$\left(\frac{\text{Trade}_{US,i}}{\text{GDP}_i}\right) \times \Delta \ln(lsap_t)$							0.074 (0.07)	0.287* (0.16)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.219 (0.18)	0.221 (0.18)	0.220 (0.18)	0.218 (0.18)	0.222 (0.18)	0.219 (0.18)	0.213 (0.18)	0.220 (0.19)
$\ln(\text{Stock Market Cap}_{it})$	0.012 (0.01)	0.012 (0.01)	0.012 (0.01)	0.012 (0.01)	0.012 (0.01)	0.012 (0.01)	0.012 (0.01)	0.013 (0.01)
$\Delta \ln(\text{VIX}_{t-1})$	0.050*** (0.01)	0.050*** (0.01)	0.050*** (0.01)	0.050*** (0.01)	0.050*** (0.01)	0.050*** (0.01)	0.050*** (0.01)	0.050*** (0.01)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.151*** (0.03)	0.152*** (0.03)	0.152*** (0.03)	0.151*** (0.03)	0.152*** (0.03)	0.151*** (0.03)	0.151*** (0.03)	0.151*** (0.03)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.177*** (0.06)	0.177*** (0.06)	0.177*** (0.06)	0.177*** (0.06)	0.177*** (0.06)	0.177*** (0.06)	0.177*** (0.06)	0.176*** (0.06)
Ex.Rate Regime	-0.002 (0.01)	-0.003 (0.01)	-0.002 (0.01)	-0.002 (0.01)	-0.003 (0.01)	-0.002 (0.01)	-0.002 (0.01)	-0.003 (0.01)
Capital Inflow Controls	0.008 (0.02)	0.006 (0.02)	0.008 (0.02)	0.009 (0.02)	0.006 (0.02)	0.009 (0.02)	0.008 (0.02)	-0.001 (0.02)
Capital Outflow Controls	0.108*** (0.02)	0.108*** (0.02)	0.107*** (0.02)	0.107*** (0.02)	0.110*** (0.03)	0.107*** (0.02)	0.106*** (0.02)	0.115*** (0.02)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1309	1309	1309	1309	1309	1309	1309	1309
$R^2$	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
$H_0 : \beta^p = \gamma_z^p = 0$								
$\chi^2(2) :$	13.06	43.45	19.52	16.19	32.95	13.68	66.28	
$p\text{-value} :$	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$								
$\chi^2(8) :$								155.42
$p\text{-value} :$								0.00
$H_0 : \gamma_1^p = \dots = \gamma_G^p = 0$								
$\chi^2(7) :$								28.90
$p\text{-value} :$								0.00

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag. “ $F$ -statistics (1st stage)” reports the  $F$ -statistic for the first stage of 2SLS.  $R^2$  is from the second stage.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(lsap_t)$  and each interaction term. The sample period is from December 2008–February 2014.



Table 7: Impact of BOE and BOJ Asset Purchases on EME Asset Prices

Dependent Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
		$\Delta \ln(s_{i/\$t})$				$\Delta \ln(p_{it})$					$\Delta \ln(r_{it})$	
<b>Bank of England</b>												
$\Delta \ln(\text{BOE Total}_t)$	0.074*** (0.03)							0.242*** (0.03)	-0.152*** (0.04)			
$\Delta \ln(\text{U.K Gilts}_t)$		0.042*** (0.01)		0.041*** (0.01)		0.137*** (0.01)		0.137*** (0.01)		-0.000 (0.01)	0.002 (0.01)	
$\Delta \ln(\text{Non-Gilts}_t)$			0.031*** (0.01)	0.029*** (0.01)			0.006 (0.01)	0.000 (0.01)		-0.052*** (0.02)	-0.052*** (0.02)	
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1302	1302	1302	1302	1293	1293	1293	1293	1289	1289	1289	1289
$R^2$	0.09	0.11	0.08	0.11	0.18	0.20	0.13	0.20	0.03	0.01	0.01	0.01
$F$ -Statistic (1st Stage)	17.13	16.60	17.10	16.41	22.48	21.26	21.93	21.01	14.35	14.10	14.24	13.89
<b>Bank of Japan</b>												
$\Delta \ln(\text{BOJ Total}_t)$	0.400*** (0.01)							-0.121*** (0.03)	-0.056 (0.05)			
$\Delta \ln(\text{JPN Govt Bonds}_t)$		0.539*** (0.02)		0.464*** (0.02)		-0.098** (0.04)		-0.064 (0.05)	-0.082 (0.08)		-0.070 (0.09)	
$\Delta \ln(\text{Non-Bonds}_t)$			0.201*** (0.01)	0.131*** (0.01)			-0.068*** (0.02)	-0.058** (0.02)	-0.033 (0.03)	-0.022 (0.03)		
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1296	1296	1296	1296	1293	1293	1293	1293	1289	1289	1289	1289
$R^2$	0.26	0.33	0.17	0.36	0.14	0.14	0.14	0.14	0.09	0.09	0.09	0.09
$F$ -Statistic (1st Stage)	16.81	14.79	16.64	14.05	21.81	18.89	21.66	18.01	14.23	12.72	14.24	12.33

Cluster robust standard errors (country-level) in parentheses \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . Estimation is via 2SLS, where the control for monetary policy is proxied by the monetary base, which is instrumented by its first lag. “ $F$ -Statistic (1st Stage)” is the reported  $F$ -statistic from the first stage of the 2SLS estimation. Sample period is from January 2009–February 2014. Additional control variables are the Fed’s LSAPs, the log stock market capitalization, lag of log difference U.K. or Japanese ten year sovereign yield, capital inflow controls, capital outflow controls, and a dummy variables for flexible exchange-rate regime.

**Table 8: Impact of BOE Asset Purchases on EME Exchange Rates**

Dependent Variable: $\Delta \ln(s_{i/UK,t})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(BOE_t)$	0.085*** (0.03)	0.211*** (0.04)	0.178** (0.08)	0.061* (0.04)	0.095** (0.04)	0.114** (0.05)	0.303*** (0.09)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(BOE_t)$	-0.005** (0.00)						-0.000 (0.00)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(BOE_t)$		-0.160*** (0.05)					-0.143** (0.06)
$\text{Trading}_i \times \Delta \ln(BOE_t)$			-0.129 (0.09)				-0.096 (0.09)
$\text{Language} \times \Delta \ln(BOE_t)$				0.045 (0.07)			0.073 (0.08)
$\text{North} \times \Delta \ln(BOE_t)$					-0.026 (0.06)		-0.018 (0.06)
$(\frac{\text{Trade}}{\text{GDP}}) \times \Delta \ln(BOE_t)$						-0.255 (0.34)	-0.214 (0.36)
$\Delta \ln(\text{Monetary Policy}_{it})$	-0.082 (0.06)	-0.080 (0.06)	-0.087 (0.06)	-0.085 (0.06)	-0.085 (0.06)	-0.084 (0.06)	-0.079 (0.06)
$\ln(\text{Stock Market Cap}_{it})$	-0.007 (0.01)	-0.007 (0.01)	-0.007 (0.01)	-0.007 (0.01)	-0.007 (0.01)	-0.007 (0.01)	-0.007 (0.01)
$\Delta \ln(\text{UK 10 Yr Gov't Yield}_{t-1})$	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)
Ex.Rate Regime	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)
Capital Inflow Controls	0.004 (0.02)	0.004 (0.02)	0.003 (0.02)	0.004 (0.02)	0.004 (0.02)	0.004 (0.02)	0.003 (0.02)
Capital Outflow Controls	0.011 (0.02)	0.014 (0.02)	0.014 (0.02)	0.014 (0.02)	0.014 (0.02)	0.013 (0.02)	0.012 (0.02)
$\Delta \ln(\text{lsap}_t)$	-0.300*** (0.03)	-0.300*** (0.03)	-0.299*** (0.03)	-0.299*** (0.03)	-0.299*** (0.03)	-0.300*** (0.03)	-0.301*** (0.03)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1302	1302	1302	1302	1302	1302	1302
$R^2$	0.10	0.10	0.10	0.09	0.09	0.10	0.12
$H_0 : \beta^s = \gamma_g^s = 0$	$\chi^2(2) :$ 11.06    36.74    9.98    8.28    10.15    14.07 $p\text{-value} :$ $3.96 \times 10^{-3}$ $1.05 \times 10^{-8}$ 0.01    0.02    0.01 $8.79 \times 10^{-4}$						
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(7) :$ 51.04 $p\text{-value} :$ $9.03 \times 10^{-9}$						
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(6) :$ 32.60 $p\text{-value} :$ $1.25 \times 10^{-5}$						
$F\text{-Statistic (1st Stage)}$	17.07	16.90	17.26	17.24	17.23	17.13	16.92

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag. “ $F$ -statistics (1st stage)” reports the  $F$ -statistic for the first stage of 2SLS.  $R^2$  is from the second stage.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(BOE_t)$  and each interaction term. The sample period is from January 2009–February 2014.

**Table 9: Impact of BOE Asset Purchases on EME Equity Markets**

Dependent Variable: $\Delta \ln(p_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(BOE_t)$	0.235*** (0.03)	0.303** (0.12)	0.302*** (0.09)	0.232*** (0.03)	0.156*** (0.05)	0.173*** (0.04)	0.235** (0.11)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(BOE_t)$	0.004*** (0.00)						-0.000 (0.00)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(BOE_t)$		-0.068 (0.12)					-0.146 (0.11)
$\text{Trading}_i \times \Delta \ln(BOE_t)$			-0.074 (0.10)				-0.021 (0.07)
$\text{Language} \times \Delta \ln(BOE_t)$				0.036 (0.06)			0.012 (0.05)
$\text{North} \times \Delta \ln(BOE_t)$					0.107* (0.06)		0.094 (0.08)
$(\frac{\text{Trade}}{\text{GDP}}) \times \Delta \ln(BOE_t)$						0.438*** (0.16)	0.469*** (0.16)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.079 (0.08)	0.087 (0.08)	0.080 (0.08)	0.081 (0.08)	0.081 (0.08)	0.078 (0.08)	0.088 (0.08)
$\ln(\text{Stock Market Cap}_{it})$	0.036*** (0.01)	0.036*** (0.01)	0.036*** (0.01)	0.036*** (0.01)	0.036*** (0.01)	0.036*** (0.01)	0.036*** (0.01)
$\Delta \ln(\text{UK 10 Yr Gov't Yield}_{t-1})$	-0.059*** (0.02)	-0.059*** (0.02)	-0.059*** (0.02)	-0.059*** (0.02)	-0.059*** (0.02)	-0.059*** (0.02)	-0.059*** (0.02)
Ex.Rate Regime	0.004* (0.00)	0.004* (0.00)	0.004* (0.00)	0.004* (0.00)	0.004 (0.00)	0.004 (0.00)	0.004 (0.00)
Capital Inflow Controls	-0.014 (0.03)	-0.014 (0.03)	-0.015 (0.03)	-0.014 (0.03)	-0.015 (0.03)	-0.014 (0.03)	-0.016 (0.03)
Capital Outflow Controls	-0.014 (0.03)	-0.016 (0.03)	-0.016 (0.03)	-0.016 (0.03)	-0.015 (0.03)	-0.014 (0.03)	-0.013 (0.03)
$\Delta \ln(\text{lsap}_t)$	0.349*** (0.06)	0.348*** (0.06)	0.348*** (0.06)	0.348*** (0.06)	0.349*** (0.06)	0.349*** (0.06)	0.349*** (0.06)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1293	1293	1293	1293	1293	1293	1293
$R^2$	0.18	0.18	0.18	0.18	0.18	0.18	0.18
$H_0 : \beta^s = \gamma_g^s = 0$	$\chi^2(2):$ 213.10    92.30    112.17    88.71    86.17    134.99 $p\text{-value:}$ $5.33 \times 10^{-47}$ $9.07 \times 10^{-21}$ $4.40 \times 10^{-25}$ $5.47 \times 10^{-20}$ $1.94 \times 10^{-19}$ $4.86 \times 10^{-30}$						
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(7):$ 422.09 $p\text{-value:}$ $4.36 \times 10^{-87}$						
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(6):$ 18.03 $p\text{-value:}$ $6.15 \times 10^{-3}$						
$F\text{-Statistic (1st Stage)}$	22.39	22.23	22.75	22.73	22.51	22.52	21.94

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(BOE_t)$  and each interaction term. The sample period is from January 2009–February 2014.

**Table 10: Impact of BOE Asset Purchases on EME Sovereign Yields**

Dependent Variable: $\Delta \ln(r_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(BOE_t)$	-0.157*** (0.05)	-0.005 (0.05)	-0.193** (0.08)	-0.100* (0.05)	-0.020 (0.11)	-0.045 (0.06)	0.129 (0.13)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(BOE_t)$	0.003 (0.00)						0.009** (0.00)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(BOE_t)$		-0.172** (0.07)					-0.074 (0.11)
$\text{Trading}_i \times \Delta \ln(BOE_t)$			0.051 (0.10)				-0.015 (0.06)
$\text{Language} \times \Delta \ln(BOE_t)$				-0.174** (0.08)			-0.081 (0.10)
$\text{North} \times \Delta \ln(BOE_t)$					-0.163 (0.14)		-0.129 (0.14)
$(\frac{\text{Trade}}{\text{GDP}}) \times \Delta \ln(BOE_t)$						-0.674** (0.32)	-0.624* (0.34)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.148 (0.17)	0.158 (0.17)	0.150 (0.17)	0.146 (0.17)	0.154 (0.17)	0.155 (0.17)	0.153 (0.17)
$\ln(\text{Stock Market Cap}_{it})$	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)	-0.009 (0.01)
$\Delta \ln(\text{UK 10 Yr Gov't Yield}_{t-1})$	0.080*** (0.02)	0.080*** (0.02)	0.080*** (0.02)	0.080*** (0.02)	0.080*** (0.02)	0.080*** (0.02)	0.080*** (0.02)
Ex.Rate Regime	-0.003 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.003 (0.01)	-0.003 (0.01)
Capital Inflow Controls	0.008 (0.02)	0.007 (0.02)	0.008 (0.02)	0.009 (0.02)	0.009 (0.02)	0.008 (0.02)	0.010 (0.02)
Capital Outflow Controls	0.085*** (0.03)	0.083*** (0.02)	0.084*** (0.02)	0.085*** (0.02)	0.081*** (0.02)	0.080*** (0.02)	0.084*** (0.03)
$\Delta \ln(\text{lsap}_t)$	-0.128 (0.09)	-0.130 (0.09)	-0.128 (0.09)	-0.127 (0.09)	-0.130 (0.08)	-0.129 (0.09)	-0.129 (0.09)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1289	1289	1289	1289	1289	1289	1289
$R^2$	0.03	0.03	0.03	0.03	0.03	0.03	0.04
<hr/>							
$H_0 : \beta^s = \gamma_g^s = 0$	$\chi^2(2) :$ 12.38    13.47    12.62    32.93    12.65    16.79 $p\text{-value} :$ $2.04 \times 10^{-3}$ $1.19 \times 10^{-3}$ $1.82 \times 10^{-3}$ $7.06 \times 10^{-8}$ $1.79 \times 10^{-3}$ $2.26 \times 10^{-4}$						
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(7) :$ 169.08 $p\text{-value} :$ $3.93 \times 10^{-33}$						
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(6) :$ 40.31 $p\text{-value} :$ $3.95 \times 10^{-7}$						
$F\text{-Statistic (1st Stage)}$	15.54	15.37	15.69	15.66	15.77	15.59	15.42

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(BOE_t)$  and each interaction term. The sample period is from January 2009–February 2014.

**Table 11: Impact of BOJ Asset Purchases on EME Exchange Rates**

Dependent Variable: $\Delta \ln(s_{i/JP,t})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(BOJ_t)$	0.410*** (0.01)	0.423*** (0.02)	0.408*** (0.01)	0.426*** (0.01)	0.403*** (0.01)	0.416*** (0.02)	0.446*** (0.02)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(BOJ_t)$	-0.011*** (0.00)						-0.010 (0.01)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(BOJ_t)$		-0.028 (0.03)					-0.017 (0.03)
$\text{Trading}_i \times \Delta \ln(BOJ_t)$			-0.017 (0.02)				0.037 (0.03)
$\text{North} \times \Delta \ln(BOJ_t)$				-0.033* (0.02)			-0.023 (0.03)
$\text{Border} \times \Delta \ln(BOJ_t)$					-0.019 (0.03)		-0.003 (0.05)
$(\frac{\text{Trade}}{\text{GDP}}) \times \Delta \ln(BOJ_t)$						-0.040 (0.03)	-0.055 (0.04)
$\Delta \ln(\text{Monetary Policy}_{it})$	-0.154** (0.06)	-0.157** (0.06)	-0.157** (0.06)	-0.157** (0.06)	-0.156** (0.06)	-0.157** (0.06)	-0.154** (0.06)
$\ln(\text{Stock Market Cap}_{it})$	-0.005 (0.01)	-0.004 (0.01)	-0.004 (0.01)	-0.005 (0.01)	-0.005 (0.01)	-0.004 (0.01)	-0.005 (0.01)
$\Delta \ln(\text{Japan 10 Yr Gov't Yield}_{t-1})$	0.065*** (0.01)	0.065*** (0.01)	0.065*** (0.01)	0.065*** (0.01)	0.065*** (0.01)	0.065*** (0.01)	0.065*** (0.01)
Ex.Rate Regime	0.006 (0.01)	0.006 (0.01)	0.006 (0.01)	0.006 (0.01)	0.006 (0.01)	0.006 (0.01)	0.006 (0.01)
Capital Inflow Controls	-0.011 (0.01)	-0.011 (0.01)	-0.011 (0.01)	-0.011 (0.01)	-0.011 (0.01)	-0.011 (0.01)	-0.011 (0.01)
Capital Outflow Controls	0.014 (0.01)	0.014 (0.01)	0.013 (0.01)	0.014 (0.01)	0.014 (0.01)	0.013 (0.01)	0.014 (0.01)
$\Delta \ln(\text{lsap}_t)$	-0.314*** (0.05)	-0.314*** (0.05)	-0.314*** (0.05)	-0.314*** (0.05)	-0.314*** (0.05)	-0.314*** (0.05)	-0.315*** (0.05)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1296	1296	1296	1296	1296	1296	1296
$R^2$	0.26	0.26	0.26	0.26	0.26	0.26	0.26
$H_0 : \beta^s = \gamma_g^s = 0$	$\chi^2(2):$ 1294.80    1288.67    1393.99    2129.26    1281.61    1346.50 $p\text{-value:}$ $6.87 \times 10^{-282}$ $1.48 \times 10^{-280}$ $1.99 \times 10^{-303}$ 0.00 $5.02 \times 10^{-279}$ $4.09 \times 10^{-293}$						
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(7):$ 1584.84 $p\text{-value:}$ 0.00						
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(6):$ 33.75 $p\text{-value:}$ $7.53 \times 10^{-6}$						
$F\text{-Statistic (1st Stage)}$	16.72	16.84	16.74	16.69	16.82	16.77	16.59

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(BOJ_t)$  and each interaction term. The sample period is from January 2009–February 2014.

**Table 12: Impact of BOJ Asset Purchases on EME Equity Prices**

Dependent Variable: $\Delta \ln(p_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(BOJ_t)$	-0.110*** (0.04)	-0.097 (0.08)	-0.096* (0.05)	-0.091 (0.06)	-0.110*** (0.03)	-0.099** (0.05)	-0.067 (0.08)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(BOJ_t)$	-0.012 (0.01)						0.009 (0.02)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(BOJ_t)$		-0.029 (0.08)					-0.024 (0.13)
$\text{Trading}_i \times \Delta \ln(BOJ_t)$			-0.051 (0.06)				-0.013 (0.08)
$\text{North} \times \Delta \ln(BOJ_t)$				-0.036 (0.07)			-0.004 (0.09)
$\text{Border} \times \Delta \ln(BOJ_t)$					-0.074 (0.07)		-0.098 (0.12)
$(\frac{\text{Trade}}{\text{GDP}}) \times \Delta \ln(BOJ_t)$						-0.051 (0.05)	-0.043 (0.05)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.046 (0.07)	0.042 (0.07)	0.043 (0.07)	0.043 (0.07)	0.046 (0.07)	0.042 (0.07)	0.044 (0.07)
$\ln(\text{Stock Market Cap}_{it})$	0.032*** (0.01)	0.032*** (0.01)	0.032*** (0.01)	0.032*** (0.01)	0.032*** (0.01)	0.032*** (0.01)	0.032*** (0.01)
$\Delta \ln(\text{Japan 10 Yr Gov't Yield}_{t-1})$	-0.056*** (0.01)	-0.056*** (0.01)	-0.056*** (0.01)	-0.056*** (0.01)	-0.056*** (0.01)	-0.056*** (0.01)	-0.056*** (0.01)
Ex.Rate Regime	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)	0.002 (0.00)
Capital Inflow Controls	-0.021 (0.03)	-0.021 (0.03)	-0.022 (0.03)	-0.021 (0.03)	-0.021 (0.03)	-0.021 (0.03)	-0.021 (0.03)
Capital Outflow Controls	-0.015 (0.02)	-0.015 (0.02)	-0.016 (0.02)	-0.015 (0.02)	-0.015 (0.02)	-0.016 (0.02)	-0.016 (0.02)
$\Delta \ln(\text{lsap}_t)$	0.535*** (0.06)	0.536*** (0.06)	0.536*** (0.06)	0.536*** (0.06)	0.535*** (0.06)	0.536*** (0.06)	0.536*** (0.06)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1293	1293	1293	1293	1293	1293	1293
$R^2$	0.14	0.14	0.14	0.14	0.14	0.14	0.14
$H_0 : \beta^s = \gamma_g^s = 0$	$\chi^2(2):$ 40.43    16.54    30.01    16.37    22.39    50.27 $p\text{-value:}$ $1.66 \times 10^{-9}$ $2.57 \times 10^{-4}$ $3.05 \times 10^{-7}$ $2.79 \times 10^{-4}$ $1.37 \times 10^{-5}$ $1.22 \times 10^{-11}$						
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(7):$ 163.33 $p\text{-value:}$ $6.40 \times 10^{-32}$						
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$	$\chi^2(6):$ 4.45 $p\text{-value:}$ 0.62						
$F\text{-Statistic (1st Stage)}$	21.68	22.07	21.80	21.64	21.83	21.93	21.88

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(BOJ_t)$  and each interaction term. The sample period is from January 2009–February 2014.

**Table 13: Impact of BOJ Asset Purchases on EME Sovereign Yields**

Dependent Variable: $\Delta \ln(r_{it})$	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$\Delta \ln(BOJ_t)$	-0.039 (0.05)	-0.040 (0.08)	0.014 (0.05)	-0.070 (0.08)	-0.062 (0.06)	0.028 (0.05)	-0.051 (0.10)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(BOJ_t)$	-0.019* (0.01)						-0.026 (0.02)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(BOJ_t)$		-0.019 (0.09)					0.114 (0.09)
$\text{Trading}_i \times \Delta \ln(BOJ_t)$			-0.143* (0.08)				-0.084 (0.09)
$\text{North} \times \Delta \ln(BOJ_t)$				0.017 (0.09)			0.013 (0.11)
$\text{Border} \times \Delta \ln(BOJ_t)$					0.046 (0.08)		0.135 (0.09)
$(\frac{\text{Trade}}{\text{GDP}}) \times \Delta \ln(BOJ_t)$						-0.198 (0.12)	-0.149 (0.14)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.170 (0.17)	0.164 (0.17)	0.167 (0.18)	0.164 (0.17)	0.162 (0.17)	0.165 (0.17)	0.169 (0.17)
$\ln(\text{Stock Market Cap}_{it})$	-0.006 (0.01)	-0.006 (0.01)	-0.006 (0.01)	-0.006 (0.01)	-0.006 (0.01)	-0.005 (0.01)	-0.005 (0.01)
$\Delta \ln(\text{Japan 10 Yr Gov't Yield}_{t-1})$	0.213*** (0.04)	0.213*** (0.04)	0.213*** (0.04)	0.213*** (0.04)	0.213*** (0.04)	0.213*** (0.04)	0.213*** (0.04)
Ex.Rate Regime	-0.004 (0.02)	-0.003 (0.02)	-0.003 (0.02)	-0.003 (0.02)	-0.003 (0.02)	-0.004 (0.02)	-0.003 (0.02)
Capital Inflow Controls	0.014 (0.02)	0.014 (0.02)	0.013 (0.02)	0.014 (0.02)	0.014 (0.02)	0.014 (0.02)	0.013 (0.02)
Capital Outflow Controls	0.086*** (0.03)	0.086*** (0.03)	0.084*** (0.03)	0.086*** (0.03)	0.086*** (0.03)	0.084*** (0.03)	0.084*** (0.03)
$\Delta \ln(\text{lsap}_t)$	-0.292*** (0.09)	-0.291*** (0.09)	-0.291*** (0.09)	-0.291*** (0.09)	-0.291*** (0.09)	-0.291*** (0.09)	-0.291*** (0.09)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1289	1289	1289	1289	1289	1289	1289
$R^2$	0.09	0.09	0.09	0.09	0.09	0.09	0.09
$H_0 : \beta^s = \gamma_g^s = 0$							
$\chi^2(2) :$	7.27	1.24	3.72	1.39	1.25	3.02	
$p\text{-value} :$	0.03	0.54	0.16	0.50	0.54	0.22	
$H_0 : \beta^s = \gamma_1^s = \dots = \gamma_G^s = 0$							
$\chi^2(7) :$							21.41
$p\text{-value} :$							$3.21 \times 10^{-3}$
$H_0 : \gamma_1^s = \dots = \gamma_G^s = 0$							
$\chi^2(6) :$							14.71
$p\text{-value} :$							0.02
$F\text{-Statistic (1st Stage)}$	14.15	14.32	14.10	14.16	14.25	14.18	14.05

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta(BOJ_t)$  and each interaction term. The sample period is from January 2009–February 2014.

**Table 14: Impact of U.S. LSAPs on EME Asset Prices: Global Frictions**

Dependent Variable:	$\Delta \ln(s_{i/\$,t})$ (1)	$\Delta \ln(p_{it})$ (2)	$\Delta \ln(r_{it})$ (3)
$\Delta \ln(lsap_t)$	-0.493*** (0.16)	0.700*** (0.17)	-0.137 (0.28)
$FTA_i \times \Delta \ln(lsap_t)$	-0.008 (0.07)	0.175* (0.11)	-0.193 (0.18)
$Oil_i \times \Delta \ln(lsap_t)$	0.022 (0.10)	0.039 (0.10)	-0.127 (0.15)
$Commodity_i \times \Delta \ln(lsap_t)$	0.082 (0.13)	-0.294** (0.13)	-0.022 (0.11)
$Landlock\text{-}Island_i \times \Delta \ln(lsap_t)$	-0.053 (0.16)	-0.202 (0.17)	-0.004 (0.18)
$\left(\frac{\text{Total Trade}_i}{GDP_i}\right) \times \Delta \ln(lsap_t)$	0.115* (0.06)	-0.037 (0.06)	-0.025 (0.12)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.050 (0.06)	0.062 (0.07)	0.225 (0.18)
$\ln(\text{Stock Market Cap}_{it})$	-0.004 (0.01)	0.031*** (0.01)	0.011 (0.01)
$\Delta \ln(VIX_{t-1})$	0.020*** (0.01)	-0.066*** (0.01)	0.050*** (0.01)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.011 (0.01)	-0.079*** (0.02)	0.152*** (0.03)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.109*** (0.03)	-0.090** (0.04)	0.177*** (0.06)
Ex.Rate Regime	-0.000 (0.00)	0.002 (0.00)	-0.001 (0.01)
Capital Outflow Controls	0.028** (0.01)	-0.022 (0.02)	0.110*** (0.02)
Capital Inflow Controls	-0.007 (0.02)	-0.016 (0.02)	0.009 (0.02)
Country FE	Yes	Yes	Yes
$N$	1316	1313	1309
$R^2$	0.12	0.18	0.06
$\chi^2(6)$ (Joint)	102.96	364.23	66.83
$p$ -value (Joint)	0.0000	0.0000	0.0000
$F$ -Statistic (1st Stage)	17.96	23.46	14.85

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta(lsap_t)$  and each interaction term. The sample period is from December 2008–February 2014.



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**Table A1: Impact of U.S. LSAP Purchases on EME Asset Prices: Controlling for Policy Rate**

Dependent Variable:	$\Delta \ln(s_{i/\$,t})$ (1)	$\Delta \ln(p_{it})$ (2)	$\Delta \ln(r_{it})$ (3)
$\Delta \ln(\text{lsap}_t)$	-0.014 (0.15)	0.814* (0.47)	-0.852** (0.38)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(\text{lsap}_t)$	0.138 (0.33)	-0.710 (1.33)	1.696** (0.81)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(\text{lsap}_t)$	-0.267*** (0.06)	0.096 (0.14)	0.088 (0.11)
$\text{Trading}_i \times \Delta \ln(\text{lsap}_t)$	-0.222*** (0.07)	-0.085 (0.17)	-0.202 (0.18)
$\text{Language} \times \Delta \ln(\text{lsap}_t)$	-0.209*** (0.06)	0.003 (0.14)	-0.088 (0.14)
$\text{North} \times \Delta \ln(\text{lsap}_t)$	-0.220** (0.09)	0.283** (0.14)	-0.398 (0.28)
$\text{Border} \times \Delta \ln(\text{lsap}_t)$	-0.505*** (0.19)	1.120** (0.54)	-1.200** (0.52)
$\left(\frac{\text{Trade}}{\text{GDP}}\right) \times \Delta \ln(\text{lsap}_t)$	0.204*** (0.05)	-0.252* (0.13)	0.244 (0.15)
Ex.Rate Regime	-0.001 (0.00)	0.002 (0.00)	-0.003 (0.01)
Capital Inflow Controls	-0.015 (0.02)	-0.016 (0.02)	-0.016 (0.03)
Capital Outflow Controls	0.041** (0.02)	-0.014 (0.03)	0.131*** (0.02)
$\Delta(\text{Policy Rate}_{it})$	-0.017 (0.02)	-0.007 (0.02)	-0.029 (0.03)
$\ln(\text{Stock Market Cap}_{it})$	-0.004 (0.01)	0.031*** (0.01)	0.012 (0.01)
$\Delta \ln(\text{VIX}_{t-1})$	0.026*** (0.01)	-0.063*** (0.01)	0.061*** (0.02)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.009 (0.01)	-0.081*** (0.02)	0.142*** (0.03)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.128*** (0.04)	-0.080* (0.04)	0.213*** (0.07)
Country FE	Yes	Yes	Yes
$N$	1316	1313	1309
$R^2$	0.12	0.18	0.06
$H_0 : \beta^y = \gamma_1^y = \dots = \gamma_G^y = 0$			
$\chi^2(8)$	673.12	776.31302	191.00867
$p\text{-value}$	$4.38 \times 10^{-140}$	$2.62 \times 10^{-162}$	$5.00 \times 10^{-37}$
$H_0 : \gamma_1^y = \dots = \gamma_G^y = 0$			
$\chi^2(7)$	119.85	73.69	17.72
$p\text{-value}$	$8.24 \times 10^{-23}$	$2.65 \times 10^{-13}$	0.01
$F\text{-Statistic (1st Stage)}$	3.91	3.92	2.75

Cluster cluster(id) standard errors in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Estimating is via 2SLS, where the control for monetary policy is proxied by the change in policy rate, which is instrumented by its first lag. Reported  $F$ -statistics are for the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(\text{lsap}_t)$  and each interaction term. Sample period is from December 2008–February 2014.

**Table 15: Impact U.S. LSAP Purchases and Components on EME Asset Prices: Role of Financial Linkages**

Dependent Variable:	$\Delta \ln(s_{i/s,t})$ (1)	$\Delta \ln(p_{it})$ (2)	$\Delta \ln(r_{it})$ (3)	$\Delta \ln(s_{i/s,t})$ (4)	$\Delta \ln(p_{it})$ (5)	$\Delta \ln(r_{it})$ (6)
$\Delta \ln(\text{lsap}_t)$	-0.209 (0.16)	0.695* (0.37)	-1.088*** (0.39)	-0.209 (0.16)	0.708*** (0.22)	-1.094*** (0.39)
$\left(\frac{\text{Financial Flows}_{i,US}}{\text{GDP}}\right) \times \Delta \ln(\text{lsap}_t)$	0.001 (0.27)	1.507** (0.76)	1.073** (0.54)			
$\left(\frac{\text{Financial Flows}}{\text{GDP}}\right) \times \Delta \ln(\text{lsap}_t)$				-0.068 (0.07)	0.578*** (0.13)	-0.087 (0.20)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(\text{lsap}_t)$	0.432 (0.34)	-0.146 (1.03)	2.562*** (0.63)	0.350 (0.37)	0.144 (0.63)	2.135*** (0.79)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(\text{lsap}_t)$	-0.227*** (0.08)	0.084 (0.13)	0.046 (0.15)	-0.227*** (0.08)	0.117 (0.10)	0.098 (0.15)
$\text{Trading}_i \times \Delta \ln(\text{lsap}_t)$	-0.212** (0.10)	-0.143 (0.18)	-0.274 (0.25)	-0.191* (0.10)	-0.241** (0.12)	-0.183 (0.26)
$\text{Language} \times \Delta \ln(\text{lsap}_t)$	-0.155* (0.08)	0.020 (0.11)	-0.087 (0.18)	-0.142* (0.08)	-0.019 (0.09)	-0.047 (0.17)
$\text{North} \times \Delta \ln(\text{lsap}_t)$	-0.251** (0.10)	0.220* (0.12)	-0.506 (0.31)	-0.243*** (0.09)	0.202** (0.09)	-0.459 (0.29)
$\text{Border} \times \Delta \ln(\text{lsap}_t)$	-0.638*** (0.22)	1.722*** (0.66)	-0.963 (0.59)	-0.801*** (0.26)	2.489*** (0.36)	-1.641** (0.73)
$\left(\frac{\text{Trade}}{\text{GDP}}\right) \times \Delta \ln(\text{lsap}_t)$	0.224*** (0.08)	-0.504** (0.21)	0.093 (0.20)	0.286*** (0.09)	-0.788*** (0.12)	0.354 (0.24)
$\Delta \ln(\text{Monetary Base}_{it})$	0.104 (0.08)	0.006 (0.08)	0.114 (0.14)	0.101 (0.08)	0.020 (0.09)	0.099 (0.14)
$\ln(\text{Stock Market Cap}_{it})$	-0.009 (0.01)	0.028** (0.01)	0.017 (0.01)	-0.008 (0.01)	0.027** (0.01)	0.018 (0.01)
$\Delta \ln(\text{VIX}_{t-1})$	0.026*** (0.01)	-0.062*** (0.01)	0.056*** (0.02)	0.026*** (0.01)	-0.062*** (0.01)	0.057*** (0.02)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.011 (0.01)	-0.080*** (0.02)	0.153*** (0.03)	0.011 (0.01)	-0.079*** (0.02)	0.152*** (0.03)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.131*** (0.02)	-0.065* (0.03)	0.208*** (0.06)	0.131*** (0.02)	-0.065* (0.03)	0.208*** (0.06)
$\text{Ex.Rate Regime}$	-0.001 (0.00)	0.001 (0.00)	-0.004 (0.01)	-0.001 (0.00)	0.000 (0.00)	-0.004 (0.01)
$\text{Capital Inflow Controls}$	-0.016 (0.02)	-0.015 (0.02)	0.012 (0.02)	-0.016 (0.02)	-0.015 (0.02)	0.011 (0.02)
$\text{Capital Outflow Controls}$	0.027** (0.01)	-0.021 (0.02)	0.119*** (0.03)	0.027** (0.01)	-0.024 (0.02)	0.119*** (0.03)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
$N$	1152	1159	1145	1152	1159	1145
$R^2$	0.15	0.18	0.09	0.15	0.19	0.09
$H_0 : \beta^y = \gamma_1^y = \dots = \gamma_G^y = 0$						
$\chi^2(9) :$	681.87	2102.79	590.60	706.75	4610.16	294.90
$p\text{-value} :$	$5.45 \times 10^{-141}$	0.00	$2.18 \times 10^{-121}$	$2.45 \times 10^{-146}$	0.00	$3.15 \times 10^{-58}$
$H_0 : \gamma_1^y = \dots = \gamma_G^y = 0$						
$\chi^2(8) :$	96.02	93.71	72.32	161.25	4040.88	21.23
$p\text{-value} :$	$2.78 \times 10^{-17}$	$8.2 \times 10^{-17}$	$1.69 \times 10^{-12}$	$8.77 \times 10^{-31}$	0.00	0.01
$F\text{-Statistic (1st Stage)}$	16.17	16.52	12.61	16.14	16.45	12.61

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta(\text{lsap}_t)$  and each interaction term. The sample period is from December 2008–February 2014.

**Table A3: Impact of U.S. LSAPs on EME Asset Prices: Global Frictions**

Dependent Variable:	$\Delta \ln(s_{i/\$,t})$ (1)	$\Delta \ln(p_{it})$ (2)	$\Delta \ln(r_{it})$ (3)
$\Delta \ln(lsap_t)$	-0.317 (0.24)	0.600*** (0.19)	-0.459 (0.28)
$FTA_i \times \Delta \ln(lsap_t)$	-0.201** (0.09)	-0.037 (0.09)	0.127 (0.12)
$Oil_i \times \Delta \ln(lsap_t)$	-0.007 (0.11)	0.087 (0.12)	-0.137 (0.17)
$Landlock \text{ or } Island_i \times \Delta \ln(lsap_t)$	0.093 (0.14)	-0.040 (0.14)	0.085 (0.17)
$\left(\frac{\text{Total Trade}_i}{GDP_i}\right) \times \Delta \ln(lsap_t)$	0.096* (0.05)	0.027 (0.05)	-0.023 (0.11)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.050 (0.06)	0.062 (0.08)	0.221 (0.18)
$\ln(\text{Stock Market Cap}_{it})$	-0.005 (0.01)	0.031*** (0.01)	0.012 (0.01)
$\Delta \ln(VIX_{t-1})$	0.020*** (0.01)	-0.066*** (0.01)	0.050*** (0.01)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.011 (0.01)	-0.079*** (0.02)	0.151*** (0.03)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.109*** (0.03)	-0.090** (0.04)	0.177*** (0.06)
Ex.Rate Regime	-0.000 (0.00)	0.002 (0.00)	-0.002 (0.01)
Capital Outflow Controls	0.026** (0.01)	-0.016 (0.02)	0.107*** (0.02)
Capital Inflow Controls	-0.006 (0.02)	-0.019 (0.02)	0.010 (0.02)
Country FE	Yes	Yes	Yes
$N$	1316	1313	1309
$R^2$	0.12	0.17	0.06
$H_0 : \beta^y = \gamma_1^y = \dots = \gamma_G^y = 0$			
$\chi^2(5)$	86.58	735.53	31.38
$p\text{-value}$	3.50e-17	1.02e-156	7.86e-06
$H_0 : \gamma_1^y = \dots = \gamma_G^y = 0$			
$\chi^2(4)$	11.48	1.99	3.30
$p\text{-value}$	0.02	0.74	0.51
$F\text{-Statistic (1st Stage)}$	16.81	22.28	14.09

Cluster robust standard errors (country-level) in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Regressions are estimated by 2SLS, with monetary policy proxied by the monetary base, which is instrumented by its first lag.  $F$ -statistics (1st stage) is the  $F$ -statistic from the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta(lsap_t)$  and each interaction term. The sample period is from December 2008–February 2014.

**Table AX: Impact of U.S. LSAP Purchases on EME Asset Prices - Controlling for Macro Fundamentals**

Dependent Variable:	$\Delta \ln(s_{i/\$,t})$ (1)	$\Delta \ln(p_{it})$ (2)	$\Delta \ln(r_{it})$ (3)
$\Delta \ln(lsap_t)$	-0.004 (0.14)	0.828 (0.55)	-0.790** (0.31)
$\frac{1}{\ln(\text{Distance}_i)} \times \Delta \ln(lsap_t)$	0.176 (0.27)	-0.666 (1.39)	2.073*** (0.56)
$\text{FTA}_i^{\text{Prop}} \times \Delta \ln(lsap_t)$	-0.182** (0.09)	0.055 (0.15)	0.291** (0.14)
$\text{Trading}_i \times \Delta \ln(lsap_t)$	-0.248*** (0.07)	-0.118 (0.32)	-0.273 (0.17)
$\text{Language} \times \Delta \ln(lsap_t)$	-0.304*** (0.08)	-0.046 (0.30)	-0.015 (0.12)
$\text{North} \times \Delta \ln(lsap_t)$	-0.338*** (0.06)	0.342** (0.16)	-0.827*** (0.26)
$\left(\frac{\text{Trade}}{\text{GDP}}\right) \times \Delta \ln(lsap_t)$	0.261*** (0.05)	-0.264 (0.16)	0.248** (0.10)
$\Delta \ln(\text{Monetary Policy}_{it})$	0.048 (0.08)	0.003 (0.10)	0.053 (0.12)
$\ln(\text{Stock Market Cap}_{it})$	-0.010 (0.01)	0.045*** (0.02)	0.015 (0.02)
$\Delta \ln(\text{VIX}_{t-1})$	0.026*** (0.01)	-0.071*** (0.01)	0.039** (0.02)
$\Delta \ln(\text{US Treasury Yield}_{t-1})$	0.009 (0.01)	-0.104*** (0.02)	0.136*** (0.04)
$\Delta \ln(\text{S\&P 500}_{t-1})$	0.130*** (0.03)	-0.019 (0.05)	0.145*** (0.05)
Ex.Rate Regime	-0.006*** (0.00)	-0.001 (0.00)	-0.005 (0.00)
Capital Inflow Controls	-0.005 (0.02)	-0.014 (0.02)	-0.003 (0.02)
Capital Outflow Controls	0.013 (0.01)	-0.027 (0.02)	0.131*** (0.03)
$\Delta \%(CPI_{t-1})$	-0.000 (0.00)	-0.001 (0.00)	-0.001 (0.00)
$\Delta \%(Unemp_{t-1})$	0.012* (0.01)	0.000 (0.01)	0.012 (0.01)
$\Delta \%(Reserves_{t-1})$	0.037 (0.04)	-0.162*** (0.05)	0.035 (0.10)
Country FE	Yes	Yes	Yes
$N$	857	864	850
$R^2$	0.17	0.20	0.09
$H_0 : \beta^y = \gamma_1^y = \dots = \gamma_G^y = 0$			
$\chi^2(7)$	249.97	172.97	138.67
$p\text{-value}$	$2.81 \times 10^{-50}$	$5.94 \times 10^{-34}$	$9.67 \times 10^{-27}$
$H_0 : \gamma_1^y = \dots = \gamma_G^y = 0$			
$\chi^2(6)$	117.21	17.89	122.76
$p\text{-value}$	$6.26 \times 10^{-23}$	0.01	$4.28 \times 10^{-24}$
$F\text{-Statistic (1st Stage)}$	14.33	14.50	11.14

Cluster cluster(id) standard errors in parentheses \* $p < 0.1$ , \*\* $p < 0.05$ , \*\*\* $p < 0.01$ . Estimating is via 2SLS, where the control for monetary policy is proxied by the monetary base, which is instrumented by its first lag. Reported  $F$ -statistics are for the first stage of the 2SLS procedure.  $\chi^2$  and  $p$ -value are from  $F$ -tests for joint significance of the coefficients on  $\Delta \ln(lsap_t)$  and each interaction term. Sample period is from December 2008–February 2014.