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**Exchange Rate Policy and
Regional Trade Agreements: A
Case of Conflicted Interests?**

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Abstract

The results highlight the conflicting interests of countries — to stabilize exchange rates or to keep the option of exchange rate depreciation in order to maintain competitiveness of domestic tradable producers. With deepening integration in East Asia, however, the desire for exchange rate stability will eventually outweigh the desire to maintain a protectionist tool. How extensive the pressures will be in East Asia will depend not only on how many countries seriously desire to be in the more integrated economic area in which Factory Asia operates, but also on their institutional and political readiness to commit in such schemes at the cost of renouncing an important policy instrument.

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1. INTRODUCTION

The relationship between exchange rates and trade has long been controversial. The fixed exchange rates of the pre-1914 gold standard were viewed as essential for efficient trade. In the period of 1919–39, exchange rate flexibility was positively correlated with growth and too rigid adherence to the gold standard was negatively correlated with growth (Eichengreen 1992). However, beggar-thy-neighbor policies of devaluing in order to reduce unemployment in the 1930s came to be seen as a zero-sum strategy that exacerbated the breakdown of the global economy.¹ In the Bretton Woods era the International Monetary Fund (IMF) was responsible for ensuring that countries maintained fixed exchange rates and that any devaluation or revaluation was orderly.

Since the advent of generalized floating in the 1970s, no multilateral organization has been responsible for the global exchange rate system. There have been recurring charges of countries using exchange rate protectionism or promoting exports by exchange rate undervaluation. At the same time, the global trading system is increasingly characterized by proliferation of regional trade agreements (RTAs) which, together with World Trade Organisation (WTO) commitments, limit governments' ability to use traditional trade policy measures (WTO 2011), and may increase the attractiveness of using the exchange rate as a trade policy instrument.

The aim of this paper is to examine the relationship between the exchange rate regime and exchange rate volatility and trade among countries in an RTA.² Exchange rate policy can be a substitute for trade policy, because the trade impact of any change in the exchange rate is (roughly) equivalent to that of some combination of changes in import taxes and export subsidies. The temptation to use exchange rate depreciation as a substitute for traditional trade measures may be greater within an RTA if a country has partially dismantled its trade barriers and cannot re-erect them within the RTA. On the other hand, exchange rate policy may be a complement to a liberal trade policy. If an RTA is signed to facilitate trade and promote regional value chains, exchange rate stability is complementary because, even if the cost of hedging against exchange rate risk is small, exchange rate volatility still imposes an added trade cost.

These questions are especially relevant to the Asian trading system, which has been characterized by burgeoning RTAs since the turn of the century and by increasingly complex value chains based on reduced trade costs. After the 1997–98 crisis, several proposals for financial regionalism in East Asia were floated, but actual progress through the Chiang Mai Initiative, Asian bond market coordination, and macroeconomic monitoring have made slow and limited progress. The flourishing of bilateral and plurilateral agreements in East Asia since 2000 have been trade-driven, and associated with reducing tariff and especially non-tariff barriers to the smooth functioning of regional value chains (Pomfret 2011). Exchange rate fluctuations are inimical to the operation of supply chains based on locating each individual segment of

¹ A recent revisionist argument is that fixed exchange rates were more harmful than competitive devaluations because governments striving to maintain the gold standard were more likely to adopt protectionist measures than countries that had abandoned the gold standard in favor of a more flexible exchange rate. Eichengreen and Irwin (2010) and Irwin (2012) argue that during the 1930s exchange rate policy was even more important than falling output or rising unemployment in determining national protectionist measures.

² Non-trade-related policy incentives for responding to exchange rate levels and volatility, surveyed in Weber and Wyplasz (2009), are not addressed in this paper. See also Huchet-Bourdon and Korinek (2011) for a literature review and further evidence.

the chain in the least-cost location.³ Many observers have identified the desirability of maintaining bilateral exchange rate stability, preferably by a means other than generalized pegs to the US dollar.⁴

The next section reviews the literature on the relationships between exchange rates and trade flows. Section 3 summarizes trends on trade, RTAs, and exchange rate policy choices in East Asia. Section 4 discusses the divergence between using the exchange rate as a protectionist tool as opposed to exchange rates acting as a complement to facilitating trade. In Section 5 the empirical results from a gravity model that examines the relationship between exchange rates and trade are presented. Section 6 discusses the competencies of the IMF and WTO, the two multilateral institutions with primary responsibility for exchange rate policies and international trade, concluding that the link between exchange rate and trade policies has fallen into a gap since the gold exchange standard ended in 1971–73. The final section draws conclusions and discusses policy implications.

2. EXCHANGE RATES AND TRADE

The modern econometric literature on exchange rates and trade dates from the end of the gold exchange system of fixed exchange rates in the early 1970s. From the 1970s until the early 2000s, coming out of the fixed versus flexible exchange rate debates, the focus was on whether and to what extent exchange rate volatility was harmful to trade. Since the turn of the century, attention has also turned to connections between exchange rate undervaluation or depreciation and trade.⁵

Theoretical models can produce either positive or negative effects of exchange rate volatility on trade depending on assumptions about elasticities, attitudes towards risk, and so forth (de Grauwe 1988; McKenzie 1999; Bacchetta and Van Wincoop 2000). Hedging can reduce risk, but involves extra costs (Caporale and Doroodian 1994; Obstfeld and Rogoff 1998). The theoretical literature is reviewed by Auboin and Ruta (2011).

The empirical literature on exchange rate volatility and the volume of trade is also inconclusive. Typical is the IMF (2004) study of the time path of exchange rate volatility and trade from 1970 to 2004 that found a weak negative relationship that was not robust to changes in specification; a cross-sectional analysis using a gravity model found a stronger negative, relationship, but again one that was not robust. More recent

³ Baldwin (2011) and Sourdin and Pomfret (2012) highlight the role of fragmentation and supply chains in facilitating export-oriented development. Johnson and Noguera, extending an idea of Hummels et al. (2001) with more extensive data, combine input-output and bilateral trade data to compute the value-added component of international trade. The value-added share of trade (VAX) within East Asia fell from 75% in 1995 to 61% in 2005 (2012c), the largest decadal change in any of the three regions covered. National data show the ratio declining from the late 1980s in Thailand, and with a less clear break in the People's Republic of China (PRC) (2012a). For Singapore, the VAX ratio for manufactures in 2004 was 25% (2012b).

⁴ Volz (2012) provides a recent statement of the argument, and references to the literature. Using daily data from 1999 to 2012, Click (2013) estimates an implicit currency basket for the major Association of Southeast Asian Nations (ASEAN) countries that is dominated (with almost 90% weight) by the United States (US) dollar, but concludes from the individual country variation that the region is not close to having a common currency basket. Pontines (2012) analyzes the usefulness of an agreed Asian Currency Unit index for surveillance in East Asia.

⁵ We use "depreciation" as a general term to cover a fall in a currency's value relative to another currency or basket of currencies, without regard to whether the currency was previously pegged or not. This section draws on the more detailed surveys by Coric and Pugh (2010), Huchet-Bourdon and Korinek (2011), and Auboin and Ruta (2011).

papers have similar results (e.g., Bahmain-Oskooee and Hegerty [2007]; Arize et al. [2008]) find a significant negative relationship between exchange rate volatility and export flows of eight Latin American countries, while Tenreyro (2007) using a global sample of 87 countries concludes that exchange rate volatility has no significant effect on trade flows. The conventional wisdom appears to be that there may be a negative relationship between volatility and trade, but if it exists it is of minor importance (Coric and Pugh 2010; Auboin and Ruta 2011, Annex 1).⁶

These are aggregate results and, as Maskus (1986) points out, the impact may vary by sector depending on openness to trade, concentration levels, prevalence of long-term contracts, etc. It may also be a conditional relationship: Aghion et al. (2009) find that exchange rate volatility has a negative effect on productivity growth when the financial sector is undeveloped, but not otherwise. A smaller number of studies finds a positive relationship from trade to exchange rate volatility (e.g., Broda and Romalis 2003), suggesting a two-way relationship.

Empirical research on exchange rate levels and trade has been more limited. Changes in the real exchange rate can affect trade in many direct and indirect ways, altering incentives to allocate inputs between tradable and non-tradable activities, changing the output mix, and providing an indicator of relative competitiveness. In theoretical models the effects of exchange rate changes in the long-run, when by definition all prices have adjusted, will normally be zero, while the short-run effects are assumption-specific, depending in large part on the assignment of invoice currencies (Staiger and Sykes 2010). The growth impact of undervaluation is generally thought to be positive, but this rests on the presumed existence of distortions, e.g., greater learning externalities in the traded goods sectors, and is mostly supported by anecdotal evidence (most commonly from East Asia).

The econometric literature is surprisingly inconclusive given the general presumption that depreciation/undervaluation is good for growth. The relationships may be non-linear and sensitive to the choice of time horizon (due, for example, to J-curve effects). Auboin and Ruta (2011) conclude that the results are inconclusive because the exchange rate is just one of many influences on the trade balance.

The most interesting recent contributions have disaggregated the data by individual firms, by product level, or by time period. Berman et al. (2009) argued, theoretically and with French firm-level data, that the most productive firms export and depreciation encourages less productive firms to export; the former are more likely to absorb exchange rate fluctuations in their markups, while the less productive firms respond by changes in export quantity, so that trade flows do not generally respond greatly to exchange rate volatility, but exchange rate depreciation can increase the responsiveness. Bahmani-Oskooee and Wang (2007) examined trade flows at the 2- and 3-digit industry level between the US and selected Asian economies and found large variations in responsiveness to exchange rate changes both across industries and between countries, e.g., appreciation of the US dollar against the renminbi decreased US exports in 18 of the 88 industries and increased US imports in 40 of the industries, a result attributed to demand from the People's Republic of China (PRC) for imports from the US being less price elastic than US demand for imports from the PRC. Finally, Auboin and Ruta (2011: 15–16) point out that “the relationship between exchange rates and trade varies over time, as changes in the world economy

⁶ Josheski and Lazarov (2012), updating Coric and Pugh (2010), report a meta-analysis of 67 studies from 1980 to 2012, of which 39 found a negative effect, 20 found no effect or inconclusive results, and 6 found a positive effect. They test and reject hypotheses of publication bias. However, they make no attempt to control for the quality of the studies.

materialize,” which is intuitively appealing in a world of increased outsourcing and more complex supply chains, although they are not able to cite much empirical evidence. These three considerations may be inter-connected insofar as more dynamic outward-oriented firms in particular industries (e.g., electronics) participate to a greater degree on global value chains.

All in all, there is an extensive literature on exchange rates and trade with some theoretical presumptions and empirical support for the intuitive results that depreciation favors trade and volatility deters trade, although the empirical evidence is modest. There are, however, suggestions that these relationships are uneven and conditional, perhaps in systematic ways. Of particular relevance to East Asian trade is the recurring implication of exchange rate protection and exchange promotion by countries in the region and the growing importance of regional value chains in what has become known as “Factory Asia.”

With respect to trade flows in East Asia, time series analysis of exchange rate volatility and trade has produced mixed results. Poon et al. (2005) found a negative relationship between volatility and trade for Japan, the Republic of Korea, and Singapore, but a positive relationship for Thailand and Indonesia. More recent studies using panel data have found a negative relationship between exchange rate volatility and trade, e.g., Chit et al. (2010) for ASEAN countries and the PRC, and a conditional relationship where volatility is harmful for trade when the financial sector is underdeveloped (Chit and Judge 2011).⁷

Thorbecke (2008), using data from the five largest ASEAN economies, the PRC; Japan; the Republic of Korea; and Taipei, China, found a negative relationship between exchange rate volatility and export of electronic components, and Hayaka and Kimura (2009) found similar evidence for machinery goods and parts. Tang (2012) links these results to the strengthening of regional value chains, finding that the link between volatility and trade is strongest within a grouping of the five largest ASEAN economies, the PRC; Hong Kong, China; Japan; the Republic of Korea; and Taipei, China, and stronger for trade in intermediate and equipment goods than for trade in primary products or consumption goods. This argument suggests that the relationship may be time-sensitive, becoming stronger as regional value chains have become more prevalent.

3. TRADE, RTAS, AND EXCHANGE RATE POLICIES IN EAST ASIA

East Asia’s strategy of export-led growth has resulted in the rapid expansion of its share of world trade. As presented in Table 1 below, the region’s share of global exports rose from 14% in 1980 to 21% in 1990 and 26% in 2000. Its share of global imports also rose from 14% in 1980 to 23% in 2000. However, the rapid rise in both the region’s global share of exports and imports slowed sometime in the 2000s with the region’s global share of exports and imports in 2005 at 27% and 23%, respectively. Recent figures show that the post-2007 financial crisis had an effect on the region’s share of global exports and imports; the former dropped to 29.5% in 2011 from a global share of 30% in 2010, while the latter increased to 27.5% in 2011 from a global share of 27% in 2010.

⁷ Chit and Judge also find that using currency depreciation to promote exports is only successful when the exchange rate is stable.

Particularly striking is the rapid and consistent growth of the PRC's shares of total world exports and imports from 1980 to 2010, only slowing down in 2011. Rapid growth in its exports and imports led in the early twenty-first century to the PRC overtaking Japan as East Asia's leading trading nation, which is especially striking noting that in 1980 the PRC's shares of global world exports and imports were only 1% compared with Japan's 7%.

Table 1: East Asia's Global Trade Share, 1980–2011

Economy or region	Exports					
	1980	1990	2000	2005	2010	2011
Hong Kong, China	1.1	2.4	3.2	2.8	2.6	2.4
Japan	7.1	8.5	7.5	5.7	5.2	4.6
Republic of Korea	1.0	2.0	2.7	2.7	3.2	3.2
Taipei, China	0.0	2.0	2.3	1.9	1.8	1.7
PRC	1.0	1.9	3.9	7.3	10.6	10.7
ASEAN	3.9	4.3	6.7	6.3	7.0	6.9
Sub Total (East Asia)	14.1	21.1	26.3	26.8	30.4	29.5
United States	12.1	11.6	12.1	8.7	8.6	8.3
European Union	43.1	45.0	38.0	39.2	33.5	32.8
Others	30.8	22.3	23.7	25.3	27.6	29.4
Total (World)	100.0	100.0	100.0	100.0	100.0	100.0

Economy or region	Imports					
	1980	1990	2000	2005	2010	2011
Hong Kong, China	1.2	2.3	3.2	2.8	2.8	2.6
Japan	7.4	6.7	5.8	4.8	4.5	4.7
Republic of Korea	1.1	2.1	2.4	2.4	2.8	2.9
Taipei, China	0.0	1.6	2.1	1.7	1.6	1.5
PRC	1.0	1.5	3.4	6.1	9.1	9.5
ASEAN	3.4	4.6	5.6	5.4	6.2	6.3
Sub Total (East Asia)	14.1	18.9	22.6	23.2	27.0	27.5
United States	13.4	14.7	18.8	16.1	12.8	12.3
European Union	46.4	44.8	37.5	38.4	33.8	33.1
Others	26.1	21.6	21.2	22.3	26.3	27.1
Total (World)	100.0	100.0	100.0	100.0	100.0	100.0

Source: IMF, World Economic Outlook; Direction of Trade Statistics.

East Asian economies have been active in negotiating and completing regional trade agreements, particularly since the turn of the century. Within East Asian economies alone, a number of bilateral and plurilateral trade agreements have entered into force since the ASEAN FTA (AFTA) came into effect in 1992 (Table 2). The East Asian region's largest economies, i.e., the PRC, Japan, and the Republic of Korea, have been players in the formation of these agreements within East Asia and in partnership with an ASEAN member country.⁸

⁸ East Asian economies have also signed RTAs in the broader region outside of the economies examined in this study as well as cross-regions (ADB 2008).

Table 2: Major Trade Agreements for East Asian Countries, 1992-Present

Agreement	Status	Year Enforced
<i>Bilateral RTAs</i>		
Japan-Singapore	Effective	2002
PRC-Macau	Effective	2003
PRC-Hong Kong, China	Effective	2003
Rep. of Korea-Singapore	Effective	2006
Japan-Malaysia	Effective	2006
Japan-Thailand	Effective	2007
Japan-Indonesia	Effective	2008
Japan-Philippines	Effective	2008
PRC-Singapore	Effective	2009
Japan-Viet Nam	Effective	2009
<i>Plurilateral RTAs</i>		
AFTA	Effective	1992
ASEAN-PRC	Effective	2005
ASEAN-Rep. of Korea	Effective	2007
ASEAN-Japan	Effective	2008

Source: Compiled from WTO database

In tandem with the active negotiation and completion of regional trade agreements with their East Asian neighbors, perhaps another contributing factor to the rapid growth in East Asia's trade is that before the 1997-98 East Asian crisis, most Asian countries maintained *de facto* dollar pegs⁹, which worked to stabilize exchange rates within the region. With the adoption of more flexible exchange rates following the 1997-98 East Asian crisis, intraregional exchange rate volatility has risen significantly. Table 3 depicts the evolution of East Asian exchange rate arrangements over the period of 2000 to 2007 according to the *de facto* IMF exchange rate classification.

⁹ See, for instance, Ogawa and Ito (2002) for evidence on this maintenance of a *de facto* dollar peg prior to the 1997-98 East Asian financial crisis.

**Table 3: De Facto East Asian Exchange Rate Regimes
According to IMF Exchange Rate Classification**

		Exchange Rate Arrangements				
		Currency Board	Other Conventional Fixed Peg Arrangement	Crawling Peg	Managed Float with no Predetermined Path	Independently Floating
Monetary Policy Framework	Exchange Rate Anchor US Dollar	Hong Kong, China	Viet Nam	People's Republic of China	Cambodia, Lao PDR, and Myanmar	
	Composite				Singapore	
	Others	Brunei Darussalam				
	Monetary Target					
	Inflation Targeting				Indonesia and Thailand	Rep. of Korea and Philippines
	Others				Malaysia	Japan

Source: IMF's De Facto Classification of Exchange Rate Regimes and Monetary Framework (2008).

The striking observation from Table 3 is that East Asian exchange rate arrangements cover a wide spectrum of regimes of varying degrees of flexibility ranging from the crawling peg of the PRC to independent floating regimes in the Republic of Korea, Japan, and the Philippines. The only exceptions are Hong Kong, China; Brunei Darussalam; and Viet Nam, all three of which operate a fixed exchange rate arrangement anchored on a single currency. One contributing factor for the move toward more flexible exchange rate arrangement in these East Asian countries is that after the Asian financial crisis, almost all of the crisis-affected countries, i.e., Indonesia, the Republic of Korea, Philippines, and Thailand, chose to abandon a conventional pegged exchange rate regime in favor of flexible exchange rates, while Malaysia implemented a conventional pegged arrangement until 2005 but has since shifted to a managed floating exchange rate regime (ADB 2010).

In other words, most East Asian monetary authorities have not willingly assumed the responsibilities that come with operating a rigid peg let alone the alternative of a clean float. To be more specific, by and large, the middle has not really become hollow for the exchange rate policies of these East Asian economies, and more of them have the desired preference of managing exchange rates that are edged toward flexible exchange rates albeit not free floating.

The implication of the above analysis is that moving forward with deeper integration in the region requires solving the exchange rate problem. This task is made more complex by a current understated nuance of East Asian middle-ground exchange rate management of less willingness to tolerate exchange rate appreciations.¹⁰ Part of the

¹⁰ For evidence on this phenomenon, see, for instance, the studies of Pontines and Rajan (2011) which examines the case of India, Indonesia, the Republic of Korea, Philippines, Singapore, and Thailand, while Pontines and Siregar (2012a) and Pontines and Siregar (2012b) squarely deal with the issue in the context of an announced pursuit of inflation targeting regimes by Indonesia, the Republic of Korea, Philippines, and Thailand.

reason for the unwillingness has to do with the potential of losing competitiveness against other East Asian neighboring economies that compete with each other in markets within and outside of the region. As a consequence, the scenario of a beggar-thy-neighbor competitive depreciation strategy, which can be costly to the region in terms of a large and unnecessary reallocation of resources across the region, always looms large on the horizon (Kawai and Takagi 2012).

4. THE TENSION BETWEEN DEPRECIATED OR STABLE EXCHANGE RATES: CONFLICTING DOMESTIC ASPIRATIONS IN AN RTA

Proliferation of RTAs is a salient feature of the international trading system. In view of their expressed purpose of at least partially lowering restrictions to trade, RTAs generally commit participants to freer-trade by “tying their hands” or make it difficult for members to alter their terms-of-trade through traditional trade policy measures. In this vein, RTAs enhance trade between member countries. If the effect of exchange rate volatility on trade is significant, then the traditional case for exchange rate stability in encouraging trade and investment applies to a country’s motivation of being a part of an RTA. Greater exchange rate instability among members of an RTA can work against the goal of trade-creation.

On the other hand, RTAs also increase international competition, and governments may face protectionist pressures from those most negatively affected. Given their RTA commitments and the consequent inability to pursue traditional trade measures to offset the adverse consequences of greater import competition, protectionist pressures can take the form of a desire to increase the level of the country’s international competitiveness via the pursuit of a competitive exchange rate policy, in particular, in the form of a competitive devaluation.¹¹ Exchange rate protection can serve as a substitute to trade policies, since the trade impact of a depreciated or weak currency is equivalent to that of some combination of changes in import taxes and export subsidies.

A depreciated or weak currency increases the domestic currency prices of imported goods, which raises the cost of living for domestic consumers. In a domestic political economy sense, however, it is relatively easier for governments to trade off the welfare of exporters and import-competitors, on the one hand, for that of consumers, on the other, since domestic producers represent a more coherent and better organized political lobby. In addition, consumers are probably ill-informed about the effects of protectionism and are, in any case, poorly organized (Frieden et al. 2012; Bird and Rajan 2006).

Exporters are, nonetheless, likely to be torn between a concern for currency stability, on the one hand, and a concern for a competitive, hence a depreciated exchange rate, on the other. However, when these two conflicting concerns and divergent interests—to stabilize exchange rates or to maintain the competitiveness of domestic tradable producers—are brought to bear in the national macroeconomic policy arena, it is the latter which poses the bigger danger of a conflict among countries. The underlying reason is that the adverse consequence of the volatility between two countries’

¹¹ Countries can put in place non-tariff trade barriers (NTBs), but governments when faced with greater import competition do not limit their options to trade policies, which will be constrained to a greater or lesser degree in an RTA but also consider a competitive exchange rate policy, which is more likely to remain a matter of national competence.

currencies are entirely internalized in both countries' domestic actors (e.g., exporters and import-competitors), whereas a weakened national currency imposes a negative externality on other countries by transferring the competitive pressure to the country's trading partners, which can stimulate protectionist sentiments abroad. So much so that when partner countries engage in the same policy of weakening their own currency, however, the competitive devaluations cancel each other out with no observable gain in output, but result in a significant strain in bilateral relations between the countries in question, which can also even endanger trade agreements (Frieden and Broz 2012; Frieden et al. 2012).

The implication of the above analysis is that international coordination between governments and among international institutions can help to avoid the problems that can arise as a result of artificially weak currencies. In the remainder of this paper, we first verify in the quantitative section that follows the existence of the conflicting interest of whether to stabilize exchange rates or to maintain the competitiveness of domestic producers in an RTA using data for East Asian countries. The next step, addressed in Section 6, is to consider to what extent international policy coordination might help address the problems that arise when countries decide to pursue artificially weak currencies in order to gain competitive advantage at the expense of other countries.

5. EMPIRICAL METHODOLOGY AND ANALYSIS OF RESULTS

In this section we revisit the relationships between exchange rate depreciations and trade, and between exchange rate volatility and trade. In contrast to previous studies, however, we focus on these relationships in the context of RTA membership. We estimate a conventional gravity model of trade, including dummies for RTA membership and variables capturing exchange rate depreciation and volatility, and are interested not just in the direct relationships between these variables and bilateral trade, but also in the interaction between the exchange rate variables and RTA membership.

The dependent variable in all of our estimating equations is the log volume of merchandise trade flows from country i to country j . The data cover 16 East Asian economies¹² over the period 1990 to 2010. We create a binary variable for plurilateral and bilateral RTAs involving the 16 East Asian economies using information provided by the World Trade Organization (WTO). We also create a measure of the rate of exchange rate depreciation of country i relative to country j by calculating the annual average daily changes in exchange rates for each pair of East Asian countries (an increase denotes an exchange rate depreciation). A measure of exchange rate volatility was created by calculating the standard deviation of the daily changes in exchange rates in each year for each pair of East Asian economies.

¹² The sixteen economies are Brunei Darussalam; Cambodia; Hong Kong, China; Indonesia; Japan; the Republic of Korea; Lao PDR; Macau; Malaysia; Mongolia; Myanmar; Philippines; PRC; Singapore; Thailand; and Viet Nam.

The estimating equations are:

$$\ln(X_{ijt}) = I2_0 + I2_1 \ln(Y_i Y_j)_t + I2_2 \ln D_{ij} + I2_3 \ln(\text{Area}_i \text{Area}_j) + I2_4 \text{Cont}_{ij} \\ + \beta_5 \text{Lang}_{ij} + \beta_6 \text{RTA}_{ijt} + \beta_7 \text{EXRDep}_{ijt} + \beta_8 \text{RTA}_{ijt} \times \text{EXRDep}_{ijt} + \varepsilon_{ijt} \quad (1)$$

$$\ln(X_{ijt}) = I2_0 + I2_1 \ln(Y_i Y_j)_t + I2_2 \ln D_{ij} + I2_3 \ln(\text{Area}_i \text{Area}_j) + I2_4 \text{Cont}_{ij} \\ + \beta_5 \text{Lang}_{ij} + \beta_6 \text{RTA}_{ijt} + \beta_7 \text{EXRVol}_{ijt} + \beta_8 \text{RTA}_{ijt} \times \text{EXRVol}_{ijt} + \varepsilon_{ijt} \quad (2)$$

where i and j denote countries, t denotes time, and the variables are defined as:

- X_{ijt} denotes the average value of bilateral trade flows from country i to country j at time t ,
- Y is GDP and GDP per capita, respectively,
- D is the distance between i and j ,
- Area is the land mass of the country,
- Cont is a binary variable which is unity if i and j share a land border,
- Lang is a binary variable which is unity if i and j share a common language,
- RTA is a binary variable which is unity if i and j belong to the same regional trade agreement at time t ,
- EXRDep is the rate of currency depreciation of country i to country j at time t ,
- $\text{RTA}_{ijt} \times \text{EXRDep}_{ijt}$ is the interaction between the RTA binary variable and EXRDep ,
- ε represents other influences on bilateral exports, assumed to be well behaved.

We estimate equations (1) and (2) with random effects and country fixed effects. The random effects estimates uses a generalized least-squares estimator assuming Gaussian disturbances that are uncorrelated with the random (country-pair specific) effects, while the fixed-effects “within” estimator essentially adds a set of country-pair specific intercepts to the equation, and thus exploits the time-series dimension of the data set around country-pair averages.

Table 4 presents the random effects and fixed-effects estimation results. Columns (1) to (4) show the random effect estimates, while columns (5) to (8) presents those estimated on the basis of fixed effects. The size and distance variables are the basic gravity model terms, expected to have positive and negative coefficients respectively. The contiguity and common language dummies are standard control variables, and the fixed effects estimation is intended to capture the multilateral resistance terms (Anderson and Van Wincoop 2003).¹³

¹³ We recognize the possibility of RTA formation being influenced by the level of bilateral trade or that both variables may have a common determinant (Baier and Bergstrand 2007). The problem of endogeneity

The coefficient on the RTA variable, β_6 , is expected to be positive, implying that an RTA increases trade between partner countries. The coefficient β_7 captures the relationship between exchange rate depreciations and trade in equation (1) above, while in equation (2), the β_7 coefficient captures the relationship between exchange rate volatility and trade. We expect the coefficient β_7 to be positive in equation (1) and negative in equation (2). The coefficient of most interest to us is β_8 . Specifically, β_8 in equation (1) captures the effect of whether exchange rate depreciations reinforce the expected positive impact of membership in RTAs on trade, while in equation (2) it accounts for the effect on whether exchange rate volatility neutralizes the expected positive impact of RTAs on trade.

Table 4: Gravity Model Estimation Results

<i>Variables</i>	<i>Random Effects</i>				<i>Fixed effects</i>			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Log of GDP in pair	1.38*** (0.07)		1.34*** (0.07)		1.35*** (0.07)		1.30*** (0.07)	
Log of per capita GDP in pair		1.09*** (0.12)		1.51*** (0.08)		1.00*** (0.14)		1.52*** (0.09)
Log of distance	-0.60 (0.65)	-0.58 (0.41)	-0.59 (0.63)	-0.14 (0.33)				
Log of area in pair	-0.07 (0.10)	-0.38*** (0.12)	-0.05 (0.10)	-0.69*** (0.12)				
Common land Border	0.96* (0.53)	2.10*** (0.54)	0.95* (0.46)	2.30*** (0.52)				
Common language	2.59*** (0.47)	2.44*** (0.56)	2.61*** (0.47)	1.98*** (0.59)				
RTA	0.36*** (0.09)	0.28** (0.13)	0.39*** (0.09)	0.57*** (0.12)	0.37** (0.07)	0.27** (0.13)	0.40*** (0.09)	0.56*** (0.12)
Rate of exchange rate depreciation	0.53* (0.30)	0.52* (0.30)			0.54* (0.30)	0.53* (0.30)		
RTA*rate of ER depreciation	1.35** (.61)	1.11* (.62)			1.34** (.61)	1.10* (.61)		
Exchange rate volatility			-0.34* (0.21)	-0.47** (0.21)			-0.37* (0.21)	-0.46** (0.21)
RTA*exchange rate volatility			-0.86* (0.46)	-1.22** (0.47)			-0.89** (0.46)	-1.21** (0.47)
No. of observations	3,875	3,877	3,869	3,871	3,875	3,877	3,869	3,871

though is likely to be less of an issue for the number of Asian economies that have formed RTAs between them as opposed to deep integration projects like the European Union (EU), the North American Free Trade Agreement (NAFTA), or Closer Economic Relations (CER), a free trade agreement between the governments of New Zealand and Australia.

Overall <i>R</i> -squared	0.41	0.20	0.41	0.21	0.33	0.07	0.34	0.08
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Source: Authors' calculations.

Notes: The dependent variable is the log of bilateral trade flows. In columns (1) to (8), panel data estimation techniques are applied to all annual observations over the period from 1990 to 2010. Intercept and year dummy variables are included (not reported). Robust standard errors are reported in parentheses.

*** Estimated coefficients are statistically significant at the 1% level.

** Estimated coefficients are statistically significant at the 5% level.

* Estimated coefficients are statistically significant at the 10% level.

The gravity model explains the bilateral trade data reasonably well. As predicted by the model, the log of GDP, the log of per capita GDP, the common land border dummy, and the common language dummy all have a positive and statistically significant relationship with the volume of bilateral trade between East Asian economies. The log of area coefficient is negative, as expected, and statistically significant in two (columns (2) and (4)) of the four random effect estimates. The coefficient on the distance variable is negative but statistically not different from zero.

The coefficients on the RTA binary variable coming from both the random effect estimates in columns (1) to (4) and the fixed-effect estimates reported in columns (5) to (8) robustly indicate that membership in an RTA increases trade between the partner countries. They are mostly statistically significant at the 1% level.

Exchange rate depreciations are associated with greater bilateral trade between East Asian economies. The estimated coefficients of the rate of exchange rate depreciation are, according to both the random effect estimates in columns (1) and (2) and the fixed-effect estimates in columns (5) and (6) statistically different from zero, albeit only at the 10% significance level. While currency depreciations increase trade directly, the regression results suggest that exchange rate depreciations have a further indirect effect of augmenting the positive impact of RTAs. This is shown by the coefficient on the interaction term of the RTA binary variable and the rate of exchange rate depreciation which is positive and statistically significantly different from zero in both the random effect estimates in columns (1) and (2) and the fixed-effect estimates in columns (5) and (6).

Exchange rate volatility is associated with less bilateral trade between East Asian economies. The estimated coefficients on exchange rate volatility are statistically significant and negative in both the random effect estimates in columns (3) and (4) and the fixed-effect estimates in columns (7) and (8), which suggest that exchange rate volatility directly reduces trade. Reducing exchange rate volatility then is beneficial for bilateral trade. Moreover, the negative and statistically significant coefficients on the interaction term between exchange rate volatility and the RTA binary variable in both the random effect estimates (columns (3) and (4) of Table 4) and the fixed effect estimates (columns (7) and (8) of Table 4) indicate that exchange rate stability is especially beneficial for increasing trade among RTA members. In other words, not only does exchange rate volatility have a direct negative impact on trade flows, it also has a further indirect effect of mitigating the positive impact of RTAs in East Asia.

6. ARGUMENTS FOR AND AGAINST INTERNATIONAL POLICY COORDINATION

The architects of the post-1945 global economic institutions were influenced by the experience of the 1930s, and by the prevalent interpretations of that decade (e.g., Nurkse 1944). These interpretations saw floating exchange rates and “competitive

devaluations” as destabilizing to the global economy, and the IMF’s Articles of Agreement required members to “avoid manipulating exchange rate or the international monetary system to prevent effective balance of payments adjustment or to gain an unfair competitive advantage over other countries.” The General Agreement on Tariffs and Trade (GATT) set rules for trade policy that were designed to limit protection. However, Article XII allowed any contracting party to impose quantitative restrictions on trade in order to safeguard its balance of payments position.

During the Bretton Woods period, countries resorted to import surcharges when faced with balance of payments deficits. These became less common during the 1960s, when they were typically short-term measures that were precursors to eventual devaluation. The most prominent examples were Britain’s 15% import surcharge in October 1964 reduced to 10% in 1965 and eliminated in November 1966 before the 1967 devaluation of the pound sterling, and the August 1971 “Nixon Shock” when the US imposed a 10% surcharge on imports that was removed before the devaluation of the dollar under the December 1971 Smithsonian Agreement.

Following the adoption of generalized floating in 1973, the major economies renounced exchange rate stability in favor of independent monetary policies. Recurring trade disputes were resolved by temporary measures contrary to the spirit, if not the letter, of GATT, e.g., the “voluntary” export restraint agreements of the 1980s most notably imposed by the US on Japanese car imports in a period of rapid US dollar appreciation. The direct and indirect consequences of such gray area protectionist measures were at least as harmful as—and typically much more harmful than—those from tariff protection (Pomfret 1989), and one of the achievements of the Uruguay Round was to outlaw them.

Since the establishment of the WTO in 1995, the connection between exchange rates and trade policies has fallen between the competencies of the IMF and WTO. IMF agreements condemn “protracted large-scale intervention in one direction in exchange markets”, but IMF surveillance is weak (Mussa 2008), and even if violation were found the IMF has no means of compelling a country to change its policy (Irwin 2011). The WTO has an enforcement mechanism, i.e., sanctified trade retaliation, but none of the GATT Articles or other WTO agreements provide clear legal conditions under which exchange rate policies might be actionable. The lacuna creates pressure for unilateral measures, most notably discussed in US political debates about the PRC’s purportedly undervalued currency. Copelovitch and Pevehouse (2010) provide evidence that currency undervaluation increases the likelihood of WTO disputes.

The difficulty in assigning competencies for exchange rate policies is, of course, that exchange rates may be responding to legitimate macroeconomic policy decisions or they may be manipulated to achieve a competitive edge in international markets. A country faced with unemployment or slow growth may respond with expansionary policies that lead to exchange rate depreciation, which *inter alia* will have the desirable consequence of strengthening the stimulus via increased net exports, but this may appear to the country’s trading partners as obtaining an unfair advantage in international trade through currency manipulation. The IMF formulation denouncing “protracted” intervention in one direction is an attempt to discriminate between these two motivations, but “protracted” is difficult to define and “intervention” may be indirect. Even in a pure floating exchange rate environment with no intervention, macroeconomic policies may be perceived as beggar-thy-neighbor stimuli to trade—as in for example Japan’s expansionary macro policies in 2010—or as beneficial stimuli to global demand. Similarly, accumulation of reserves accompanied by sterilization may be driven by precautionary motives, but will result in exchange rate protectionism and provide an export stimulus relative to a fixed exchange rate regime without reserve

accumulation. A recent survey of exchange rate regimes in emerging Asia (Rajan 2011) refers to a widespread apparent “fear of appreciation.”¹⁴

Concerns about the trade consequences of undervaluation interact with concerns that currency volatility increases the costs of international trade. The tension is evident in the evolution of exchange arrangements among European countries since the establishment of the customs union in the 1960s. After some European countries adopted the “Snake” in 1972, they quickly dropped the arrangement because it posed too much restriction on domestic macropolicy in an era of generalized floating and stagflation. However, bilateral exchange rate volatility was harmful for trade within the customs union and especially costly for countries with a common agricultural policy that each year set farm prices in an attempt to balance producer and consumer interests. Within a year of the Snake’s definitive demise in 1976, the leaders of France and Germany and the Chairman of the European Commission negotiated a new European Monetary System that limited bilateral exchange rate volatility and became the precursor to the euro.¹⁵

In contrast to the long-term EU experience leading to the eurozone, Copelovitch and Pevehouse (forthcoming) contend that countries are less likely to adopt or sustain a fixed exchange rate when they have signed an RTA with the country in relation to which they have traditionally fixed the currency or the major industrial country with which they have the most extensive trade ties. Using data on 99 countries from 1975–2004, they find strong support for the hypothesis that countries which have signed a RTA also tend to have more depreciated currencies. Protectionism has been greatest at the regional level during periods of sharp intra-regional exchange rate fluctuations, such as the 1992–93 European Monetary System crisis and the 1999 Brazilian real devaluation within Mercosur. Within the eurozone tensions still exist, e.g., relating to worries about whether the French government will resort to subsidies or other protectionist measures to limit the decline of Peugeot in 2013.

Asian countries face similar tensions. While there has been little enthusiasm for currency union and renunciation of monetary policy independence, bilateral exchange rate movements have been reduced by many Asian countries following a *de facto* dollar standard. Subramanian (2011) argues that the dollar standard is being replaced by a renminbi zone as the PRC becomes a crucial player in regional value chains.¹⁶ In 2012, the PRC made arrangements with the Republic of Korea and Taipei, China to increase the use of the renminbi in international transactions, although similar proposals with Japan were negatively affected by territorial disputes, reflecting the often political nature of such developments (Chin 2013). Given concerns about renminbi undervaluation, this could result in a broader assessment of East Asia as a zone of currency manipulation.

¹⁴ Also refer to footnote 10 of the paper for other evidence on this fear of appreciation in the region.

¹⁵ The role of Community fiscal policies, and especially the common agricultural policy, in the rapid emergence of a rebranded Snake in 1977–78 is analysed in Basevi and Grassi (1993) and Pomfret (1991).

¹⁶ Frankel (2011) compares prospects for the internationalization of the yuan (RMB) with that of the US dollar in 1913–45, the German mark in 1973–90, and the Japanese yen in 1978–91 and emphasizes three factors: economic size, confidence in the currency, and depth of financial markets. The RMB satisfies the first two but the latter will hold back its internationalization.

7. CONCLUSION

The connections between exchange rate regimes and trade flows are complex. Studies find systematic positive relationships between exchange rate undervaluation or depreciation and exports, and as depreciation is a zero-sum game this is a potential source of disputes between countries. Since the end of the Bretton Woods fixed exchange rate regime in 1973, however, there has been no multilateral agency tasked with monitoring exchange rates or resolving disputes over the use of exchange-rates for trade policy purposes. It is a gray area falling between the competencies of the IMF and WTO.

The econometric literature offers some cause for relief insofar as the impact of both the level and the volatility of exchange rates on trade appears to be small. However, this may reflect a twentieth century perspective, as more and more countries adopt export-oriented development strategies and become involved in value changes where predictability of prices and costs are important. These developments are especially pronounced in East Asia where countries are outward-oriented and participate in regional value chains often referred to as “Factory Asia.”

Another salient feature of the twenty-first century East Asian economy has been the proliferation of trade agreements. Participation in an RTA places constraints on a country’s ability to pursue independent trade policies; even a free trade agreement in which countries retain trade policy autonomy vis-à-vis non-members, restricts introduction of protectionist measures on trade with members. In this setting member countries may be tempted to use currency depreciation as an alternative to protectionist trade policies, or to gain a competitive edge as an exporter. At the same time, if RTA formation is driven by a desire to facilitate trade among countries involved in regional value chains, exchange rate stability will be desirable.

This paper analyzes the impact of the level and volatility of exchange rates on bilateral trade in 1990–2010 among sixteen East Asian economies (ASEAN+3; Hong Kong, China; Macau; and Mongolia), many of which have shifted from not being part of any RTAs in 1990 to having a range of RTA partners in the region. In a variety of standard gravity model specifications, exports are positively related to the rate of exchange rate depreciation and to RTA membership and negatively related to exchange rate volatility. The novel finding is that interaction terms indicate that both exchange rate effects are magnified when the two economies have a trade agreement. We interpret the level result as indicating that, because a RTA restricts governments’ trade policy instruments, they are more likely to use the exchange rate for trade policy ends. We interpret the volatility result as evidence that, because East Asian trade agreements are related to fragmentation and regional value chains, exchange rate volatility is especially harmful to trade flows within RTAs.

The policy implications favor formation of RTAs among countries wishing to participate in regional value chains, because such agreements can target desirable trade facilitation measures, including exchange rate stability. There is, however, a potential time-inconsistency problem. If a consequence of the RTA is intensified pressure on import-competing producers, a member may resort to exchange rate depreciation as an instrument for protection. However, depreciation is potentially harmful to other countries, implying the need for some monitoring mechanism within the RTA, comparable to avoiding the IMF-WTO policy gap at the global level. With deepening integration, the desire for exchange rate stability will eventually outweigh the desire to maintain a protectionist tool. This has been the evolutionary path in the European Union. Within ASEAN there has been a similar time path, although not so clearly

focused on exchange rates.¹⁷ How extensive such pressures will be in East Asia will depend not only upon how many countries seriously desire to be in this more integrated economic area, but also on their institutional and political readiness to commit to such grander schemes.

¹⁷ Despite AFTA entering into effect in 1992, its impact during the 1990s was limited by the extensive list of exceptions for politically important activities; Malaysia's car industry was the most high-profile example, but there were many others. In the twenty-first century such exceptions have been abandoned in favor of creating a more integrated intra-ASEAN market en route to an ASEAN Economic Community. The pressures for exchange rate stability within the AEC will be similar to those that built up in the EU after completion of the customs union and then the Single Market (EC92) program.

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