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Currency Wars? Unconventional Monetary Policy Does Not Stimulate Exports

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Abstract

I investigate whether countries that use unconventional monetary policy (UMP) experience export booms. I use a popular gravity model of trade which requires neither the exogeneity of UMP, nor instrumental variables for UMP. In practice, countries that engage in UMP experience a *drop* in exports vis-à-vis countries that are not engaged in such policies, holding other things constant. Quantitative easing is associated with exports that are about 10% lower to countries not engaged in UMP; this amount is significantly different from zero and similar to the effect of negative nominal interest rates. Thus there is no evidence that countries have gained export markets through unconventional monetary policy; any currency wars launched have been lost.

Keywords: quantitative; easing; negative; nominal; interest; trade; gravity; bilateral; data; empirical.

JEL Classification Numbers: F14, E58

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> "We're in the midst of an international currency war, a general weakening of currency. This threatens us because it takes away our competitiveness…"
>
> - Brazilian Finance Minister Guido Mantega, Mon Sep 27, 2010, reported by the Financial Times and Reuters

> "A 'currency war' … occurs when a country eases monetary policy specifically to depreciate its currency, with the ultimate objective of cheapening its exports and gaining unfair competitive advantage in international trade…"
>
> - Ben Bernanke (2016, p2)

1. Introduction

In this short paper, I search for evidence of currency wars. More precisely, I look for signs that countries engaging in unconventional monetary policy (hereafter "UMP") subsequently experienced an actual boost to their exports, particularly to countries that did not use UMP. I do not find evidence of successful currency wars; in practice, countries that used quantitative easing and/or negative nominal interest rates actually suffered non-trivial reductions in their exports vis-à-vis countries that forewent UMP.

It is easy to motivate this investigation. In his 2015 Mundell-Fleming lecture, Ben Bernanke writes (2015, p1):

> "I heard two related complaints at international meetings and through the media: First, that the United States was engaging in 'currency wars' – a phrase used most prominently by Brazilian finance minister Guido Mantega in 2010, following the Fed's introduction of a second round of quantitative easing – by choosing policies that would weaken the dollar and thereby unfairly increase US competitiveness at the expense of trading partners … "[1]

Bernanke provides a forceful and persuasive defense of Fed actions; see also Bernanke (2016). However, he does so without providing much direct empirical evidence of the export effects, if any, of unconventional Fed policy. Doing so is part of the objective of this paper.

I make three assumptions in my investigation. First, I identify currency wars with *unconventional* monetary policy; as Bernanke states, this issue first reared its head around the time of a round of quantitative easing.[2] Second, I consider currency wars to be *bilateral* events between economies engaging in UMP (whom one might fancifully refer to as "aggressors") and economies who have not used UMP (potential "victims"). This corresponds to Mantega's statement in September 2010 " 'The advanced countries are seeking to devalue their currencies' in order to increase exports, naming the United States, Europe and Japan …" as quoted by Reuters. Third, I focus on the effects, if any, of unconventional monetary policy *on exports*, again consistent with the policy debate.

There is an extensive literature on broader aspects of unconventional monetary policy. Among many others, Haldane et al (2016) discuss the evidence on quantitative easing, Arteta et al (2016) provide the same for negative nominal interest rates, and both provide an extensive set of references. To the best of my knowledge, no work focuses on the linkage between UMP and trade patterns; hence the focus of this analysis.

2. Empirical Setup

Strategy

I am interested in determining whether there have been successful currency wars; that is, whether a country engaged in UMP boosted its exports vis-à-vis countries that did not use UMP, *ceteris paribus*. One could imagine estimating the effect of UMP on exchange rates, and then the linkage between the exchange rate and trade patterns. Both are complicated

problems, even ignoring the fact that UMP may have indirect effects on trade other than through the exchange rate. I sidestep such issues by directly examining the effect of UMP on trade. Since the objective of a competitive depreciation is to boost exports (and hence employment and output), this simplicity is appealing.

A naïve look at the data reveals little. Figure 1 contains time-series plots of quarterly nominal American exports and imports since 2005, along with dates when the three rounds of quantitative easing were initiated by the Federal Reserve. There is no obvious pattern to aggregate export behavior following this unconventional monetary policy. Both exports and imports continued to drop following QE1; QE2 seems to make little difference to trend growth in both exports and imports, while QE3 was followed by a flattening of trade.[3]

Such evidence is intrinsically superficial. Only one country is considered, the multilateral nature of the data means that no distinction can be made between American exports to countries that were and were not engaging in their own quantitative easing, and no attempt is made to control for other factors driving trade. What is needed is a more comprehensive approach involving more countries, bilateral data, and a plausible econometric model; I now turn to that task.

Methodology

I pursue my investigation with "theory-consistent estimation" of the gravity equation of trade, closely following the suggestions in the recent survey by Head and Mayer (2014). This technique allows me to address concerns about "multilateral resistance" and other general equilibrium effects, while also allowing me to avoid potentially thorny identification problems.

I rely on the "LSDV" (Least Squares with time-varying country Dummy Variables) technique, which Head and Mayer show works well in many situations. In particular, I estimate:

$$\ln(X_{ijt}) = \gamma UMP_{ijt} + \beta Z_{ijt} + \{\lambda_{it}\} + \{\psi_{jt}\} + \{\phi_{ij}\} + \varepsilon_{ijt} \quad (1)$$

where:

- X_{ijt} denotes the nominal value of bilateral exports from i to j at time t,
- UMP is unity if i uses unconventional monetary policy at time t and j does not, zero otherwise,
- β is a vector of nuisance coefficients,
- Z is a vector of controls (dummy variables for currency unions and regional trade agreements),
- $\{\lambda_{it}\}$ is a complete set of time-varying exporter dummy variables,
- $\{\psi_{jt}\}$ is a complete set of time-varying importer dummy variables,
- $\{\phi_{ij}\}$ is a complete set of time-invariant (dyadic) exporter-importer dummy variables, and
- ε_{ijt} represents the myriad other export determinants, assumed to be well behaved.

The coefficient of interest is γ which links unconventional monetary policy to exports. Those who believe in successful currency wars hypothesize $\gamma>0$, so that countries engaging in quantitative easing, negative nominal interest rates and the like receive an export boost from countries not engaging in UMP. The econometric technique matches the economic question of interest, namely whether there have been successful currency wars. It does so in the context of an empirical model with a long track record of success.

Identification

Equation (1) has one important regressor (UMP), two controls (Z) and a host of (over 50,000) fixed effects {λ, ψ, ϕ}. The latter are the most striking feature of the setup, particularly the time-varying exporter and importer fixed effects. These hold constant all country-specific "monadic" phenomena, whether time-invariant (such as an exporter's land area or sea access), or time-varying (such as the state of an importer's business cycle or its level of financial distress during a particular period). Consistently, (1) can *only* be used to estimate the effect of phenomena that are both a) pair-specific and b) time-varying, like the effect of UMP by a countries on its exports to a country that does not use UMP.

I estimate equation (1) with least squares on all observations with positive export flows; Head and Mayer (2014) provide an extensive discussion of related issues. An obvious question is whether unconventional monetary policy can be treated as exogenous. But since equation (1) includes a comprehensive set of time-varying exporter fixed effects, the answer is irrelevant, since the equation does not attempt to estimate the effect of, e.g., QE1 on American exports. From an econometric viewpoint, the reason is straightforward; the effect of any policy, shock, or other economic phenomena specific to a country during a particular period of time is swept away by the exporter-time and importer-time fixed effects. The implicit economic argument is that the model allows for two types of effects of unconventional monetary policy. One – which is implicitly included but which I do not explicitly estimate – is the common effect of UMP shocks (like QE1) on *all* American export flows similarly vis a vis *any* possible importer. It seems plausible that countries that decide to use UMP, for whatever reasons, do so for monadic

reason (e.g., QE1 is implemented because of insufficient American aggregate demand, rocky banks, or whatever); thus exogeneity issues are swept away. This makes sense if economies which engage in unconventional monetary policy do so in a monadic sense; when the United States implemented quantitative easing, it is interested in the effect on America. What γ measures is any *additional* effect on an exporter engaging in UMP when the importer does not engage in UMP. To use a military metaphor, γ measures the effect of a currency war by a particular belligerent on the defenders, not the effect of war on the belligerent.

Data

For the regressand (exports), I rely on the *Direction of Trade* data set assembled by the International Monetary Fund (IMF). This data set is wide; it covers bilateral trade between over 200 IMF country codes (with gaps). Not all of the areas covered are countries in the conventional sense of the word; colonies (e.g., Falklands), territories (e.g., Guam), special administrative areas (e.g., Hong Kong), and so forth are all included; I use the term "country" simply for convenience.[4] I collect quarterly data from 2000 (well before the global financial crisis) through the first half of 2016 (the most recent available data). I choose to work at the quarterly frequency as a compromise between the excessive noise in monthly data (monthly trade is often lumpy or unavailable, especially for smaller countries), and the insufficiently granular annual frequency.

Bilateral trade on FOB exports and CIF imports is recorded in U.S. dollars. I create an average value of the nominal value of bilateral exports between two countries by averaging both measures available (i's exports to j and j's imports from i). As (Z) controls, I use two

dummy variables; unity if i and j are in a currency union/regional trade agreement at time t, and zero otherwise; the series are updated from Glick and Rose (2016), who provide more details.[5]

I rely on two measures of unconventional monetary policy, using central bank websites to determine dates. One important policy is quantitative easing (hereafter "QE"), balance sheet operations by central banks that entail the purchase of assets such as mortgage-backed securities or treasury bonds. For QE, I create a binary variable which is one for any quarter when the central bank is engaged in balance sheet operations (i.e., actively acquiring securities), and zero otherwise. I also consider a variant if the central bank has any outstanding assets on its balance sheets from QE, even if it is not actively engaging that quarter with further asset purchases.[6] That is, my default measure of QE relies on asset purchase flows, while my variant relies on outstanding stocks.

The other UMP of relevance is negative nominal interest rates (hereafter "NNIR"), which have been observed in Europe since 2011, and Japan more recently. I consider nominal interest rates to be negative if short-term market rates are negative, following Hameed and Rose (2016). The NNIR binary variable is unity if the economy experienced negative nominal interest rates during the quarter and zero otherwise. I also consider a variant which is similar but uses official policy rather than market interest rates.[7]

As a robustness check, I also briefly consider state-contingent forward guidance, such as that used by the Federal Reserve beginning in December 2012, when an explicit threshold for the unemployment rate was described as a necessary condition for interest rate "lift-off."

Dates for both QE and NNIR are recorded in an appendix table. Both QE and NNIR are rare in the data set, affecting less than 2.5% of the observations (forward guidance is even more obscure, at 0.4% of the sample). QE and NNIR policies are related, an issue to which I shall return below (the bilateral correlation coefficients is .58).

3. Results

Table 1 presents baseline estimates of equation (1). The table begins without any measures of UMP, in column 1 at the extreme left. The estimates indicate positive and statistically significant effects of the two (Z) controls on log exports; robust standard errors are recorded parenthetically. The effect of currency unions is economically and statistically large and comparable in magnitude to that estimated by Glick and Rose (2016); the regional trade agreement effect is much lower but still positive and statistically significant. While perhaps independently interesting, I ignore these nuisance coefficients hereafter. The equation fits well, with an R^2 close to 90%, and a root mean squared error of 1.37, approximately a third of the (3.98) standard deviation of log exports. This goodness of fit is unsurprising, since the model includes over 24,000 exporter-time and importer-time fixed effects as well as some 26,000 (dyadic) exporter-importer fixed effects. That is, the model seems to control for a host of potential export determinants.

Column 2 of Table 1 indicates that QE has a point estimate of -.11 when added by itself, so that QE is associated with an approximately 11% drop in exports, holding other things

constant. This negative effect is significantly different from zero at any reasonable confidence level (the t-statistic exceeds five). The QE estimate is comparable in both economic magnitude and statistical precision to the effect of NNIR, presented in column 3. Indeed, the hypothesis that the two have the same effect on log exports cannot be rejected (the p-value for the F-test is .66).

Column 4 of Table 1 includes a measure for state-contingent interest rate forward guidance comparable to those for QE and NNIR; this has a small economic effect which is insignificantly different from zero at any confidence level (t=-.2). Since the forward guidance effect shrinks further when included simultaneously with QE and NNIR in column 5, it is dropped hereafter; a likely reason is the relative obscurity of explicit state-contingent forward guidance, combined with its overlap with other types of UMP.

Table 1 provides no support for the hypothesis of currency wars; while a number of the γ estimates are economically and statistically different from zero, they are negative, not positive. If countries deliberately try to boost their exports through unconventional monetary policy – a big "if" – it seems that they have been singularly unsuccessful in the attempt.

Sensitivity Analysis

Table 1 shows that if currency wars have been launched, they have not (yet) been won; unconventional monetary policy seems to have had a dampening rather than a stimulating effect on exports. Table 2 provides evidence that this result is not a fragile result of the exact features of the econometric methodology. Each of the (nineteen) rows presents the results of a

different perturbation of the baseline results. The column on the left records the coefficient estimate of γ (and its robust standard error) when quantitative easing is the unconventional monetary policy (as always, in the exporter and not in the importer). The center column is analogous for negative nominal interest rates. In the right column, both QE and NNIR are included simultaneously in (1), and the p-value for the test of equal QE and NNIR effects is tabulated (high p-values are consistent with the null hypothesis of equality). For ease of comparison, the top row of Table 2 records results from the baseline, columns 2, 3, and 6 respectively of Table 1.

I begin with four variants of the key regressors, UMP measures. First, I replace the default flow-based QE measures with the variant based on outstanding stocks of assets purchased through QE, while also using official negative nominal interest rates instead of negative nominal market rates. This leads to little change, though the γ coefficients grow somewhat in magnitude. I then replace my UMP measures with (sequentially), the first lag of UMP, the fourth UMP lag (recall that this is a quarterly data set), and the first lead of UMP. None of these substitutions has any substantive effect.

The remainder of Table 2 simply drops observations in a number of different ways. I first use only data after 2011, then only data before 2016. While the coefficients shrink a little, they remain resolutely negative, significant, and similar. In order to see if the results are sensitive to the inclusion of any particular currency warrior, I drop the exporter observations of eight countries one by one; these countries either engaged in UMP or are large. Reassuringly, the results are quite robust. I then drop four large sets of importer countries to see if the

precise destinations for the exports matter; they seem not to. Finally, I drop all observations where the residual lies at least three standard errors away from its mean, again without changing the key results.

To summarize: a large number of robustness checks shows that the results of Table 1 are insensitive to the exact measure of UMP and sample of data. The effect of both QE and NNIR on exports, *ceteris paribus*, seems to be around -10%. This is grossly inconsistent with the positive estimate that a successful currency war might be expected to deliver.

Monadic Fixed Effects

The key coefficient of interest to me is γ, the response of log exports from a country with UMP to a country without UMP. This seems appropriate, since a hypothetical currency war links one or more aggressors (countries engaged in UMP) to a set of defenders (countries not engaged in UMP). These are intrinsically bilateral relationships that vary over time. It is important to re-emphasize that γ does *not* measure the response of log exports from a country with UMP to the rest of the world. Again, the effect of, e.g., the beginning of QE or NNIR on an exporter cannot be estimated in the context of (1); only relationships which are both a) time-varying and b) bilateral are estimable. The presence of the $\{\lambda_{it}\}$ terms (exporter-time fixed effects) means that anything which affects a given exporter at a point of time – including the multilateral effects of UMP on exports – is subsumed in the time-varying exporter fixed effects.

It may therefore be of interest to examine the latter $\{\lambda_{it}\}$ terms, at least briefly. Figure 2 presents two event studies of estimates of $\{\lambda_{it}\}$. On the left, average quarterly values of $\{\lambda_{it}\}$ during the two years, before, during, and after the onset of QE are portrayed, along with a

(5,95) confidence interval. The right-hand figure is analogous, but portrays the time-varying exporter fixed effects around the time when market interest rates went negative. There is remarkably little movement in the fixed effects during the years around the start of these unconventional monetary policies. In particular, exports seem not to change systematically around the years when a country begins UMP, whether in the form of QE or NNIR.

4. Conclusion

In this short paper, I ask if a currency war initiated by one country's use of UMP, whether deliberately or inadvertently, had the consequence of raising its exports to countries that did not use UMP. My answer is resoundingly negative; countries using quantitative easing and/or negative nominal interest rates simply did not experience export booms.

A number of possible extensions come to mind immediately. First, I measure both QE and NNIR as simple dummy variables. One could imagine constructing more continuous measures, which might be more revealing. Second, my definition of a currency war uses unconventional monetary policy; one could imagine using conventional monetary policy measures as well. Finally, currency wars entail a positive response of exports to UMP, and I have found no evidence of currency wars. But what could account for the negative effect of UMP on exports to countries not engaging in UMP? It seems plausible to me that negative domestic productivity shocks that both lower exports and induce unconventional monetary policy while coinciding with comparably but positive foreign shocks are one possibility for the

finding of a negative γ coefficient; expectations of lower foreign demand are another. However, direct verification of either hypothesis lies beyond the scope of this study.

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Table 1: The Effect of Unconventional Monetary Policy on Exports

	1	2	3	4	5	6
Quantitative Easing by Exporter, not Importer (2.4%)		-.11** (.02)			-.07** (.02)	-.07** (.02)
Negative Nominal Interest rate in Exporter, not Importer (2.5%)			-.09** (.02)		-.05* (.02)	-.05* (.02)
State-Contingent Forward Guidance by Exporter, not Importer (0.4%)				-.02 (.07)	.00 (.07)	
Currency Union	.35** (.02)	.33** (.02)	.32** (.02)	.35** (.02)	.32** (.02)	.32** (.02)
Regional Trade Agreement	.04** (.01)	.04** (.01)	.04** (.01)	.04** (.01)	.04** (.01)	.04** (.01)
Exporter-Quarter Fixed Effects (11,773)	Yes	Yes	Yes	Yes	Yes	Yes
Importer-Quarter Fixed Effects (12,997)	Yes	Yes	Yes	Yes	Yes	Yes
Exporter-Importer Fixed Effects (26,096)	Yes	Yes	Yes	Yes	Yes	Yes
R^2	.89	.89	.89	.89	.89	.89
RMSE	1.37	1.37	1.37	1.37	1.37	1.37

Coefficients, with robust standard errors recorded in parentheses. Coefficients significantly different from zero at the .05 (.01) level marked by one (two) asterisk(s). Each column stems from a separate regression. Least squares estimation; regressand is log bilateral exports in US$. Binary regressors included but not recorded for exporter + importer in: a) currency union; and b) regional trade agreement. Fixed effects included for all sets of: a) exporter*quarter, b) importer*quarter, and c) exporter*importer. Quarterly data 2000Q1-2016Q2 for over 200 countries and territories; 1,313,527 observations.

Table 2: The Effect of Unconventional Monetary Policy on Exports, Sensitivity Analysis

	Quantitative Easing by Exporter, not Importer	Neg. Nom. Int. Rate in Exporter, not Importer	Test for Equality (p-value)
Default	-.11**	-.09**	.66
	(.02)	(.02)	
UMP Variants (Stock QE, Official NNIR)	-.14**	-.10**	.09
	(.02)	(.02)	
First lag of UMP	-.10**	-.08**	.59
	(.02)	(.02)	
Fourth lag of UMP	-.12**	-.07**	.24
	(.03)	(.02)	
First lead of UMP	-.10**	-.09**	.66
	(.02)	(.02)	
After 2011	-.06**	-.04*	.21
	(.02)	(.02)	
Before 2016	-.08**	-.06**	.71
	(.02)	(.02)	
Drop US as exporter	-.11**	-.08**	.57
	(.02)	(.02)	
Drop UK as exporter	-.11**	-.09**	.70
	(.02)	(.02)	
Drop Japan as exporter	-.11**	-.08**	.75
	(.02)	(.02)	
Drop Denmark as exporter	-.11**	-.09**	.50
	(.02)	(.02)	
Drop Sweden as exporter	-.09**	-.07**	.84
	(.02)	(.02)	
Drop Switzerland as exporter	-.11**	-.08**	.16
	(.02)	(.02)	
Drop Germany as exporter	-.10**	-.08**	.67
	(.02)	(.02)	
Drop China, HK as exporter	-.10**	-.08**	.58
	(.02)	(.02)	
Drop Advanced Countries as Importers	-.08*	-.12**	.06
	(.04)	(.04)	
Drop Asians DCs as importers	-.12**	-.09**	.51
	(.02)	(.02)	
Drop Africans as importers	-.09**	-.07**	.34
	(.02)	(.02)	
Drop Latin/Caribbean as importers	-.12**	-.10**	.87
	(.02)	(.02)	
Drop 3σ outliers	-.07**	-.06**	>.99
	(.02)	(.01)	

Coefficients, with robust standard errors recorded in parentheses. Coefficients significantly different from zero at the .05 (.01) level marked by one (two) asterisk(s). Each cell stems from a separate regression. Least squares estimation; regressand is log bilateral exports in US$. Binary regressors included but not recorded for exporter + importer in: a) currency union; and b) regional trade agreement. Fixed effects included for all sets of: a) exporter*quarter, b) importer*quarter, and c) exporter*importer. Quarterly data 2000Q1-2016Q2 for over 200 countries and territories; default regression has 1,313,527 observations.

Figure 1

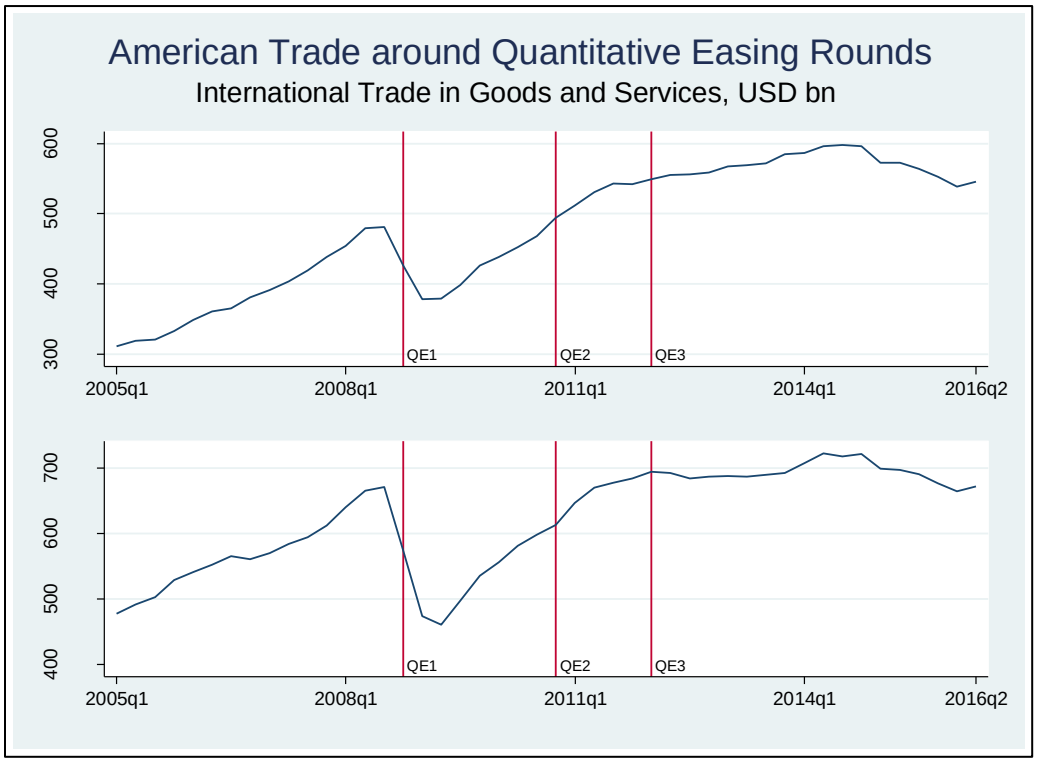
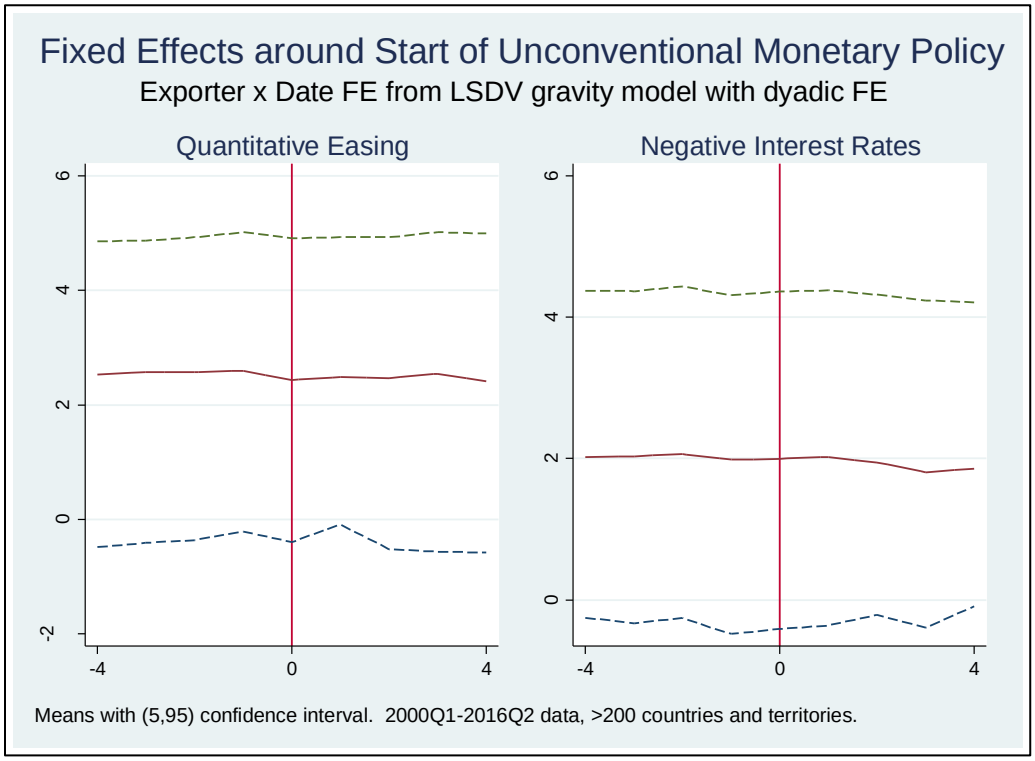


Figure 2



Appendix Table A1: Unconventional Monetary Policy, as of 2016Q4

	Quantitative Easing	Negative Nominal Interest Rates
USA, QE1	2008Q4-2010Q1	
USA, QE2	2010Q4-2011Q2	
USA, QE3	2012Q3-2014Q4	
UK, QE1	2009Q1-2010Q1	
UK, QE2	2011Q4-2012Q2	
UK, QE3	2012Q3-2012Q4	
Switzerland		2011Q3-
Denmark		2012Q3-
Sweden	2015Q1-	2015Q1-
Japan	2001Q1-2006Q1	
Japan	2010Q4-	2016Q1-
EMU	2015Q1-	2014Q2-

Appendix Table A2: List of Countries

Afghanistan
Albania
Algeria
American Samoa
Angola
Antigua & Barbuda
Argentina
Armenia
Aruba
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Barbados
Belarus
Belgium
Belize
Benin
Bermuda
Bhutan
Bolivia
Bosnia & Herzegovina
Botswana
Brazil
Brunei Darussalam
Bulgaria
Burkina Faso
Burundi
Cambodia
Cameroon
Canada
Cape Verde
Central African Republic
Chad
Chile
China, Hong Kong
China, Macao
China, Mainland
Colombia
Comoros
Congo, DR
Congo, Rep
Costa Rica
Cote d'Ivoire
Croatia
Cuba
Cyprus
Czech Republic
Denmark
Djibouti
Dominica
Dominican Republic
Ecuador
Egypt
El Salvador
Equatorial Guinea
Eritrea
Estonia
Ethiopia
Falkland Islands
Faroe Islands
Fiji
Finland
France
Gabon
Gambia
Georgia
Germany
Ghana
Gibraltar
Greece
Greenland
Grenada
Guam
Guatemala
Guinea
Guinea-Bissau
Guyana
Haiti
Honduras
Hungary
Iceland
India
Indonesia
Iran
Iraq
Ireland
Israel
Italy
Jamaica
Japan
Jordan
Kazakhstan
Kenya
Kiribati
Korea, North
Korea, South
Kosovo
Kuwait
Kyrgyz Republic
Laos
Latvia
Lebanon
Lesotho
Liberia
Libya
Lithuania
Luxembourg
Macedonia
Madagascar
Malawi
Malaysia
Maldives
Mali
Malta
Mauritania
Mauritius
Mexico
Moldova
Mongolia
Montenegro
Morocco
Mozambique
Myanmar
Namibia
Nauru
Nepal
Netherlands
Netherlands Antilles
New Caledonia
New Zealand
Nicaragua
Niger
Nigeria
Norway
Oman
Pakistan
Palau
Panama
Papua New Guinea
Paraguay
Peru
Philippines
Poland
Portugal
Qatar
Romania
Russian Federation
Rwanda
Saint Helena
Saint Pierre & Miquelon
Samoa
Sao Tome & Principe
Saudi Arabia
Senegal
Serbia
Serbia & Montenegro
Seychelles
Sierra Leone
Singapore
Slovak Republic
Slovenia
Solomon Islands
Somalia
South Africa
South Sudan
Spain
Sri Lanka
St. Kitts & Nevis
St. Lucia
St. Vincent & Grenadines
Sudan
Suriname
Swaziland
Sweden
Switzerland
Syria
Taiwan
Tajikistan
Tanzania
Thailand
Timor-Leste
Togo
Tonga
Trinidad & Tobago
Tunisia
Turkey
Turkmenistan
Tuvalu
Uganda
Ukraine
United Arab Emirates
United Kingdom
United States
Uruguay
Uzbekistan
Vanuatu
Venezuela
Vietnam
West Bank & Gaza
Yemen
Zambia
Zimbabwe

Endnotes

[1] Alternatively, Bernanke writes (2015, p9): " 'Currency wars' is a colorful synonym for the familiar concept of competitive depreciation of exchange rates, with the goal of diverting world demand toward one's own exports while suppressing imports …"

[2] This seems consistent with the historical record; the competitive devaluations of the 1930s are usually associated with exits from the gold-exchange standards (sometimes accompanied by capital controls), certainly unconventional monetary policy for its day.

[3] This is consistent with Eaton et al (2016), who do not discuss monetary policy in their discussion of the 2008-09 collapse of international trade.

[4] The (205) countries and territories are listed in an appendix table.

[5] Colonial relationships cannot be recovered from the within estimator of (1) since there is no variation over time; accordingly, they are omitted from the equation.

[6] This is mostly relevant for Japan, which engaged in QE from March 2001 through March 2006, but reversed these purchases by July 2006. More details are available in "Managing the Exit" by Yamaoka and Syed, IMF WP/10/114.

[7] Switzerland experienced negative nominal market rates from 2011 through 2014, but only officially lowered its policy rate below zero in 2015. Officially, but in a mostly technical sense, Sweden had negative rates in 2009-10, Norway from the Fall of 2015, and Hungary in 2016.