

Unconventional Monetary Policy Spillovers Evidence from Emerging Markets

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Abstract:

Using an event studies framework, I study the reaction of some emerging markets to unconventional monetary policy announcements made by the Federal Reserve. I find large and statistically significant spillovers with considerable heterogeneity across countries and events. Given that the effects of some spillovers are greater overseas than they are in the US, it is necessary to understand their nature and implications. My findings raise some questions about topics such as international monetary coordination.

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1. Introduction

Since the Global Financial Crisis starting in December 2007, and going well into the recovery, the Federal Reserve (Fed) occupied central stage in combatting the recession. As the federal funds rate approached zero at the end of 2008, the Fed began quantitative easing (QE) programs which vastly expanded its balance sheet, from less than \$1 trillion at the end of 2008 to over \$4 trillion today.¹ In addition to have wide-ranging effects on the US economy, the Fed's accommodative monetary policy has spilled over internationally. A particularly potent example of one of these spillovers was the so-called "taper tantrum" which took place in summer 2013 and resulted in slowed capital inflows and depreciated currencies in many emerging markets (Eichengreen and Gupta, 2013). The spillovers from the Fed as well as other central banks brought forward accusations of "currency wars."² Rajan (2014), in somewhat less martial terms, warns of "competitive easing" and contends that "[o]ur attitudes towards [unconventional monetary policies] should be conditioned by the size of their spillover effects rather than by any innate legitimacy of either form of intervention."

Luckily for economists, this spillover manifested itself in more than just politicians fulminating and clever monikers being devised for significant economic events. In light of this, I use an event studies framework to understand the effect of QE programs on a group of seven emerging markets. I compare their behavior to that of the United States and to the UK and Germany. The rest of the paper is set up as follows: the next section reviews the literature. Section 3 discusses channels for monetary policy spillover. Section 4 discusses the data and methodology. Section 5 presents and discusses the results. Section 6 concludes.

2. Literature Review

¹ See https://www.federalreserve.gov/monetarypolicy/bst_recenttrends.htm

² See for instance, <http://www.ft.com/intl/cms/s/0/33ff9624-ca48-11df-a860-00144feab49a.html#axzz47uFpwr2R>.

Here I review the literature surrounding event studies of Quantitative Easing (QE) events and international spillovers of Fed policy. Gagnon, et al. (2010) using an event study framework considering one-day windows surrounding both significant dates during QE 1 and all Federal Open Market Committee (FOMC) meeting statement and minute releases find that QE announcements reduced long term rates on US Treasuries through decreases in term premiums. They further find QE announcements linked to decreases in agency mortgage backed security (MBS) yields, an index of US corporate bonds. Krishnamurthy and Vissing-Jorgensen (2011) consider the effects of QE1 and QE2 and the Fed's Maturity Extension Program.³ They construct two-day windows surrounding each announcement and assess the impacts on Treasury yields, agency yields, corporate bond yields, as well as on futures yields. They find that QE1 reduced corporate bond and MBS risk more than QE2, while QE2 had a greater impact on agency bond yields. Neely (2015), using a 1-day window around QE1 announcements, finds that in other advanced countries⁴, long term bond yields fell, although not with the same magnitude with which they fell in the US. Further, the dollar depreciated against other advanced country currencies at the same time. Chen, et al (2015) use a global vector error-correction model with spreads between long and short term US Treasury Bonds and the spread between corporate and government US bonds as measures of US Monetary policy. They find that a decrease in corporate spreads is correlated with an increase in international equity prices, while a decrease in the term spread is correlated with a decrease in equity prices. They also find that a decrease in corporate spreads raise growth and inflation in other countries. Perhaps most interestingly they find some effects of US monetary policy stronger in emerging markets than in the United States itself. Morais, Peydro, and Ruiz (2015) study both changes in the federal funds rate and QE announcements to understand the impact on credit growth in Mexico.

³ Although it seems they label this as a first instance of QE3.

⁴ Australia, Canada, Germany, Japan, and the United Kingdom

They use loan and firm level data and find that accommodative monetary policy in advanced economies resulted in an increase in credit and default for Mexican firms. Chodorow-Reich (2014) studies the impact of QE1-3 announcements on the financial sector using a very short intraday window and finds that monetary easing is associated with increases in stock prices for financial firms along with a decrease in their corporate yields. Finally moving away from QE, Hausman and Wongswan (2011) study the impact of FOMC meetings between February 1994 and March 2005 on a set of 49 countries. They divide policy surprises in those FOMC meetings into target and path surprises (related to the target federal funds rate or the future path of that rate) and compare them to changes in interest rates and asset prices in other countries. They find, perhaps unsurprisingly, heterogeneous impacts across assets and countries.

3. Channels of Monetary Policy Spillover

Ammer et al, (2016) discuss three channels through which monetary policy can spillover to other countries: exchange rate, domestic demand, and financial spillovers. Financial spillovers can be decomposed into channels which Neely (2015) identifies, including liquidity, signaling, and portfolio balance. I discuss the exchange rate channel and financial spillover channel by recording changes in exchange rates and long term interest rates. Emerging markets express concern about lower long term interest rates which can reduce debt burdens while also promoting risk taking and increasing asset prices. Further, emerging markets worry about a depreciating dollar which shifts US consumption from foreign to domestic thus reducing their imports.

Caballero, Farhi, and Gourinchas (2016) contend that output around the world has to decline at the zero lower bound (ZLB - during which unconventional monetary policy plays out). In their model, the nominal exchange rate controls the probability a country will be hit with a recession. And since a depreciated nominal exchange rate would provide domestic stimulus (and reduce the risk of recession), countries would be incentivized to directly intervene in foreign exchange markets. Yet to the extent that

unconventional monetary policy can influence the nominal exchange rate, the intervention need not be direct. Looking at the exchange rate in this manner – as the probability of recession – makes it all the more necessary to understand the effects of unconventional monetary policy on exchange rates.

4. Data and Methodology

I use QE dates as shown in Table 1. With the exception of November 25, 2008, the dates and program classifications come from Chodorow-Reich (2014). Following Neely (2015), I construct a one-day window during which I record the impact of each announcement on long term bond yields and foreign exchange rates for ten countries. The key identifying assumption is that the Fed's action in a given event window is the most important piece of economic news during that window. Krishnamurthy and Vissing-Jorgensen (2011) and Chodorow-Reich (2014)'s Online Appendix validate this assumption for this set of dates.

I consider seven emerging markets and two advanced economies, in addition to the United States. The emerging markets are Brazil, China, India, Mexico, South Africa, South Korea, and Thailand. These were chosen based on inclusion in MSCI's list of emerging markets, having a floating exchange rate according to the IMF's 2014 Annual Report on Exchange Arrangements and Exchange Restrictions (with the exception of China), and having their currency included on the Fed's H.10 releases of foreign exchange rates. The United Kingdom and Germany are included in order to compare emerging and advanced economies, and German bond yields serve as a proxy for European bond yields. Daily 10-year government bond yields for all countries come from Global Financial Data. Daily data on foreign exchange rates comes from the Fed's H.10 indexes and are downloaded from WRDS. The H.10 tables report foreign exchange rates as of noon Eastern. For dates during which an announcement is made prior to that time (November 25, 2008 and May 22, 2013), I construct the window for foreign exchange on the date of the announcement. For all other dates, I construct the

window on the following day. For government bond yield announcements, I consider the day of the announcement if the market in a given country would have been open at the time. Otherwise, I consider the next day. This means that I consider the day of the announcement for the US, Brazil, and Mexico, and the day after for all other countries, with one exception. The November 25, 2008 announcement was made at 8:15 AM EST, when markets in the UK and Germany were open, thus I consider the changes in their government bond yields on the same day. Tables 2 and 3 summarize these variables.

In order to determine whether changes during event windows are significant, I regress the changes on dummies corresponding to the day of the event (or the day after) using robust standard errors. I report the t-statistic of each dummy and, following Krishnamurthy and Vissing-Jorgensen (2011), perform joint F-tests on the sum of each group of events (QE1, QE2, FG, QE3).

Some of the Fed's announcement's coincide with holidays resulting in market closures in other countries. I have excluded these dates from the analysis surrounding those countries' government bonds. However, I include all dates in the analysis surrounding foreign exchange rate since those data are reported from New York.

The primary challenge results from the length of the event window. In some cases, when the day of the announcement is being considered, the length of the window is considerably shorter than when the next day whole day is considered. This may either prevent new information from fully being priced into the shorter window, or allow for too much (extraneous) information to be priced into the longer window. To check for the former problem (too short of a window), I perform robustness checks using two-day windows.

5. Results and Analysis

5.1 Government Bond Yields

I begin with a discussion of 10-year government bond yields. Table 4 reports one day changes in yields, along with sums across QE programs as well as averages

across event dates. Figures 1-6 show the evolution of bond yields in advanced and emerging markets over the course of QE. The vertical lines represent QE event dates. Averages are presented for emerging markets, and foreign countries with and without China (since it follows a different currency regime than the rest of the countries in the sample). The bond yields for the US confirm previous studies including Neely (2015), Chodorow-Reich (2014), Gagnon, et al. (2011) and Krishnamurthy and Vissing-Jorgensen (2011). They also serve as a measure to compare other changes against. Appendix Table 1 reports the results of regressions and F-tests performed to assess significance. It reports the coefficient on each dummy, the robust standard error, and the t-statistic associated with the dummy. The bottom of the table reports joint F-tests of the dummies belonging to each program. An F-test is not conducted for either FG for India since one of the two dates for the program is not considered. Similarly, an F-test is not conducted for Korea during QE2, and for China for both FG and QE2.

Over the course of QE1 events, bond yields decreased most dramatically in Brazil (108 basis points), followed by the United States (102 basis points), and rose by about 39 basis points in China. On average, foreign yields fell by about half as much as they fell in the United States, with the UK and Germany around the average, India and South Korea above the average and Mexico and South Africa below it. There is also a considerable level of heterogeneity at the country level. For example, on December 1, 2008, Brazil's bond yields fell more than three times those of the United States, yet on December 16, 2008, Brazil was the only country to see an increase in yields. Table 5 suggests all these changes are statistically significant (the only coefficient which is not significant is January 28, 2009 for Germany when its yield did not change).

By comparison, the effects of QE2 seem to be more modest. This is partly because there are less dates to study during the program, but also partly because there is less of an effect on these dates. Bond yields in the US dropped 18 basis points on these dates. QE2 responses in Brazil, India, Mexico, and Thailand were much more

mented than they were in QE1. Brazil and India's rates fell somewhat, Thailand's rose 3 basis points, and Mexico's rate change was not statistically different from zero. On the flip side, South Africa, Germany, and the UK reacted much more than in QE1, with all of three seeing greater drops in their yields than the US. China and South Korea only provide us with one data point making it difficult to draw conclusions.

FG paints a similarly mixed picture. US bond yields fall 27 points. South Africa and the UK reacted in a manner similar to QE2, while changes in German yields canceled each other out (although but events were significant on their own). Unlike QE2, Thailand's yields reacted strongly downward. Only one date is available for China, India, and South Korea, but India saw a significant increase of 28 basis points on the first day.

Finally, QE3 provides several events and includes the Taper Tantrum. Over the events, US yields rose 8 points while foreign yields rose on average 12 points. Perhaps because it included events which both expansionary and contractionary measures, over the period, Indian and German bond yields did not change in a statistically significant manner. However, looking at the two tapering dates, every country in the sample, with the exception of China, experiences a statistically significant increase in bond yields ranging from 8 to 54 basis points. As it became clear that tapering would be delayed, bond yields decreased almost across the board. However, most countries did not see enough of a decrease to reverse the earlier increases.

Two main conclusions can be drawn from this discussion. The first is that QE had a significant impact on foreign government bond yields, both in advanced and developing countries. The second is that these effects varied greatly across countries and events.

5.2 Foreign Exchange Rates

Table 6 presents changes in foreign exchange rates. Appendix Table 2 reports the regression output, as well as the t-statistic and F-tests as described earlier. Figures

7-9 present changes in exchange rates over the course of QE events. Positive numbers indicate the dollar appreciating while negative numbers indicate the dollar depreciating. Broadly over QE1 dates, there is a level of similarity in exchange rate responses. Excluding China, the dollar depreciated between 1.6 (against Brazil) and 8 (against South Africa) percentage points. To the extent that Caballero, Farhi, and Gourinchas (2016)'s model holds, this represents quite a shift of recessionary risk from the United States to other countries.

The dollar depreciated against the Chinese yuan as well, but not nearly as much as against the other currencies. One interesting observation though is that the December 1, 2008 announcement resulted, on average, in an appreciation against emerging market currencies and a depreciation of 0.7 percent against both the euro and pound. While the Mexican peso and Thai baht reacted in much the same way as the pound, other emerging markets reacted in the opposite way, illustrating another example of heterogeneity in responses.

Effects of FG on foreign exchange rate are similar to QE1 in that all currencies appreciate against the dollar. However, QE2 and QE3 are more complicated. Excluding China, the dollar appreciated against 3 emerging market currencies, and depreciated against 2 emerging markets as well as the 2 advanced economies (although the depreciation against the pound was statistically significant, it was small in magnitude). Tapering led to across the board dollar appreciation, most significantly against the Brazilian real and Mexican peso. Some currencies were able to recover from this or had seen earlier appreciations leaving QE3 with mixed results over the course of the program.

There are also differences in behavior for the same country between yield and foreign exchange changes. For instance, Brazil's bond yields saw the greatest decrease over QE1, but its currency appreciated only moderately over the dollar compared to other countries. Conversely, South Africa saw a modest decrease in bond yields but the

greatest amount of currency appreciation over QE1.

I performed robustness checks using a two-day window. The regression outputs, t-statistics and f-statistics are reported in Appendix Tables 3 and 4. The robustness checks mostly confirm the main results, however, some dates⁵ were dropped as they corresponded to weekends or other market closures. In general, bond yields seem to be more robust to the extended window than exchange rates.

These results are widely in line with the literature. They confirm Hausman and Wongswan (2011)'s conclusion of American monetary policy having different effects on different international asset classes (in this case government bonds and currencies). Many of the episodes, such as Brazil's experience with QE1 or the events surrounding the taper tantrum confirm Chen et al. (2015)'s findings of greater impacts in emerging markets than in the US. With respect to Neely (2015)'s analysis of other advanced country, these results that emerging market responses may be more complicated than responses in other advanced countries. In addition, over the course of QE2, advanced countries such as the UK and Germany were more affected by QE than the United States, unlike for QE. In addition, over QE1, the pound and euro appreciated more relative to the dollar than many emerging market currencies. This suggests that advanced countries, in addition to emerging markets, need to be cognizant of monetary policy in other advanced countries.

The heterogeneity at different levels of these results complicate worries about competitive devaluation, currency wars, or asset price bubbles some have raised in response to accommodative monetary policy in the US. While it is clear the American monetary policy has spilled over into other countries, the effects are not straightforward. These results also raise questions about the efficacy of international monetary coordination since spillover effects can vary widely across countries and asset classes.

6. Conclusion

⁵ Including two days after November 25, 2008 for India due to terrorist attacks.

I study responses of long term government bond yields and exchange rates to the Fed's quantitative easing announcements. The results show that the Fed's announcements generally move long term bond rates in the US in the intended direction and have large and significant international effects. Over the course of QE1, bond rates fell greatly in almost every country in the sample, while the dollar depreciated against foreign currencies. However later episodes of QE had more mixed results. For example, the taper tantrum showed the dollar appreciating while yields increased, yet these changes were reversed by future QE3 announcements.

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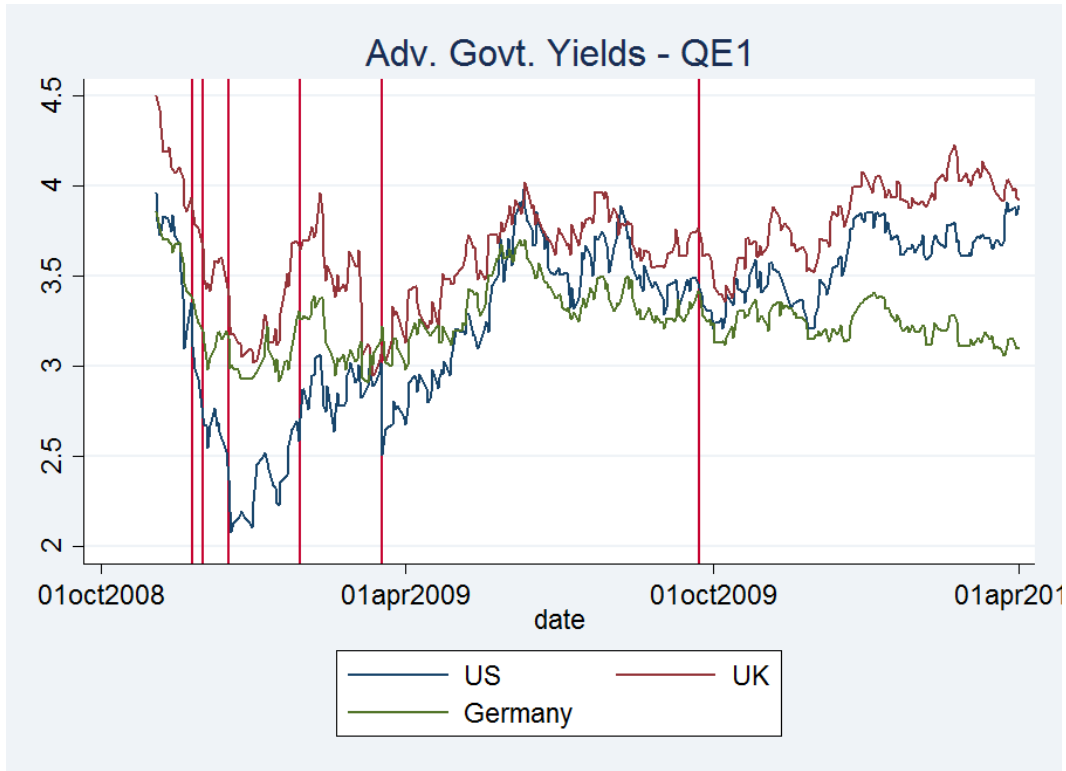


Figure 1: Advanced Country Government Yields during QE1, percent

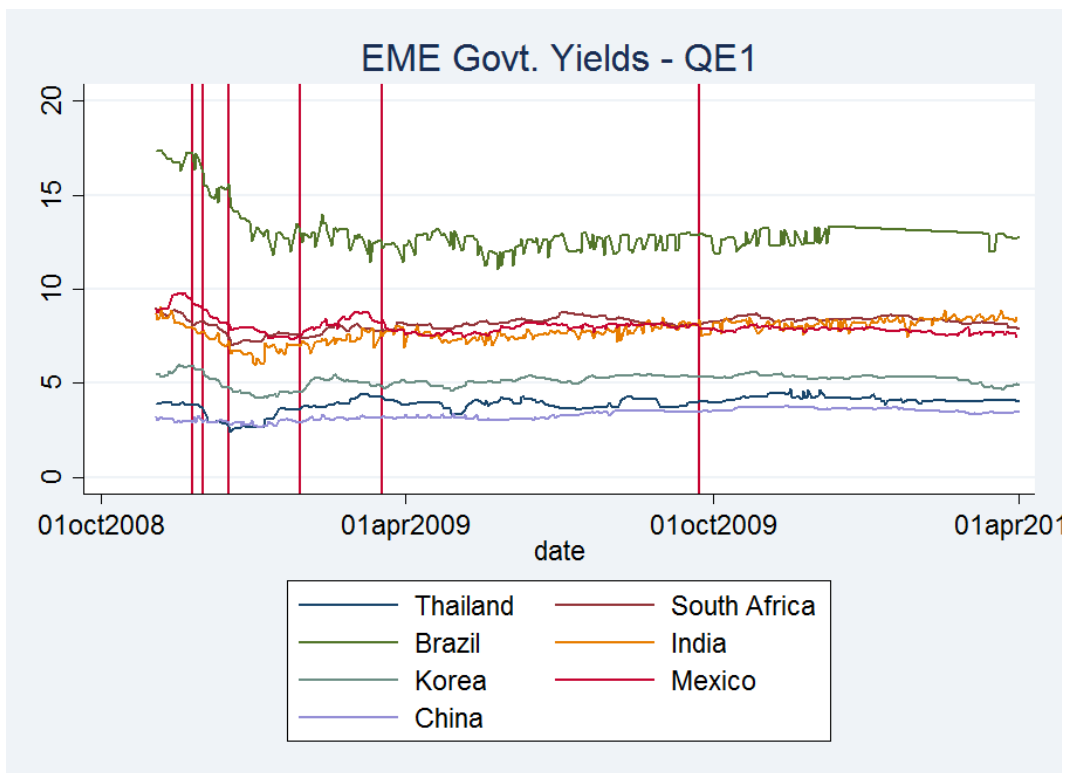


Figure 2: Emerging Economies Government Yields during QE1, percent

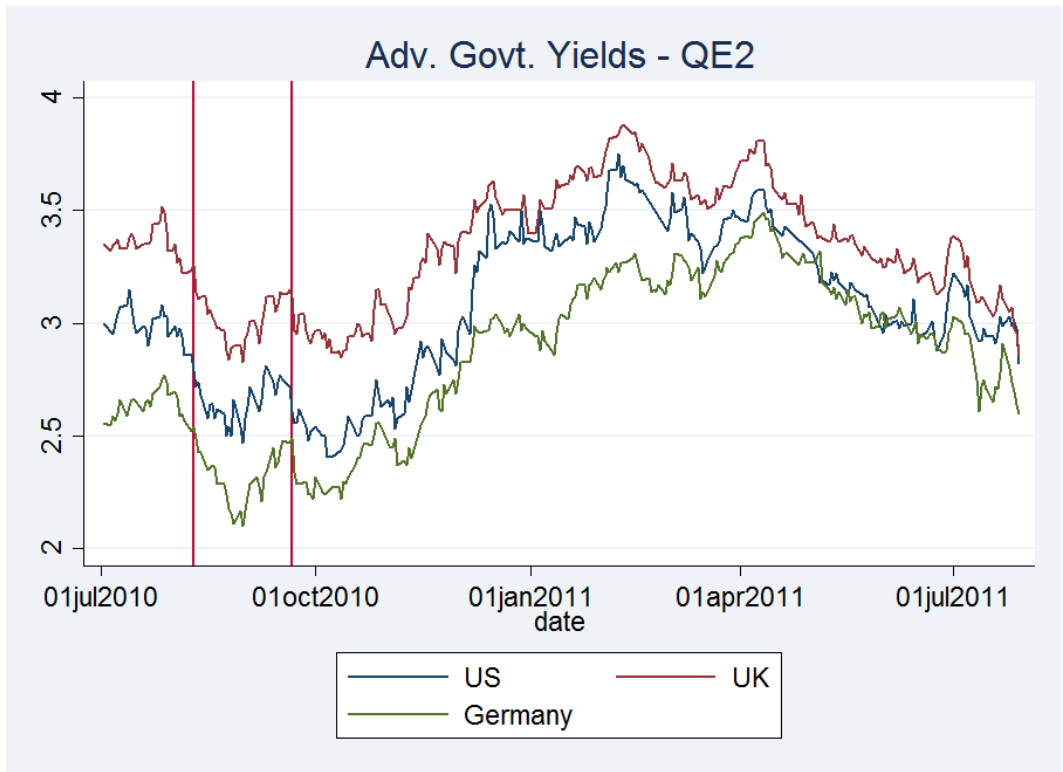


Figure 3: Advanced Country Government Yields during QE2, percent

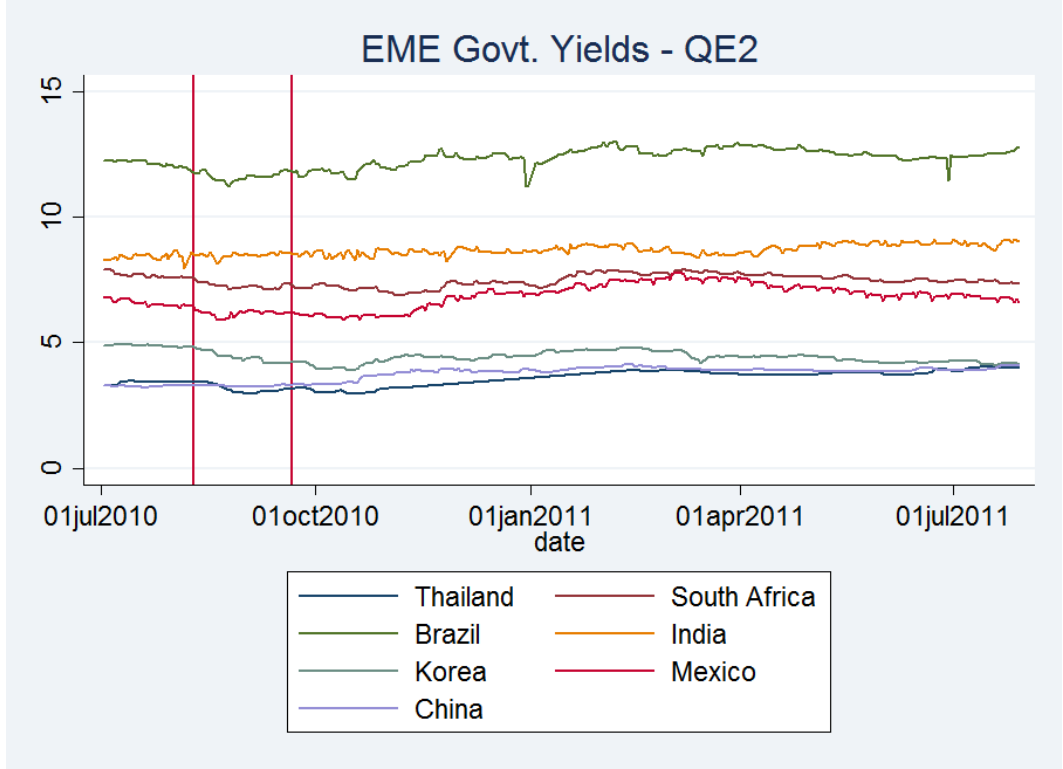


Figure 4: Emerging Economies Government Yields during QE2, percent

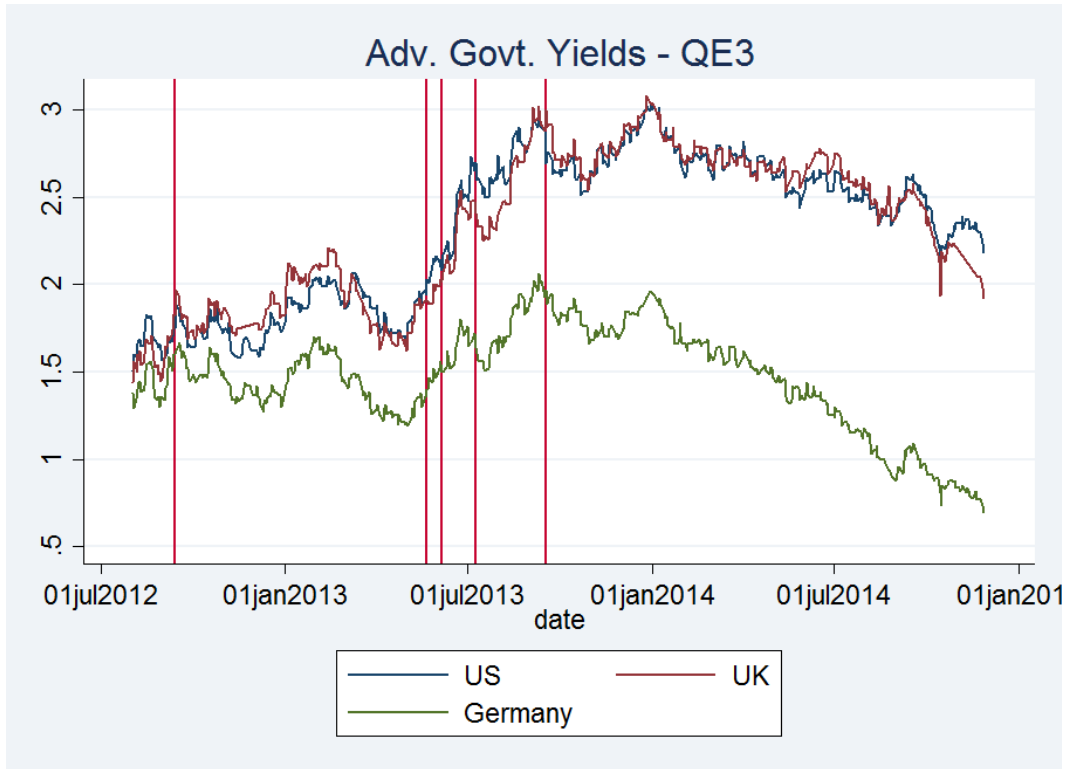


Figure 5: Advanced Country Government Yields during QE3, percent

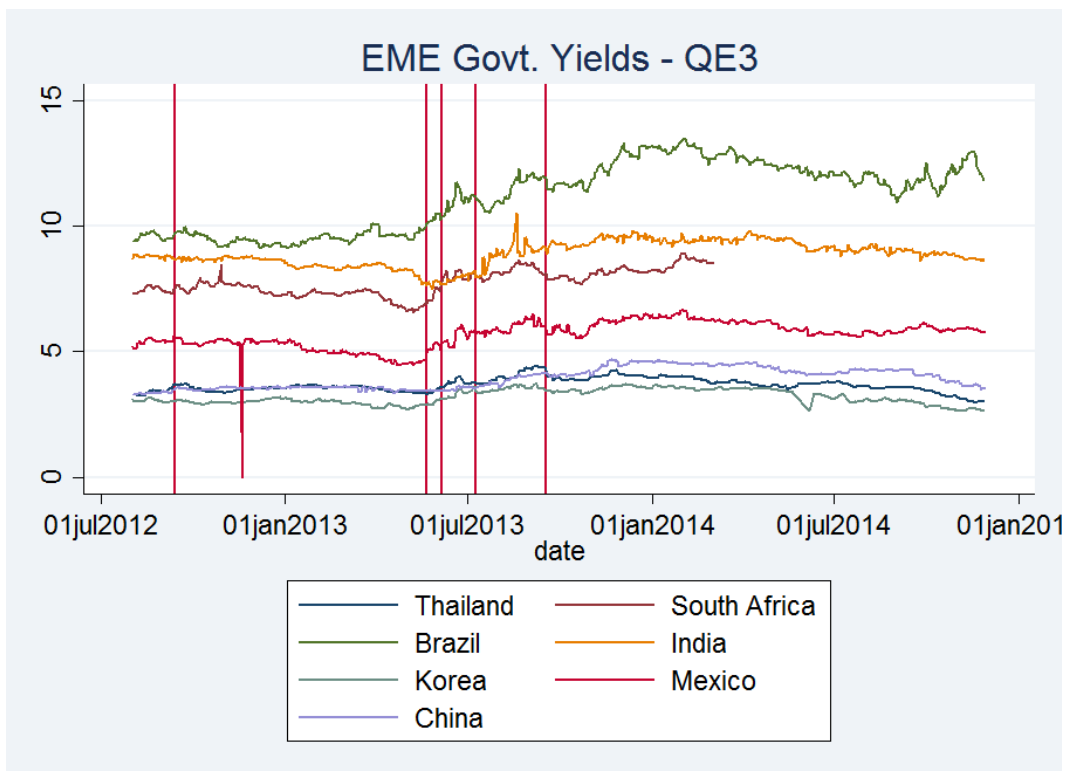


Figure 6: Advanced Country Government Yields during QE3, percent

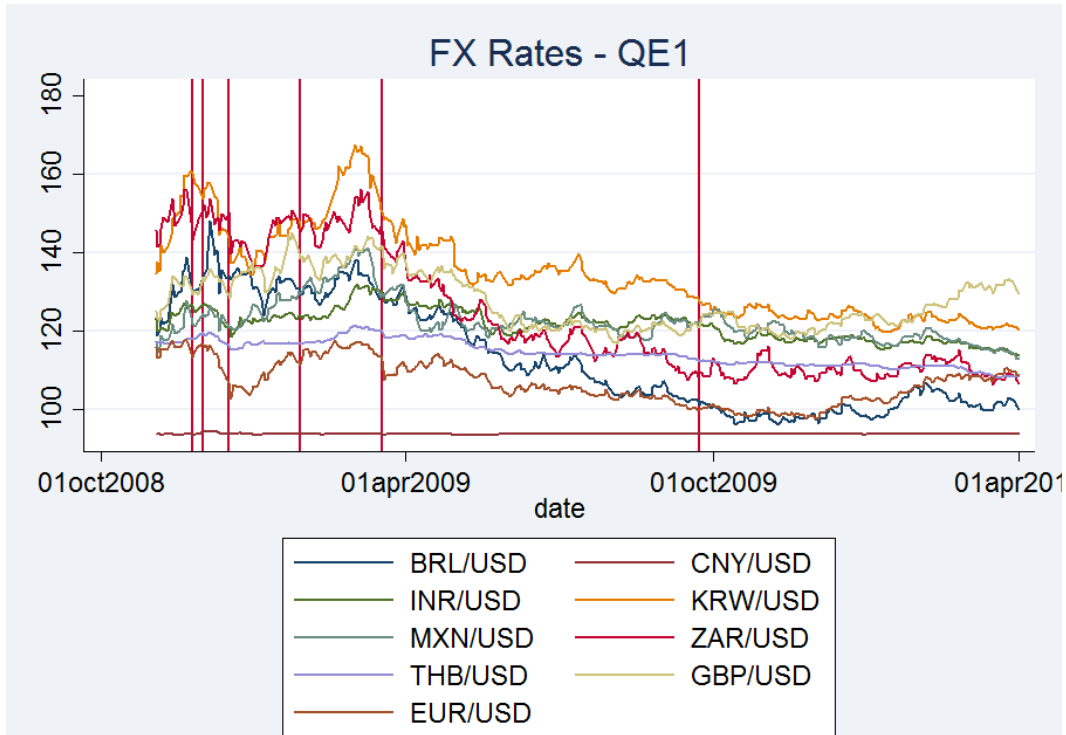


Figure 7: Exchange Rates during QE1, normalized to 100 at the beginning of 2008

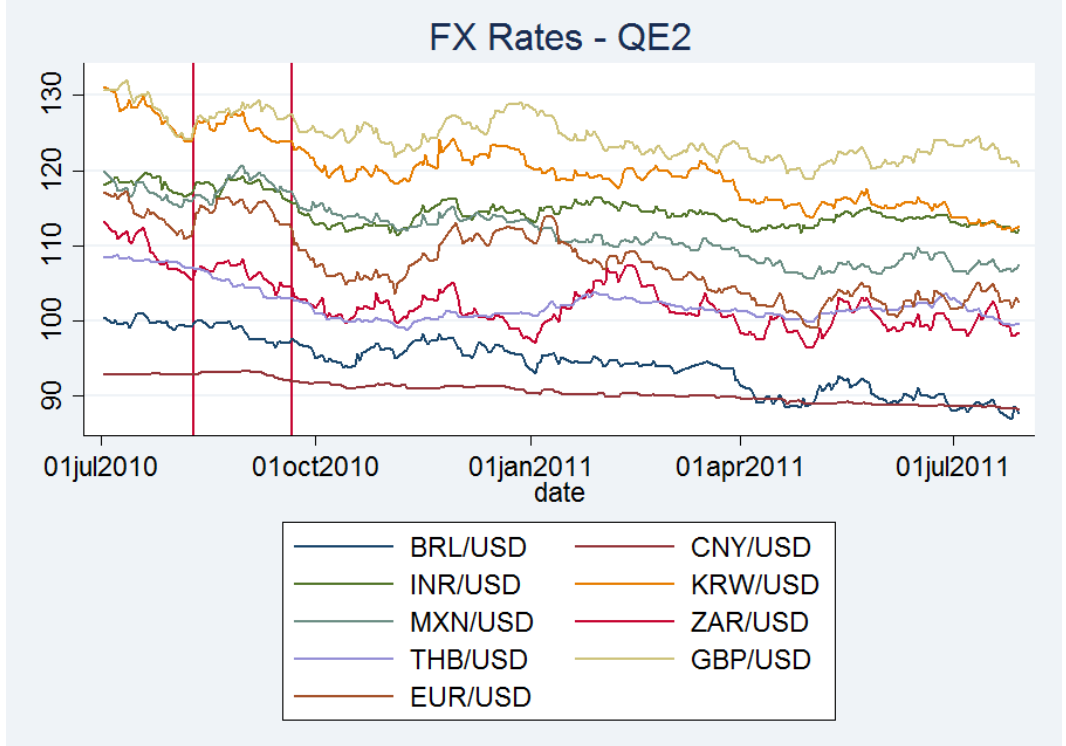


Figure 8: Exchange Rates during QE2, normalized to 100 at the beginning of 2008

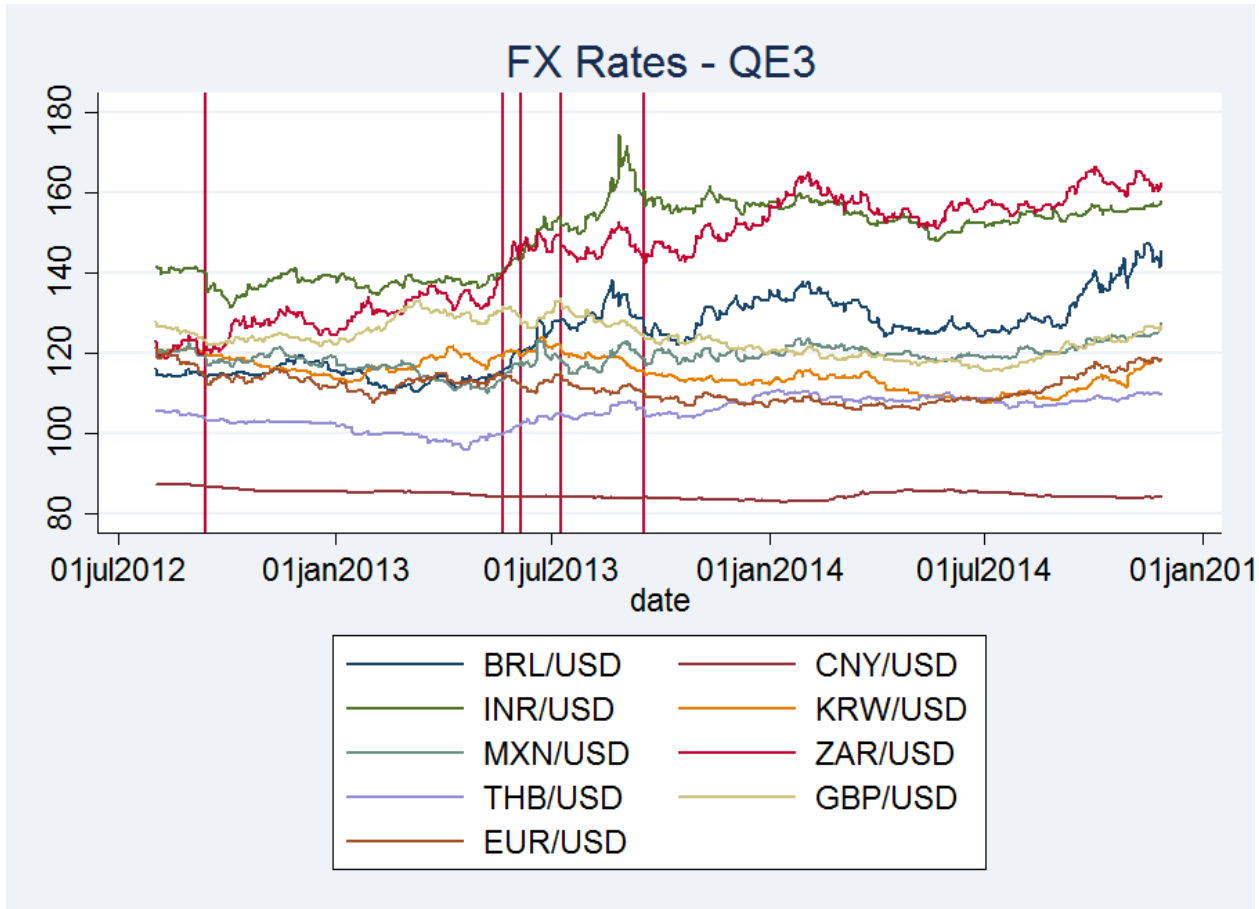


Figure 9: Exchange Rates during QE3, normalized to 100 at the beginning of 2008

Table 1: Quantitative Easing (QE) Dates

Program	Date	Form of Communication	Notes
QE1	11/25/08	FOMC Statement	Fed announces it will buy agency MBS
	12/1/08	Bernanke speech	
	12/16/08	FOMC Statement	
	1/28/09	FOMC Statement	China excluded because of market closure
	3/18/09	FOMC Statement	
	9/23/09	FOMC Statement	
QE2	8/10/10	FOMC Statement	
	9/21/10	FOMC Statement	China, South Korea excluded because of market closure
Forward Guidance (FG)	8/9/11	FOMC Statement	
	1/25/12	FOMC Statement	China, India excluded because of market closure
QE3	9/13/12	FOMC Statement	
	5/22/13	Bernanke JEC testimony	Taper talk (labeled per Neely (2014))
	6/19/13	FOMC Statement	Taper talk (labeled per Neely (2014))
	7/10/13	Bernanke NBER Speech	
	9/18/13	FOMC Statement	Tapering delayed 2

Table 2: Daily 10 Year Govt Bond Yield Change Summary, basis points

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
US	1,989	-0.0825	6.413	-51	24
Brazil	2,120	0.154	23.26	-115	153
China	2,198	-0.0823	6.740	-66.90	48
India	1,804	0.00859	18.63	-112.8	117.9
Mexico	2,161	-0.0879	38.08	-1,087	1,026
South Africa	1,764	0.0686	9.790	-172.5	137.5
South Korea	1,940	-0.188	5.786	-71	71
Germany	2,035	-0.183	5.041	-26	24
Thailand	1,617	-0.144	6.645	-45.05	68
UK	2,061	-0.120	5.662	-29.40	24.20

Table 3: Daily Exchange Rate Change, percent

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
BRL/USD	1,929	0.0422	1.080	-8.562	7.844
CNY/USD	1,929	-0.00663	0.128	-0.993	1.833
INR/USD	1,927	0.0126	0.578	-3.686	3.865
MXN/USD	1,929	0.0270	0.778	-5.784	8.452
ZAR/USD	1,929	0.0378	1.098	-6.103	8.246
KRW/USD	1,929	0.00684	0.876	-12.38	10.67
THB/USD	1,929	0.00415	0.343	-3.464	4.572
EUR/USD	1,929	0.0134	0.681	-4.523	3.045
GBP/USD	1,929	0.00645	0.632	-4.334	4.108

Table 4: 10 Year Govt Bond Yield Changes, bp

	Date	US	Brazil	China	India	Mexico	South Africa	South Korea	Thailand	Germany	UK	EME Average	EME Avg excl. China	Foreign Avg excl. China	Foreign Average
	11/25/08	-24	2	31	-4	-15	2	-18	4	-1	-7	0	-5	-5	-1
	12/01/08	-21	-72	10	-6	-10	-2	-25	-18	-7	-18	-17	-22	-20	-16
	12/16/08	-16	26	-15	-41	-11	0	-4	-31	-17	-17	-11	-10	-12	-12
QE1	01/28/09	12	-25		33	10	-11	5	13	0	4	4	4	4	4
	03/18/09	-51	-43	9	21	17	-12	-16	-12	-16	-8	-5	-8	-9	-7
	09/23/09	-2	4	4	-84	-20		-7	-6	-8	-6	-18	-23	-18	-15
	QE1 Sum	-102	-108	39	-82	-29	-23	-65	-49	-49	-51	-45	-59	-57	-46
	08/10/10	-7	-4	1	-6	0	-10	-5	-1	-5	-12	-4	-4	-5	-5
QE2	09/21/10	-11	1		-3	-1	-9		4	-15	-15	-2	-2	-5	-5
	QE2 Sum	-18	-3	1	-10	-1	-19	-5	3	-20	-27	-5	-6	-10	-9
	08/09/11	-20	3	-6	28	6	-17	-4	-15	4	-23	-1	0	-2	-3
FG	01/25/12	-7	0			-10	-14		0	-4	-7	-6	-6	-6	-6
	FG Sum	-27	3	-6	28	-4	-31	-4	-15	0	-30	-4	-4	-7	-7
	09/13/12	-2	9	7	6	-2	11	2	-4	2	15	4	4	5	5
	05/22/13	9	6	0	15	19	16	2	4	0	1	9	10	8	7
	06/19/13	13	9	0	5	23	38	18	17	8	16	16	18	17	15
QE3	07/10/13	5	0	1	7	-19	-8	-8	-3	-3	-3	-4	-5	-5	-4
	09/18/13	-17	1		-31	-7	-24		-22	-8	-10	-17	-17	-14	-14
	Taper Sum	22	15	0	20	42	54	20	21	8	17	25	29	25	22
	QE3 Sum	8	25	8	2	14	33	14	-8	-1	19	13	13	12	12

Table 5: Foreign Exchange Responses to QE, percent

Date	BRL/USD	KRW/USD	MXN/USD	ZAR/USD	THB/USD	INR/USD	CNY/USD	GBP/USD	EUR/USD	EME Average	EME Avg excl. China	Foreign Avg excl. China	Foreign Average
11/25/08	-0.866	-0.431	-1.419	-3.154	-0.255	-0.14	-0.0425	-1.123	-1.07	-0.90	-1.04	-1.06	-0.94
12/01/08	0.656	1.674	-0.774	1.002	-0.616	0.22	-0.0813	-0.742	-0.708	0.30	0.36	0.09	0.07
12/16/08	0.0845	-1.737	-0.401	-4.028	-0.662	-0.648	-0.143	-0.873	-3.812	-1.08	-1.23	-1.51	-1.36
QE1 01/28/09	-0.083	0	0.566	0.702	0.0287	-0.656	0	0.387	1.96	0.08	0.09	0.36	0.32
03/18/09	-2.245	-1.455	-0.502	-2.845	-1.34	-1.972	-0.157	-4.178	-4.523	-1.50	-1.73	-2.38	-2.14
09/23/09	0.828	-0.276	0.847	0.281	0.179	-0.0209	0.0132	2.1	0.384	0.26	0.31	0.54	0.48
QE1 Sum	-1.6255	-2.225	-1.683	-8.042	-2.6653	-3.2169	-0.4106	-4.429	-7.769	-2.84	-3.24	-3.96	-3.56
08/10/10	0.324	1.147	0.323	0.882	-0.125	0.778	0.0369	0.552	1.519	0.48	0.55	0.68	0.60
QE2 09/21/10	-0.289	-0.862	-0.533	-1.365	-0.584	-0.0658	-0.0358	-0.622	-1.865	-0.53	-0.62	-0.77	-0.69
QE2 Sum	0.035	0.285	-0.21	-0.483	-0.709	0.7122	0.0011	-0.07	-0.346	-0.05	-0.06	-0.10	-0.09
08/09/11	-0.307	-0.676	0.332	-0.599	-0.1	0.111	-0.205	0.162	0.356	-0.21	-0.21	-0.09	-0.10
FG 01/25/12	-1.255	-0.793	-1.551	-3.25	-1.077	-1.515	0	-0.872	-1.324	-1.35	-1.57	-1.45	-1.29
FG Sum	-1.562	-1.469	-1.219	-3.849	-1.177	-1.404	-0.205	-0.71	-0.968	-1.56	-1.78	-1.54	-1.40
09/13/12	-0.385	-1.049	-1.879	-1.397	-0.807	-3.686	-0.235	-0.742	-1.756	-1.35	-1.53	-1.46	-1.33
05/22/13	0.123	0.291	-0.0325	0.309	0	0.361	-0.0717	0.88	0.361	0.14	0.18	0.29	0.25
06/19/13	4.194	1.385	4.141	2.483	1.434	1.482	0.0212	1.221	1.448	2.16	2.52	2.22	1.98
QE3 07/10/13	-0.273	-0.921	-0.772	-0.394	-0.288	-0.1	0.0228	-1.269	-1.541	-0.39	-0.46	-0.69	-0.62
09/18/13	-1.614	-0.973	-1.789	-1.208	-1.959	-2.541	0	-0.495	-1.295	-1.44	-1.68	-1.48	-1.32
Taper Sum	4.317	1.676	4.1085	2.792	1.434	1.843	-0.0505	2.101	1.809	2.30	2.70	2.51	2.23
QE3 Sum	2.045	-1.267	-0.3315	-0.207	-1.62	-4.484	-0.2627	-0.405	-2.783	-0.88	-0.98	-1.13	-1.04

Appendix Table 1: Bond Yield Change Significance

Program	VARIABLES	(1) US	(2) Brazil	(3) China	(4) India	(5) Mexico	(6) South Africa	(7) South Korea	(8) Thailand	(9) Germany	(10) UK
QE1	11/25/08	-23.99*** (0.141)	1.806*** (0.509)	31.10*** (0.144)	-4.343*** (0.439)	-14.92*** (0.827)	1.908*** (0.234)	-17.84*** (0.131)	3.783*** (0.164)	-0.850*** (0.112)	-6.522*** (0.124)
		-170.4	3.549	216.3	-9.883	-18.03	8.171	-136.4	23.01	-7.605	-52.65
	12/01/08	-20.99*** (0.141)	-72.19*** (0.509)	10.20*** (0.144)	-5.643*** (0.439)	-9.921*** (0.827)	-2.092*** (0.234)	-24.84*** (0.131)	-17.62*** (0.164)	-6.850*** (0.112)	-17.72*** (0.124)
		-149.1	-141.9	70.96	-12.84	-11.99	-8.959	-189.9	-107.2	-61.25	-143.1
	12/16/08	-15.99*** (0.141)	25.81*** (0.509)	-14.90*** (0.144)	-41.44*** (0.439)	-10.92*** (0.827)	-0.0920 (0.234)	-3.842*** (0.131)	-30.65*** (0.164)	-16.85*** (0.112)	-17.22*** (0.124)
		-113.6	50.73	-103.6	-94.31	-13.20	-0.394	-29.36	-186.4	-150.7	-139.0
	1/28/09	12.01*** (0.141)	-25.19*** (0.509)		32.66*** (0.439)	10.08*** (0.827)	-11.09*** (0.234)	5.158*** (0.131)	13.16*** (0.164)	0.150 (0.112)	4.378*** (0.124)
		85.35	-49.53		74.31	12.18	-47.50	39.42	80.01	1.337	35.34
	3/18/09	-50.99*** (0.141)	-43.19*** (0.509)	9.202*** (0.144)	20.56*** (0.439)	17.08*** (0.827)	-12.09*** (0.234)	-15.84*** (0.131)	-11.85*** (0.164)	-15.85*** (0.112)	-7.922*** (0.124)
		-362.3	-84.91	64.01	46.78	20.64	-51.78	-121.1	-72.09	-141.7	-63.96
	9/23/09	-1.987*** (0.141)	3.806*** (0.509)	4.102*** (0.144)	-84.14*** (0.439)	-19.92*** (0.827)		-6.842*** (0.131)	-5.498*** (0.164)	-7.850*** (0.112)	-5.822*** (0.124)
		-14.12	7.481	28.53	-191.5	-24.08		-52.29	-33.44	-70.20	-47.00
QE2	8/10/10	-6.987*** (0.141)	-4.194*** (0.509)	1.102*** (0.144)	-6.343*** (0.439)	0.0792 (0.827)	-10.09*** (0.234)	-4.842*** (0.131)	-0.898*** (0.164)	-4.850*** (0.112)	-11.92*** (0.124)
		-49.65	-8.245	7.666	-14.43	0.0957	-43.22	-37.01	-5.461	-43.37	-96.25
	9/21/10	-10.99*** (0.141)	0.806 (0.509)		-3.243*** (0.439)	-0.921 (0.827)	-9.092*** (0.234)		4.102*** (0.164)	-14.85*** (0.112)	-14.92*** (0.124)
		-78.07	1.584		-7.380	-1.113	-38.94		24.95	-132.8	-120.5
FG	8/9/11	-19.99*** (0.141)	3.106*** (0.509)	-5.898*** (0.144)	27.76*** (0.439)	6.079*** (0.827)	-17.09*** (0.234)	-3.842*** (0.131)	-14.90*** (0.164)	4.150*** (0.112)	-22.92*** (0.124)
		-142.0	6.105	-41.03	63.16	7.348	-73.20	-29.36	-90.60	37.10	-185.0
	1/25/12	-6.987*** (0.141)	-0.194 (0.509)			-9.921*** (0.827)	-14.09*** (0.234)		0.102 (0.164)	-3.850*** (0.112)	-6.922*** (0.124)
		-49.65	-0.382			-11.99	-60.35		0.620	-34.43	-55.88

Appendix Table 1: Bond Yield Change Significance, contd

	US	Brazil	China	India	Mexico	South Africa	South Korea	Thailand	Germany	UK	
QE3	9/13/12	-1.987*** (0.141)	8.806*** (0.509)	7.102*** (0.144)	5.957*** (0.439)	-1.921** (0.827)	10.91*** (0.234)	2.158*** (0.131)	-3.898*** (0.164)	2.150*** (0.112)	15.08*** (0.124)
		-14.12	17.31	49.40	13.56	-2.322	46.71	16.49	-23.71	19.22	121.7
	5/22/13	9.013*** (0.141)	5.806*** (0.509)	0.102 (0.144)	14.66*** (0.439)	19.08*** (0.827)	15.91*** (0.234)	2.158*** (0.131)	4.102*** (0.164)	0.150 (0.112)	1.078*** (0.124)
		64.04	11.41	0.710	33.35	23.06	68.12	16.49	24.95	1.337	8.699
	6/19/13	13.01*** (0.141)	8.806*** (0.509)	0.102 (0.144)	5.257*** (0.439)	23.08*** (0.827)	37.91*** (0.234)	18.16*** (0.131)	17.10*** (0.164)	8.150*** (0.112)	16.08*** (0.124)
		92.46	17.31	0.710	11.96	27.90	162.3	138.8	104.0	72.87	129.8
	7/10/13	5.013*** (0.141)	-0.194 (0.509)	1.102*** (0.144)	6.857*** (0.439)	-18.92*** (0.827)	-8.092*** (0.234)	-7.842*** (0.131)	-2.898*** (0.164)	-2.850*** (0.112)	-2.922*** (0.124)
		35.62	-0.382	7.666	15.60	-22.87	-34.65	-59.93	-17.62	-25.49	-23.59
	9/18/13	-16.99*** (0.141)	0.506 (0.509)		-31.04*** (0.439)	-6.921*** (0.827)	-24.09*** (0.234)		-21.90*** (0.164)	-7.850*** (0.112)	-9.922*** (0.124)
		-120.7	0.994		-70.64	-8.365	-103.2		-133.2	-70.20	-80.10
	Constant	-0.0127 (0.141)	0.194 (0.509)	-0.102 (0.144)	0.0432 (0.439)	-0.0792 (0.827)	0.0920 (0.234)	-0.158 (0.131)	-0.102 (0.164)	-0.150 (0.112)	-0.0775 (0.124)
		-0.0900	0.382	-0.710	0.0984	-0.0957	0.394	-1.206	-0.620	-1.337	-0.626
	Observations	1,989	2,120	2,198	1,804	2,161	1,764	1,940	1,617	2,035	2,061
	R-squared	0.064	0.008	0.015	0.020	0.001	0.020	0.026	0.037	0.020	0.035
	p-val QE1 F-Test	0	0	0	0	1.04e-08	0	0	0	0	0
	p-val QE2 F-Test	0	0.000881		0	0.611	0		0	0	0
	p-val FG F-test	0	0.00426			0.0203	0	0	0	0.181	0
	p-val QE3 F-Test	0	0	0	0.444	0.000511	0	0	0	0.652	0

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 2: Foreign Exchange Significance

Program	VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
		BRL/USD	CNY/USD	INR/USD	MXN/USD	ZAR/USD	KRW/USD	THB/USD	GBP/USD	EUR/USD
QE1	11/25/08	-0.909***	-0.0363***	-0.157***	-1.448***	-3.198***	-0.440***	-0.263***	-1.133***	-1.090***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		-36.79	-12.31	-12.10	-81.91	-128.1	-21.94	-34.11	-79.45	-71.82
	12/1/08	0.613***	-0.0751***	0.203***	-0.803***	0.958***	1.665***	-0.623***	-0.751***	-0.727***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		24.81	-25.49	15.63	-45.42	38.36	82.95	-80.95	-52.72	-47.94
	12/16/08	0.0413*	-0.137***	-0.665***	-0.430***	-4.073***	-1.746***	-0.669***	-0.883***	-3.831***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		1.673	-46.46	-51.19	-24.32	-163.1	-86.99	-86.88	-61.93	-252.6
	1/28/09	-0.126***	0.00622**	-0.673***	0.538***	0.657***	-0.00934	0.0213***	0.377***	1.940***
	(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)	
	-5.106	2.110	-51.74	30.41	26.32	-0.465	2.761	26.46	127.9	
3/18/09	-2.288***	-0.150***	-1.989***	-0.531***	-2.890***	-1.464***	-1.347***	-4.188***	-4.542***	
	(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)	
	-92.59	-51.00	-153.0	-30.07	-115.7	-72.95	-175.0	-293.8	-299.4	
9/23/09	0.785***	0.0194***	-0.0380***	0.818***	0.236***	-0.286***	0.172***	2.090***	0.364***	
	(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)	
	31.76	6.584	-2.921	46.25	9.448	-14.23	22.28	146.7	23.99	
QE2	8/10/10	0.280***	0.0431***	0.760***	0.294***	0.837***	1.137***	-0.133***	0.543***	1.499***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		11.35	14.63	58.49	16.64	33.53	56.66	-17.22	38.08	98.83
9/21/10	-0.333***	-0.0296***	-0.0829***	-0.562***	-1.410***	-0.871***	-0.592***	-0.632***	-1.885***	
	(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)	
	-13.46	-10.03	-6.377	-31.78	-56.46	-43.41	-76.84	-44.31	-124.3	
FG	8/9/11	-0.350***	-0.199***	0.0935***	0.303***	-0.643***	-0.685***	-0.108***	0.153***	0.336***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		-14.17	-67.53	7.193	17.15	-25.76	-34.14	-13.99	10.70	22.18
1/25/12	-1.298***	0.00622**	-1.532***	-1.580***	-3.294***	-0.802***	-1.084***	-0.881***	-1.343***	
	(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)	
	-52.53	2.110	-117.8	-89.37	-131.9	-39.96	-140.8	-61.83	-88.56	

Appendix Table 2: Foreign Exchange Significance, contd

	BRL/USD	CNY/USD	INR/USD	MXN/USD	ZAR/USD	KRW/USD	THB/USD	GBP/USD	EUR/USD	
QE3	9/13/12	-0.428***	-0.229***	-3.703***	-1.908***	-1.441***	-1.059***	-0.814***	-0.751***	-1.776***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		-17.33	-77.75	-284.9	-107.9	-57.72	-52.74	-105.7	-52.70	-117.1
	5/22/13	0.0796***	-0.0655***	0.344***	-0.0614***	0.264***	0.281***	-0.00741	0.870***	0.342***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		3.220	-22.22	26.44	-3.476	10.57	14.02	-0.962	61.07	22.53
	6/19/13	4.151***	0.0274***	1.465***	4.112***	2.439***	1.375***	1.427***	1.212***	1.428***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		168.0	9.309	112.7	232.6	97.67	68.52	185.2	85.02	94.14
	7/10/13	-0.316***	0.0290***	-0.117***	-0.801***	-0.438***	-0.930***	-0.296***	-1.279***	-1.561***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		-12.78	9.854	-9.023	-45.33	-17.56	-46.35	-38.38	-89.72	-102.9
	9/18/13	-1.657***	0.00622**	-2.558***	-1.818***	-1.252***	-0.982***	-1.966***	-0.504***	-1.315***
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		-67.06	2.110	-196.7	-102.8	-50.16	-48.93	-255.3	-35.38	-86.67
	Constant	0.0432*	-0.00622**	0.0171	0.0290	0.0446*	0.00934	0.00741	0.00943	0.0197
		(0.0247)	(0.00295)	(0.0130)	(0.0177)	(0.0250)	(0.0201)	(0.00770)	(0.0143)	(0.0152)
		1.746	-2.110	1.315	1.640	1.788	0.465	0.962	0.662	1.296
Observations	1,929	1,929	1,927	1,929	1,929	1,929	1,929	1,929	1,929	
R-squared	0.013	0.005	0.047	0.027	0.026	0.011	0.048	0.040	0.065	
p-val QE1 F-Test	0	0	0	0	0	0	0	0	0	
p-val QE2 F-Test	0.292	0.0215	0	0	0	0	0	0.00186	0	
p-val FG F-test	0	0	0	0	0	0	0	0	0	
p-val QE3 F-Test	0	0	0	7.72e-08	0.000596	0	0	2.80e-10	0	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 3: Yield Change Robustness Check - 2 Day Window

VARIABLES	(1) US	(2) Brazil	(3) Mexico	(4) Thailand	(5) India	(6) South Africa	(7) South Korea	(8) China	(9) Germany	(10) UK	
QE1	11/25/08	-35.91***	-90.48***	-21.86***	3.677***		12.81***	4.060***	-6.693***	-14.82***	
		(0.198)	(0.606)	(0.810)	(0.239)		(0.338)	(0.166)	(0.156)	(0.177)	
		-181.2	-149.4	-26.97	15.41		37.84	24.39	-42.93	-83.60	
	12/1/08	-24.91***	-142.5***	-19.86***	-39.31***	-25.98***	-13.19***	-37.65***	13.26***	-15.69***	-22.82***
		(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
		-125.7	-235.3	-24.50	-164.7	-55.58	-38.98	-212.2	79.66	-100.7	-128.7
	12/16/08	-32.91***	-43.48***	-10.86***	-22.05***	-66.88***	-35.19***	-4.649***	-9.840***	-14.69***	-22.22***
		(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
		-166.1	-71.79	-13.39	-92.40	-143.1	-104.0	-26.20	-59.11	-94.25	-125.4
	1/28/09	28.09***	-79.48***	16.14***	13.46***	24.22***	-12.19***	13.35***		2.307***	6.184***
	(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)		(0.156)	(0.177)	
	141.7	-131.2	19.92	56.39	51.82	-36.02	75.24		14.80	34.90	
3/18/09	-40.91***	-31.48***	-1.855**	-15.20***	23.82***	-9.192***	-5.649***	-7.840***	-19.69***	-8.416***	
	(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)	
	-206.5	-51.97	-2.289	-63.68	50.96	-27.16	-31.84	-47.09	-126.3	-47.49	
9/23/09	-5.913***	15.52***	-11.96***	-5.369***	-79.48***		-4.649***	4.160***	-12.69***	-13.92***	
	(0.198)	(0.606)	(0.810)	(0.239)	(0.467)		(0.177)	(0.166)	(0.156)	(0.177)	
	-29.84	25.63	-14.75	-22.50	-170.0		-26.20	24.99	-81.42	-78.52	
QE2	8/10/10	-13.91***	-12.48***	-17.86***		-6.780***	-19.19***	-9.649***	-0.840***	-10.69***	-14.82***
		(0.198)	(0.606)	(0.810)		(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
		-70.21	-20.60	-22.03		-14.50	-56.70	-54.38	-5.043	-68.59	-83.60
	9/21/10	-15.91***	-2.477***	-3.855***	4.231***	0.420	-10.19***			-19.69***	-16.82***
	(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)			(0.156)	(0.177)	
	-80.30	-4.090	-4.757	17.73	0.899	-30.11			-126.3	-94.89	
FG	8/9/11	-22.91***	9.523***	-34.86***	-14.77***	27.92***	-23.19***	-18.65***	-10.84***	-4.693***	-16.82***
		(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
		-115.6	15.72	-43.01	-61.89	59.73	-68.52	-105.1	-65.12	-30.10	-94.89
	1/25/12	-11.91***	-9.477***	-15.86***	0.231		-23.19***			-8.693***	-8.816***
	(0.198)	(0.606)	(0.810)	(0.239)		(0.338)			(0.156)	(0.177)	
	-60.12	-15.65	-19.56	0.968		-68.52			-55.76	-49.74	

Appendix Table 3: Yield Change Robustness Check - 2 Day Window

	US	Brazil	Mexico	Thailand	India	South Africa	South Korea	China	Germany	UK	
QE3	9/13/12	11.09***	14.52***	-8.855***							
		(0.198)	(0.606)	(0.810)							
		55.95	23.98	-10.93							
	5/22/13	8.087***	7.523***	34.14***	-	-	-	1.351***	4.160***	-	-
		(0.198)	(0.606)	(0.810)				(0.177)	(0.166)		
		40.81	12.42	42.13	-	-	-	7.612	24.99	-	-
	6/19/13	21.09***	70.52***	69.14***	21.23***	13.12***	32.81***	29.35***	16.16***	11.31***	27.18***
		(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
		106.4	116.4	85.32	88.97	28.07	96.93	165.4	97.08	72.52	153.4
	7/10/13	-4.913***	-16.48***	-12.86***	-3.769***	1.020**	-3.192***	-11.65***	5.160***	-6.693***	-7.816***
		(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
		-24.79	-27.21	-15.86	-15.79	2.182	-9.431	-65.65	31.00	-42.93	-44.10
9/18/13	-9.913***	-40.78***	-28.86***	-24.77***	-4.880***	-26.19***			-4.693***	-7.816***	
	(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)			(0.156)	(0.177)	
	-50.03	-67.33	-35.61	-103.8	-10.44	-77.38			-30.10	-44.10	

Constant	-0.0867	0.477	-0.145	-0.231	0.0799	0.192	-0.351**	-0.160	-0.307**	-0.184
	(0.198)	(0.606)	(0.810)	(0.239)	(0.467)	(0.338)	(0.177)	(0.166)	(0.156)	(0.177)
	-0.437	0.788	-0.179	-0.968	0.171	0.568	-1.977	-0.964	-1.968	-1.041
Observations	1,988	2,119	2,160	1,616	1,803	1,763	1,939	2,197	2,034	2,060
R-squared	0.046	0.027	0.003	0.025	0.019	0.014	0.026	0.006	0.018	0.024
p-val QE1 F-Test	0	0	0	0	0	0	0	0.591	0	0
p-val QE2 F-Test	0	0	0	0	0	0	0		0	0
p-val FG F-Test	0	0.970	0	0		0			0	0
p-val QE3 F-Test	0	0	0	0	5.27e-11	0.000764	0	0	0.865	0

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix Table 4: Foreign Exchange, Robustness Check, 2-Day Window

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
	BRL/USD	CNY/USD	INR/USD	MXN/USD	ZAR/USD	KRW/USD	THB/USD	GBP/USD	EUR/USD	
QE1	11/25/08	-0.739*** (0.0343)	0.0601*** (0.00403)	-1.571*** (0.0188)	-1.847*** (0.0252)	-1.749*** (0.0355)	-2.064*** (0.0283)	-0.0731*** (0.0113)	-0.291*** (0.0206)	0.451*** (0.0219)
		-21.57	14.92	-83.35	-73.20	-49.25	-72.98	-6.444	-14.16	20.57
	12/1/08	1.317*** (0.0343)	-0.128*** (0.00403)	-0.0891*** (0.0188)	-0.197*** (0.0252)	-1.302*** (0.0355)	1.938*** (0.0283)	-0.548*** (0.0113)	0.368*** (0.0206)	-0.304*** (0.0219)
		38.43	-31.68	-4.727	-7.793	-36.66	68.51	-48.37	17.87	-13.85
	12/16/08	-0.545*** (0.0343)	-0.145*** (0.00403)	-2.287*** (0.0188)	-0.374*** (0.0252)	-7.229*** (0.0355)	-4.666*** (0.0283)	-1.052*** (0.0113)	1.422*** (0.0206)	-3.437*** (0.0219)
		-15.89	-35.86	-121.3	-14.84	-203.6	-165.0	-92.78	69.13	-156.7
	1/28/09	0.969*** (0.0343)	0.0118*** (0.00403)	-0.00806 (0.0188)	1.445*** (0.0252)	2.919*** (0.0355)	0.768*** (0.0283)	0.184*** (0.0113)	-0.691*** (0.0206)	3.404*** (0.0219)
		28.26	2.922	-0.428	57.27	82.21	27.17	16.27	-33.59	155.2
	3/18/09	-2.394*** (0.0343)	-0.0906*** (0.00403)	-1.435*** (0.0188)	0.0145 (0.0252)	-3.408*** (0.0355)	-0.922*** (0.0283)	-1.580*** (0.0113)	-3.204*** (0.0206)	-3.395*** (0.0219)
		-69.86	-22.49	-76.15	0.573	-95.98	-32.60	-139.3	-155.8	-154.8
	9/23/09	0.619*** (0.0343)	0.0396*** (0.00403)	0.0136 (0.0188)	1.247*** (0.0252)	-0.742*** (0.0355)	-0.852*** (0.0283)	0.0732*** (0.0113)	2.721*** (0.0206)	0.446*** (0.0219)
		18.07	9.828	0.721	49.42	-20.88	-30.10	6.453	132.3	20.35
QE2	8/10/10	0.329*** (0.0343)	0.193*** (0.00403)	0.815*** (0.0188)	0.164*** (0.0252)	0.802*** (0.0355)	1.445*** (0.0283)	-0.204*** (0.0113)	1.275*** (0.0206)	1.742*** (0.0219)
		9.594	47.99	43.24	6.482	22.59	51.10	-18.00	62.01	79.42
	9/21/10	-0.595*** (0.0343)	-0.00761* (0.00403)	-0.115*** (0.0188)	-1.013*** (0.0252)	-1.388*** (0.0355)	-0.841*** (0.0283)	-0.406*** (0.0113)	-1.107*** (0.0206)	-1.589*** (0.0219)
		-17.37	-1.888	-6.093	-40.15	-39.10	-29.73	-35.80	-53.81	-72.44
FG	8/9/11	-0.160*** (0.0343)	-0.562*** (0.00403)	0.150*** (0.0188)	0.485*** (0.0252)	-1.080*** (0.0355)	-0.886*** (0.0283)	0.151*** (0.0113)	-0.229*** (0.0206)	0.0597*** (0.0219)
		-4.663	-139.5	7.963	19.24	-30.40	-31.31	13.30	-11.12	2.720
	1/25/12	-1.284*** (0.0343)	0.0118*** (0.00403)	-1.623*** (0.0188)	-1.805*** (0.0252)	-3.610*** (0.0355)	-0.792*** (0.0283)	-1.663*** (0.0113)	-0.952*** (0.0206)	-1.648*** (0.0219)
		-37.46	2.922	-86.13	-71.54	-101.7	-28.01	-146.7	-46.30	-75.14

Appendix Table 4: Foreign Exchange, Robustness Check, 2-Day Window, contd

	BRL/USD	CNY/USD	INR/USD	MXN/USD	ZAR/USD	KRW/USD	THB/USD	GBP/USD	EUR/USD	
QE3	5/22/13	0.671*** (0.0343)	-0.0143*** (0.00403)	0.456*** (0.0188)	1.103*** (0.0252)	0.0135 (0.0355)	1.561*** (0.0283)	0.319*** (0.0113)	0.316*** (0.0206)	-0.284*** (0.0219)
		19.58	-3.549	24.20	43.72	0.381	55.20	28.16	15.34	-12.95
	6/19/13	4.229*** (0.0343)	0.116*** (0.00403)	1.195*** (0.0188)	4.169*** (0.0252)	2.770*** (0.0355)	2.243*** (0.0283)	1.548*** (0.0113)	1.829*** (0.0206)	2.199*** (0.0219)
		123.4	28.84	63.38	165.2	78.00	79.30	136.5	88.93	100.3
	7/10/13	-0.322*** (0.0343)	0.0721*** (0.00403)	-0.0490*** (0.0188)	-0.961*** (0.0252)	-0.469*** (0.0355)	-0.988*** (0.0283)	-0.305*** (0.0113)	-1.168*** (0.0206)	-1.580*** (0.0219)
		-9.394	17.89	-2.602	-38.07	-13.21	-34.92	-26.86	-56.79	-72.04
	9/18/13	-1.783*** (0.0343)	0.0118*** (0.00403)	-1.785*** (0.0188)	-1.537*** (0.0252)	0.460*** (0.0355)	-0.533*** (0.0283)	-1.944*** (0.0113)	-0.369*** (0.0206)	-1.294*** (0.0219)
		-52.03	2.922	-94.70	-60.93	12.96	-18.82	-171.4	-17.96	-59.00
	Constant	0.0800** (0.0343)	-0.0118*** (0.00403)	0.0490*** (0.0188)	0.0492* (0.0252)	0.0852** (0.0355)	0.0350 (0.0283)	0.0163 (0.0113)	0.0181 (0.0206)	0.0258 (0.0219)
		2.334	-2.922	2.602	1.951	2.398	1.238	1.440	0.882	1.176
	Observations	1,927	1,927	1,925	1,927	1,927	1,927	1,927	1,927	1,927
	R-squared	0.008	0.007	0.014	0.014	0.022	0.015	0.028	0.019	0.029
p-val QE1 F-Test	0.000174	0	0	0.0570	0	0	0	0.00864	0	
p-val QE2 F-Test	0.000105	0	0	0	0	0	0	4.31e-05	0.000498	
p-val FG F-Test	0	0	0	0	0	0	0	0	0	
p-val QE3 F-Test	0	0	0.0152	0	0	0	0	0	0	

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1