Welfare Costs of Bilateral Currency Crises: The Role of International Trade*

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Abstract

This paper shows that bilateral currency crises reduce bilateral trade up to 50% after controlling for the depreciation rate. Using a trade model, these reductions are connected to the welfare costs of currency crises. The results show that a single currency crisis can result in welfare reductions through changes in international trade corresponding to more than 10% (and up to 41%) of the costs of autarky for 23 different currency crisis episodes between 1960 and 2014. These welfare costs are also shown to be greater than the welfare gains from having free trade agreements and using common currencies for 25 different currency crisis episodes.

JEL Classification: F14, F31, F63

Key Words: Welfare Costs; Currency Crises; International Trade

Conflicts of Interest: None

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1 Introduction

The negative effects of a currency crisis at the country level are well known (e.g., see Eichengreen, Rose, and Wyplosz (1996) or Kaminsky, Lizondo, and Reinhart (1998)).[1] These country-level currency crises are mostly identified through the depreciation of the nominal exchange rate of a country with respect to a vehicle currency such as the U.S. dollar (e.g., see Frankel and Rose (1996) or Milesi-Ferretti and Razin (2000)). However, international trade patterns are determined on the basis of bilateral exchange rates, since both exporters and importers solve their optimization problems using their home currencies due to their costs and/or income being in terms of these currencies. Therefore, the negative effects of currency crises on international trade can occur at the bilateral level, especially when bilateral currency transactions are interrupted due to a crisis.

This paper investigates the possibility that bilateral currency crises (defined on the basis of nominal bilateral exchange rates) can affect bilateral imports. This is achieved by using the implications of a trade model, in which bilateral currency crises are accepted as additional trade costs due to potential increases in transaction costs. Accordingly, bilateral imports are shown to be affected by bilateral currency crises after controlling for the depreciation rate of the importing country's currency with respect to the exporting country's currency. This implication is tested empirically by using annual bilateral trade data from 66 countries covering the period between 1960 and 2014. The empirical results suggest that having a bilateral currency crisis can reduce international trade by up to 50%, depending on the severity of the crisis.

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[1] As discussed by Kaminsky (2006), these negative effects can be due to domestic economic fragility, with vulnerabilities related to current account deterioration, fiscal imbalances, financial excesses, foreign debt unsustainability, sudden-stop phenomenon or self-fulfilling crises.

These negative effects of bilateral currency crises are further connected to the corresponding welfare costs by using the implications of the trade model. It is shown that these welfare costs can be measured as the weighted average of the negative effects of bilateral currency crises on international trade, where the weights are the bilateral import shares. The corresponding empirical results suggest that the welfare costs of a single bilateral currency crisis are as high as 2.5% (for Costa Rica in 1982). To give these welfare costs context, they are further compared to the costs of autarky and the welfare gains from having free trade agreements and common currencies. The results show that the welfare costs of a single bilateral currency crisis correspond to more than 10% of the costs of autarky for 23 different episodes, even reaching up to 41% (for Angola in 1991). These costs are also shown to be greater than the welfare gains from having free trade agreements and common currencies (during the time of the crisis) for 25 different episodes.

This paper contributes to the literature along several dimensions. First, to our knowledge, this is the first paper to investigate *bilateral* currency crises. In particular, *bilateral* currency crises in this paper are defined in terms of bilateral trading partners, whereas currency crises in the literature (e.g., see Frankel and Rose (1996) or Milesi-Ferretti and Razin (2000)) are defined at the country level with respect to a vehicle currency. Second, the effects of bilateral currency crises on international trade are measured, whereas the literature mostly focuses on the relationship between currency unions and international trade (e.g., see Anderson and Van Wincoop (2004) or Glick and Rose (2016)). Third and most importantly, the measured effects of currency crises on international trade are further connected to the welfare of countries and thus the welfare costs of bilateral currency crises (through international trade) are calculated.

The rest of the paper is organized as follows. The next section provides a theoretical motivation for the empirical investigation. Section 3 introduces the estimation methodology and the data used. Section 4 depicts the welfare costs of bilateral currency crises. Section 5 concludes. Country-specific results are given in the Appendix.

2   Economic Environment

We utilize a trade model with endowments following Armington (1969). Consistent with the data set (to be introduced below), all prices are represented in a common currency, and, thus, the depreciation rate is controlled for by construction. The utility of individuals in country n at time t is given by the following function:

$$C_{nt} = \left(\sum_i (\alpha_{int})^{\frac{1}{\eta}} (C_{int})^{\frac{\eta-1}{\eta}} \right)^{\frac{\eta}{\eta-1}} \tag{1}$$

where C_{int} represents the goods imported from country i (representing consumption of home goods when $i = n$), and α_{int} represents preferences toward such goods. Based on the budget constraint of $\sum_i P_{int} C_{int} = E_{nt}$, where P_{int} is the price of C_{int}, and E_{nt} represents total expenditure, the optimization results in the following value of imports from country i:

$$P_{int} C_{int} = \alpha_{int} \left(\frac{P_{int}}{P_{nt}} \right)^{1-\eta} P_{nt} C_{nt} \tag{2}$$

where

$$P_{nt} = \left(\sum_i \alpha_{int} (P_{int})^{1-\eta} \right)^{\frac{1}{1-\eta}} \tag{3}$$

which implies that $\sum_i P_{int} C_{int} = P_{nt} C_{nt}$. With P_{nnt} representing the (source) price of the endowment in country n at time t, total expenditure E_{nt} is covered by the income coming from the sale of time-invariant endowment Y_n as follows:

$$E_{nt} = P_{nnt} Y_n \tag{4}$$

which implies the following welfare expression due to $E_{nt} = P_{nt} C_{nt}$:

$$C_{nt} = \frac{P_{nnt} Y_n}{P_{nt}} \tag{5}$$

Percentage changes in welfare, while keeping the endowment Y_n constant, are implied as follows:

$$d \left(\log C_{nt} \right) = d \log \left(\frac{P_{nnt}}{P_{nt}} \right) \tag{6}$$

which can be rewritten by using Equation 2 (when $i = n$) as follows:

$$d \left(\log C_{nt} \right) = - \frac{d \log \left(\lambda_{nnt} \right)}{\eta - 1} \tag{7}$$

where $\lambda_{nnt} = \frac{P_{nnt} C_{nnt}}{P_{nt} C_{nt}}$ is the home expenditure share. This is the same expression as in studies such as by Arkolakis, Costinot, and Rodríguez-Clare (2012) or Costinot and Rodríguez-Clare (2014).

After defining trade costs of τ_{int} from country i to country n at time t as satisfying $P_{int} = P_{iit} \tau_{int}$, where P_{iit} represents source prices in country i, an alternative expression for welfare changes can be found by combining Equation 6 with the total derivative of Equation 3 as follows, this time depending on bilateral trade patterns due to definition of P_{nt} in Equation

$$\underbrace{d\left(\log C_{nt}\right)}_{\text{Welfare Changes}} = \underbrace{-\sum_{i}\lambda_{int}d\left(\log \tau_{int}\right)}_{\text{Changes in Trade Costs}} \underbrace{-\sum_{i}\lambda_{int}\left(d\log P_{iit}\right) + \sum_{i}\lambda_{int}d\left(\log P_{nnt}\right)}_{\text{Changes in Terms of Trade}} \qquad (8)$$
$$\underbrace{\phantom{-\sum_{i}\lambda_{int}d\left(\log \tau_{int}\right)-\sum_{i}\lambda_{int}\left(d\log P_{iit}\right) + \sum_{i}\lambda_{int}d\left(\log P_{nnt}\right)}}_{\text{Due to Trading Partner } i}$$

where $\lambda_{int} = \frac{P_{int}C_{int}}{P_{nt}C_{nt}}$ is the share of country-n consumption for the imports coming from country i. We are interested in the welfare changes in this expression due to bilateral currency crises that we consider as factors contributing to (log) trade costs as follows:

$$\log \tau_{int} = \beta_{CRISIS}\phi_{int}^{CRISIS} + \beta_{EXTREME}\phi_{int}^{EXTREME} - \beta_{FTA}\phi_{int}^{FTA} - \beta_{CUR}\phi_{int}^{CUR} + f_{in} \qquad (9)$$

where ϕ_{int}^{CRISIS} is a time-varying dummy variable taking a value of one if the currency of the destination country n depreciates with respect to the currency of the source country i at time t with a rate of 25% or higher, together with this depreciation rate at least doubling the one in the previous year, and the depreciation rate of the previous year being below 40%. This is exactly the same definition used by Milesi-Ferretti and Razin (2000) in the context of defining a country-specific currency crisis, where the depreciation is defined with respect to the U.S. dollar.[2] In contrast, our definition of ϕ_{int}^{CRISIS} in this paper is with respect to a trading partner's currency, which corresponds to a "bilateral" currency crisis.

In order to capture the degree of severity of crises as suggested in studies such as by Kaminsky (2006), an additional time-varying dummy variable of $\phi_{int}^{EXTREME}$ is also included in the definition of trade costs in Equation 9, which takes a value of one if the currency of the destination country n depreciates with respect to the currency of the source country i at

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[2] Milesi-Ferretti and Razin (2000) claim that this definition is better than the one used by Frankel and Rose (1996), which is defined as a depreciation of 25% that is at least 10% higher than the depreciation of the previous year, because it avoids capturing the large exchange rate fluctuations associated with high inflation episodes.

time t with a rate of 100% or higher, together with the depreciation rate at least doubling the one in the previous year, and a depreciation rate of the previous year being below 40%. Since both ϕ_{int}^{CRISIS} and $\phi_{int}^{EXTREME}$ are included in the definition of trade costs, $\phi_{int}^{EXTREME}$ captures the effects of *extreme* bilateral currency crisis on top of those captured by ϕ_{int}^{CRISIS} that we call as *regular* bilateral currency crisis.

Finally, in Equation 9, standard gravity variables of ϕ_{int}^{FTA} and ϕ_{int}^{CUR} are time-varying dummy variables taking a value of one if countries i and n have a free trade agreement (FTA) and a common currency, respectively, at time t, whereas f_{in} represents source-destination fixed effects that are constant over time (capturing the effects of other standard gravity variables such as distance, contiguity, common language, colonial relationship, etc.).

Combining Equation 8 with the total derivative of trade costs in Equation 9 results in the following expression:

$$
d\left(\log C_{nt}\right) = -\beta_{CRISIS} \sum_i \lambda_{int} d\left(\phi_{int}^{CRISIS}\right) - \beta_{EXTREME} \sum_i \lambda_{int} d\left(\phi_{int}^{EXTREME}\right) \qquad (10)
$$

$$
+ \beta_{FTA} \sum_i \lambda_{int} d\left(\phi_{int}^{FTA}\right) + \beta_{CUR} \sum_i \lambda_{int} d\left(\phi_{int}^{CUR}\right) + \sum_i \lambda_{int} d\left(f_{in}\right)
$$

$$
- \sum_i \lambda_{int}\left(d \log P_{iit}\right) + \sum_i \lambda_{int} d\left(\log P_{nnt}\right)
$$

where our main focus is on the effects of bilateral currency crises captured by the first two expressions on the right hand side. In particular, given that country n has bilateral currency crises with at least one trading partner i (i.e., $\phi_{int}^{CRISIS} = 1$ or $\phi_{int}^{EXTREME} = 1$ for any i), we would like to know the welfare gains of country n from removing the negative effects of these bilateral currency crises. This hypothetical question can be answered by having a counterfactual analysis through setting the changes in dummy variables of bilateral currency

crises to $d\left(\phi_{int}^{CRISIS}\right) = -\phi_{int}^{CRISIS}$ and/or $d\left(\phi_{int}^{EXTREME}\right) = -\phi_{int}^{CRISIS}$, depending on the severity of the depreciation, whereas other variables are kept the same. Accordingly, the welfare costs of bilateral currency crises are implied as follows:

$$\underbrace{d\left(\log C_{nt}\right)}_{\text{Welfare Costs}} = \underbrace{\beta_{CRISIS}\sum_i \lambda_{int}\phi_{int}^{CRISIS}}_{\text{Regular Currency Crises}} + \underbrace{\beta_{EXTREME}\sum_i \lambda_{int}\phi_{int}^{EXTREME}}_{\text{Extreme Currency Crises}} \tag{11}$$
$$\underbrace{\hphantom{\beta_{CRISIS}\sum_i \lambda_{int}\phi_{int}^{CRISIS} + \beta_{EXTREME}\sum_i \lambda_{int}\phi_{int}^{EXTREME}}}_{\text{Effects of Bilateral Currency Crises}}$$

which can be calculated when the parameters of β_{CRISIS} and $\beta_{EXTREME}$ are known.

Once the welfare costs of bilateral currency crises are calculated using Equation 11, they can further be compared to the welfare costs of autarky (that can be calculated by setting $d\log\left(\lambda_{nnt}\right) = \log\lambda_{nnt}$ in Equation 7) as follows:

$$\frac{\text{Costs of Bilateral Currency Crises}}{\text{Costs of Autarky}} = \frac{\left(\begin{array}{c} (1-\eta)\,\beta_{CRISIS}\sum_i \lambda_{int}\phi_{int}^{CRISIS} \\[4pt] + (1-\eta)\,\beta_{EXTREME}\sum_i \lambda_{int}\phi_{int}^{EXTREME} \end{array} \right)}{\log\lambda_{nnt}} \tag{12}$$

which can be considered as the autarky-equivalent welfare costs of bilateral currency crises. We call this expression "First Ratio" in our results, below.

A second comparison can be achieved by using the welfare gains from having free trade agreements and common currencies. In a way that is similar to calculating welfare costs of bilateral currency crises, these gains can be measured by setting $d\left(\phi_{int}^{FTA}\right) = -\phi_{int}^{FTA}$ and $d\left(\phi_{int}^{CUR}\right) = -\phi_{int}^{CUR}$ in Equation 10, whereas other variables are kept the same. Therefore,

this second comparison can be achieved by considering the following ratio:

$$-\frac{\text{Costs of Bilateral Currency Crises}}{\text{Gains from FTAs and Common Currencies}} = \frac{\left(\begin{array}{c} (1-\eta)\,\beta_{CRISIS} \sum_i \lambda_{int} \phi_{int}^{CRISIS} \\ + (1-\eta)\,\beta_{EXTREME} \sum_i \lambda_{int} \phi_{int}^{EXTREME} \end{array} \right)}{\left(\begin{array}{c} (1-\eta)\,\beta_{FTA} \sum_i \lambda_{int} \phi_{int}^{FTA} \\ + (1-\eta)\,\beta_{CUR} \sum_i \lambda_{int} \phi_{int}^{CUR} \end{array} \right)} \tag{13}$$

where both the numerator and the denominator have been multiplied by $(1-\eta)$. Given that country n has an FTA or a common currency with at least one trading partner at the time of a bilateral currency crisis, this expression would be useful to show the relative importance of having bilateral currency crises with respect to the gains from reducing trade costs through FTAs and common currencies. We call this expression "Second Ratio" in our results, below.

In both Equations 12 and 13, given the data on ϕ_{int}^{CRISIS}'s, $\phi_{int}^{EXTREME}$'s, λ_{int}'s, ϕ_{int}^{FTA}'s and ϕ_{int}^{CUR}'s, the only missing information is on $(1-\eta)\,\beta_{CRISIS}$, $(1-\eta)\,\beta_{EXTREME}$, $(1-\eta)\,\beta_{FTA}$ and $(1-\eta)\,\beta_{CUR}$. These parameters can be estimated as coefficients in front of the corresponding dummy variables in a typical trade regression, which does **not** require the knowledge of the trade elasticity $1-\eta$, as we detail in the next section.

3   Empirical Methodology and Data

The log version of Equation 2 implies the following expression representing log imports of country n from country i at time t:

$$\log\left(P_{int} C_{int}\right) = \log \alpha_{int} - (\eta-1)\log \tau_{int} - (\eta-1)\log\left(P_{iit}\right) + \log\left(\left(P_{nt}\right)^{\eta} C_{nt}\right) \tag{14}$$

Combining this expression with Equation 9 results in:

$$
\underbrace{\log\left(P_{int}C_{int}\right)}_{\text{Log Bilateral Imports}} = \underbrace{-\left(\eta-1\right)\beta_{CRISIS}\phi_{int}^{CRISIS}}_{\text{Regular Currency Crises}} - \underbrace{\left(\eta-1\right)\beta_{EXTREME}\phi_{int}^{EXTREME}}_{\text{Extreme Currency Crises}} \tag{15}
$$

$$
+ \underbrace{\left(\eta-1\right)\beta_{FTA}\phi_{int}^{FTA}}_{\text{Free Trade Agreements}} + \underbrace{\left(\eta-1\right)\beta_{CUR}\phi_{int}^{CUR}}_{\text{Common Currency}} - \underbrace{\left(\eta-1\right)f_{in}}_{\text{Dyadic Fixed Effects}}
$$

$$
- \underbrace{\left(\eta-1\right)\log\left(P_{iit}\right)}_{\text{Source-Time Fixed Effects}} + \underbrace{\log\left(\left(P_{nt}\right)^{\eta}C_{nt}\right)}_{\text{Destination-Time Fixed Effects}} + \underbrace{\log\alpha_{int}}_{\text{Preferences}}
$$

In order to consider potential zero-trade observations for imports represented by $P_{int}C_{int}$'s, Poisson Pseudo-Maximum Likelihood (PPML) is used for the estimation of Equation 15, which can be achieved by using the following expression for preferences:

$$
\log\alpha_{int} = \log\left(\frac{P_{int}C_{int}}{P_{int}C_{int}-v_{int}}\right) \tag{16}
$$

where v_{int}'s are orthogonal to $P_{int}C_{int}$'s with zero mean. The final version of the PPML regression based on Equation 15 is implied as follows:

$$
\underbrace{P_{int}C_{int}}_{\text{Bilateral Imports}} = \exp\left(
\begin{array}{c}
\underbrace{-\left(\eta-1\right)\beta_{CRISIS}\phi_{int}^{CRISIS}}_{\text{Regular Currency Crises}} - \underbrace{\left(\eta-1\right)\beta_{EXTREME}\phi_{int}^{EXTREME}}_{\text{Extreme Currency Crises}} \\[2mm]
\underbrace{+\left(\eta-1\right)\beta_{FTA}\phi_{int}^{FTA}}_{\text{Free Trade Agreements}} + \underbrace{\left(\eta-1\right)\beta_{CUR}\phi_{int}^{CUR}}_{\text{Common Currency}} - \underbrace{\left(\eta-1\right)f_{in}}_{\text{Dyadic Fixed Effects}} \\[2mm]
- \underbrace{\left(\eta-1\right)\log\left(P_{iit}\right)}_{\text{Source-Time Fixed Effects}} + \underbrace{\log\left(\left(P_{nt}\right)^{\eta}C_{nt}\right)}_{\text{Destination-Time Fixed Effects}}
\end{array}
\right) + v_{int} \tag{17}
$$

where $(1-\eta)\beta_{CRISIS}$, $(1-\eta)\beta_{EXTREME}$, $(1-\eta)\beta_{FTA}$ and $(1-\eta)\beta_{CUR}$ can be estimated (as coefficients in front of the corresponding variables) to be further used in Equations 12 and 13, which does not require the knowledge of the trade elasticity $\eta-1$. Nevertheless, since the calculation of actual welfare costs of bilateral currency crises in Equation 11 requires the

knowledge of the trade elasticity, we follow studies such as by Anderson and Van Wincoop (2003), Head and Mayer (2014) or Yilmazkuday (2019) to adopt a trade elasticity measure of $\eta - 1 = 5$ in our calculations below. Finally, source-time fixed effects and destination-time fixed effects in Equation 17 control for any country-specific development over time (e.g., several Asian countries being affected differently by the 1997 Asian twin crises).[3]

For the estimation, annual bilateral imports data (for $P_{int}C_{int}$'s) are borrowed from Fouquin and Hugot (2016), where zero-trade observations are carefully considered. To obtain measures for bilateral import shares of λ_{int}'s, bilateral imports data are combined with $P_{nt}C_{nt}$'s measured by the gross domestic product minus total exports (also available in the same data set) as in studies such as by Yotov (2012). Finally, for the calculation of the home expenditure share of λ_{nnt}'s, we use $P_{nt}C_{nt}$'s together with $P_{nnt}C_{nnt}$'s measured by the gross domestic product minus total exports plus total imports (also available in the same data set).

Annual nominal exchange rate data are borrowed from the Global Crises Data by Country that is available on the web page of the Behavioral Finance and Financial Stability Project.[4] Since these nominal exchange rates represent those with respect to the U.S. dollar, they are converted into bilateral exchange rates between trading partners (by using the no-arbitrage condition) to be further connected to the bilateral imports data. These newly-constructed bilateral exchange rates are the ones used to construct the time-varying dummy variables of ϕ_{int}^{CRISIS} and $\phi_{int}^{EXTREME}$ representing regular and extreme currency crises, respectively.[5]

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[3]It is possible that countries can trade by using a third currency. Nevertheless, if this usage of a third currency is exporter specific (e.g., oil exporting countries selling oil in US dollars), importer specific, or this usage is stable over time between trading partners (e.g., two countries always using US dollars), such details are already captured in Equation 17 which controls for source-time fixed effects and destination-time fixed effects as well as dyadic fixed effects.

[4]The corresponding web page is https://www.hbs.edu/behavioral-finance-and-financial-stability/data/Pages/global.aspx.

[5]The corresponding countries which have experienced a bilateral currency crisis with at least one trading partner are listed in the Online Appendix Table A.1, where the corresponding years are also depicted.

Finally, time-varying gravity variables of ϕ_{int}^{FTA} and ϕ_{int}^{CUR} representing the existence of a free trade agreement and a common currency, respectively, between country i and n at time t are borrowed from the economic geography database of CEPII (Centre d'Etudes Prospectives et d'informations Internationales).

The combination of all data sets results in a sample of 66 countries covering the annual period between 1960-2014.

4   Empirical Results

The PPML estimation results based on Equation 17 are given in Table 1, where the coefficients depicted in the first four rows are $(1-\eta)\beta_{CRISIS}$, $(1-\eta)\beta_{EXTREME}$, $(\eta-1)\beta_{CUR}$ and $(\eta-1)\beta_{FTA}$, respectively. As is evident, bilateral currency crises reduce international trade, independent of the regression specification considered. In terms of the magnitudes, based on the complete regression (i.e., the first column), having a regular bilateral currency crisis reduces imports by about 8%, whereas having an extreme bilateral currency crisis reduces imports by about an additional 44%. Since having a free trade agreement or a common currency both increase imports by about 44%, it is implied that the total negative effects of having an extreme bilateral currency crisis on imports (about 50%) is more than the positive effects of having a free trade agreement or a common currency. Although these coefficient estimates provide useful information on the effects of the corresponding variables on imports, they are silent about the welfare implications, for which Equations 12 and 13 can be used.

Robustness of the results in the first column of Table 1 is investigated in its other columns. In particular, independent of other right-hand-side variables considered, having a regular bilateral currency crisis reduces imports by about between 8% and 15%, whereas having an

extreme bilateral currency crisis reduces imports by about between an additional 44% and 68%. The control variables of having a common currency or a free trade agreement have stable effects across columns of Table 1, supporting the contribution of bilateral currency crises on imports given in the first column of Table 1.

The welfare implications based on Equation 12 are given in Table 2, where countries having a First Ratio higher than 10% are depicted. The currency crisis of Angola in 1991 corresponds to an autarky-equivalent welfare cost of about 41%, whereas the currency crisis of Argentina in 1981 corresponds to an autarky-equivalent welfare costs of about 36%. The complete list of countries that have experienced welfare loses due to currency crises is given in the Online Appendix Table A.1, whereas the highest First Ratio measures that they have experienced over the years are depicted in Figure 1. As is evident, South American countries have experienced the most harmful currency crises, although the effects are widespread around the world. Even advanced countries such as the United States, the United Kingdom, Germany, Japan or France have experienced welfare losses based on their bilateral currency crises.[6]

The welfare implications based on Equation 13 are given in Table 3, where countries having a Second Ratio higher than 1 are depicted. It is evident that for certain countries, the welfare costs of bilateral currency crises are much higher than the welfare gains from having free trade agreements and common currencies (combined). For sure, these results are partly because such trade policies (of having free trade agreements or common currencies) have not been utilized enough by these countries, but they are useful to understand the devastating effects of currency crises. The complete list of countries that have experienced welfare loses

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[6]For example, the United States have experienced a minor autarky-equivalent loss of about 0.04% in 2003, following a bilateral currency crisis with Australia. See the Online Appendix Table A.1 for more country-specific results.

due to currency crises is given in the Online Appendix Table A.1, whereas the highest Second Ratio measures that they have experienced over the years are depicted in Figure 2. As is evident, several countries, including those in Europe or South America, have experienced welfare losses due to bilateral currency crises that can be compared to their welfare gains from having free trade agreements or common currencies, because these are the countries which have conducted such trade policies in the first place.

5   Conclusion

This paper has attempted to measure the welfare implications of bilateral currency crises due to their negative effects on the bilateral trade between countries. Different from the literature in which a currency crisis is defined at the country level in terms of exchange rates with a common currency (e.g., the U.S. dollar), this paper has considered bilateral currency crises defined at the bilateral-country level in terms of nominal bilateral exchange rates, because international trade between any two countries is subject to these bilateral rates. This is true even when a common currency is used as a vehicle currency in transactions, because both importers and exporters convert their own currency into this common currency when solving their optimization problems (and thus bilateral rates eventually enter the picture).

Using a trade model, the welfare costs of bilateral currency crises transmitted through international trade are shown to be the weighted average of the negative effects of these crises on bilateral trade, where the weights are the bilateral trade shares. These negative effects are measured empirically by running a bilateral trade regression, where, different from what is done in the existing literature, *bilateral* currency crises are included as dummy variables in addition to the otherwise standard right hand side variables. The empirical results show

that having a currency crisis can reduce bilateral trade by as much as approximately 50%, depending on the severity of the crisis.

When the corresponding welfare costs through international trade are calculated, a single currency crisis is shown to result in welfare costs that correspond to as much as 41% or more of the overall costs of autarky (for Angola in 1991). To show that this observation is not an outlier, we have identified 23 different episodes of currency crises which resulted in welfare costs that were greater than 10% of the costs of autarky. This implies that the welfare effects of currency crises through international trade have been devastating for several countries over the years.

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Table 1 - PPML Estimation Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable: Bilateral Imports						
Currency Crisis	-0.0824*	-0.119**	-0.147***		-0.103**		
	(0.0352)	(0.0398)	(0.0429)		(0.0352)		
Extreme Currency Crisis	-0.436***	-0.567***		-0.680***		-0.514***	
	(0.0929)	(0.134)		(0.146)		(0.0921)	
Common Currency	0.434***				0.433***	0.434***	0.434***
	(0.0672)				(0.0672)	(0.0671)	(0.0672)
Free Trade Agreement	0.427***				0.428***	0.428***	0.429***
	(0.0489)				(0.0492)	(0.0491)	(0.0496)
Source-Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Destination-Time Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Destination-Source Fixed Effects	YES	YES	YES	YES	YES	YES	YES
Sample Size	227703	227703	227703	227703	227703	227703	227703

Notes: Standard errors are in parentheses. *, ** and *** represent significance at the 5%, 1% and 0.1% levels, respectively.

Table 2 - Autarky-Equivalent Costs of Currency Crises

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio
		Regular	Extreme	Total		
Angola	1991	0.2%	1.1%	1.3%	3.1%	41.3%
Argentina	1981	0.1%	0.8%	0.9%	2.6%	35.8%
Nigeria	1999	0.3%	1.8%	2.1%	6.1%	34.4%
Brazil	1964	0.1%	0.4%	0.4%	1.4%	32.7%
Uruguay	1965	0.1%	0.4%	0.5%	1.7%	31.4%
Mexico	1982	0.1%	0.6%	0.7%	2.2%	29.7%
Costa Rica	1982	0.4%	2.1%	2.5%	9.2%	27.0%
Argentina	1975	0.1%	0.3%	0.4%	1.5%	23.3%
Venezuela	1983	0.1%	0.4%	0.5%	1.9%	23.2%
Myanmar	2012	0.2%	0.8%	1.0%	4.6%	21.4%
Nicaragua	1988	0.2%	0.9%	1.1%	5.9%	18.5%
Uruguay	1972	0.1%	0.3%	0.3%	1.8%	18.4%
Brazil	1987	0.0%	0.2%	0.2%	1.3%	17.9%
Angola	1998	0.7%	1.2%	1.8%	11.3%	16.1%
Zimbabwe	2003	0.1%	0.8%	0.9%	5.7%	15.9%
Dominican Republic	1985	0.2%	0.9%	1.0%	6.7%	15.6%
Peru	1987	0.2%	0.4%	0.6%	3.6%	15.4%
Poland	1978	0.1%	0.6%	0.8%	5.5%	14.1%
Argentina	2002	0.0%	0.3%	0.3%	2.4%	13.0%
Zambia	1985	0.3%	0.7%	1.0%	8.2%	12.3%
Uruguay	1982	0.1%	0.2%	0.3%	2.6%	11.9%
Guatemala	1986	0.1%	0.2%	0.3%	3.0%	10.7%
Poland	1989	0.1%	0.3%	0.4%	3.7%	10.1%

Notes: First Ratio represents autarky-equivalent welfare costs of currency crisis, and it is defined as the total costs of currency crises divided by the costs of autarky. The countries presented here are those which have First Ratio measures more than 10%. A trade elasticity measure of 5 has been used to obtain the numbers in this table, although First Ratio is independent of the trade elasticity.

Table 3 - Costs of Currency Crises versus Gains from FTAs and Common Currencies

Country	Year	Costs of Currency Crises			Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total		
Egypt, Arab Rep.	1979	-0.18%	0.00%	-0.18%	0.00%	1371.4
Nigeria	1999	-0.33%	-1.76%	-2.10%	0.01%	175.7
Morocco	1985	-0.10%	0.00%	-0.10%	0.00%	128.1
Egypt, Arab Rep.	1989	-0.02%	0.00%	-0.02%	0.00%	22.5
Egypt, Arab Rep.	1990	-0.03%	0.00%	-0.03%	0.00%	17.6
Morocco	1980	-0.01%	0.00%	-0.01%	0.00%	7.7
Dominican Republic	2003	-0.41%	0.00%	-0.41%	0.06%	6.7
Central African Republic	1994	-0.03%	0.00%	-0.03%	0.00%	6.6
Nigeria	2002	0.00%	0.00%	0.00%	0.00%	5.2
Morocco	1983	-0.01%	0.00%	-0.01%	0.00%	5.0
Zimbabwe	1997	-0.21%	0.00%	-0.21%	0.05%	3.9
Turkey	1994	-0.04%	-0.18%	-0.22%	0.08%	3.0
Egypt, Arab Rep.	2003	-0.11%	0.00%	-0.11%	0.04%	2.8
Zimbabwe	1998	-0.13%	0.00%	-0.13%	0.04%	2.8
Korea, South	2008	-0.36%	0.00%	-0.36%	0.14%	2.6
Zambia	2000	-0.35%	0.00%	-0.35%	0.17%	2.1
Kenya	1999	-0.02%	0.00%	-0.02%	0.01%	1.7
Zimbabwe	2003	-0.14%	-0.76%	-0.90%	0.58%	1.6
Zimbabwe	2000	-0.07%	0.00%	-0.07%	0.05%	1.4
Portugal	1985	-0.14%	0.00%	-0.14%	0.11%	1.3
Australia	1985	-0.05%	0.00%	-0.05%	0.05%	1.1
Brazil	2002	-0.14%	0.00%	-0.14%	0.13%	1.1
Nigeria	2003	0.00%	0.00%	0.00%	0.00%	1.0
Venezuela	2011	-0.16%	0.00%	-0.16%	0.16%	1.0
Venezuela	2002	-0.21%	0.00%	-0.21%	0.21%	1.0

Notes: Second Ratio is defined as the (negative) total costs of currency crises divided by the gains from FTAs and common currencies. The countries presented here are those which have Second Ratio measures more than 1. A trade elasticity measure of 5 has been used to obtain the numbers in this table, although Second Ratio is independent of the trade elasticity.

Figure 1 – Highest First Ratio across Years
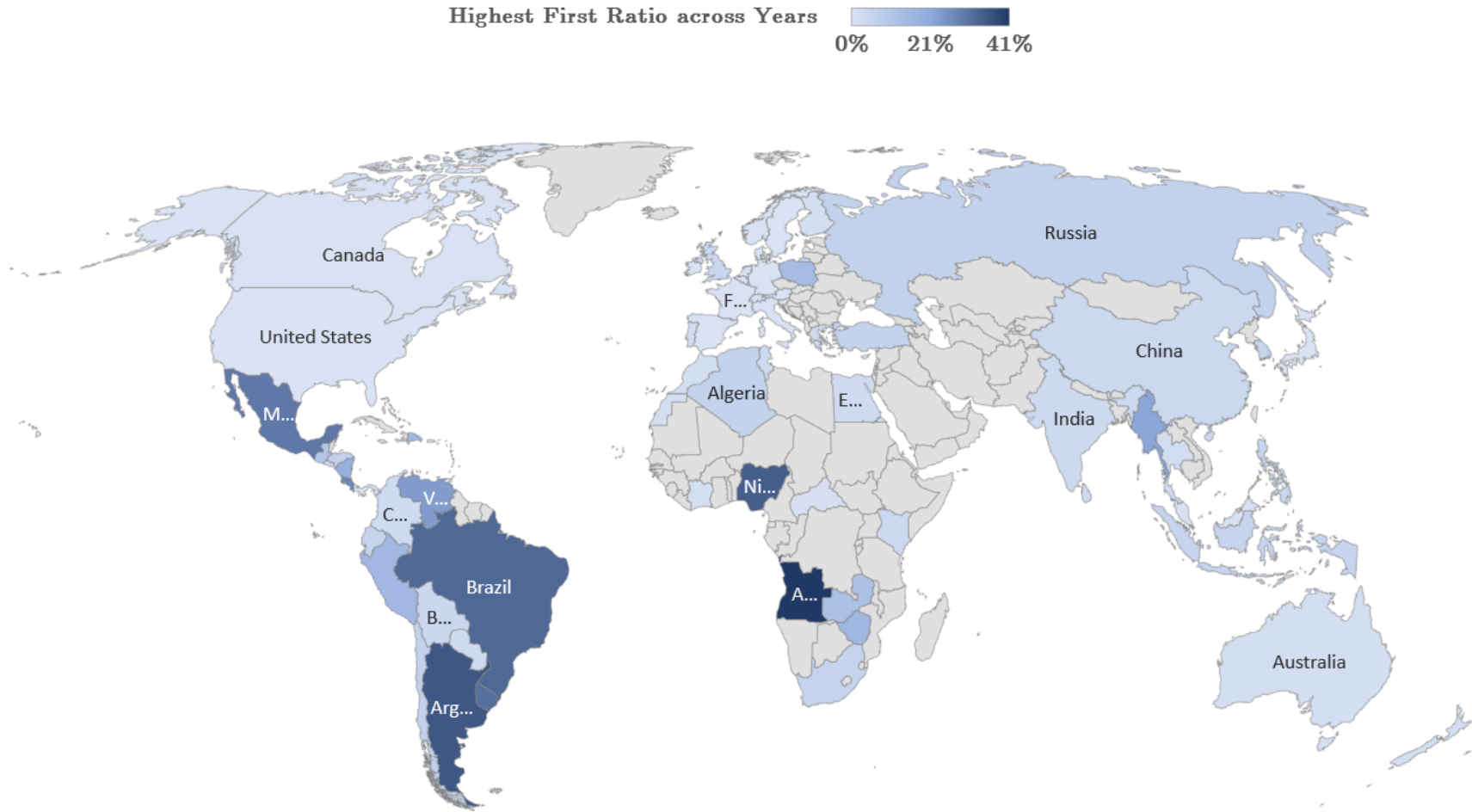
Notes: The highest First Ratio measure (across years) is shown for each country.

Figure 2 – Highest Second Ratio across Years
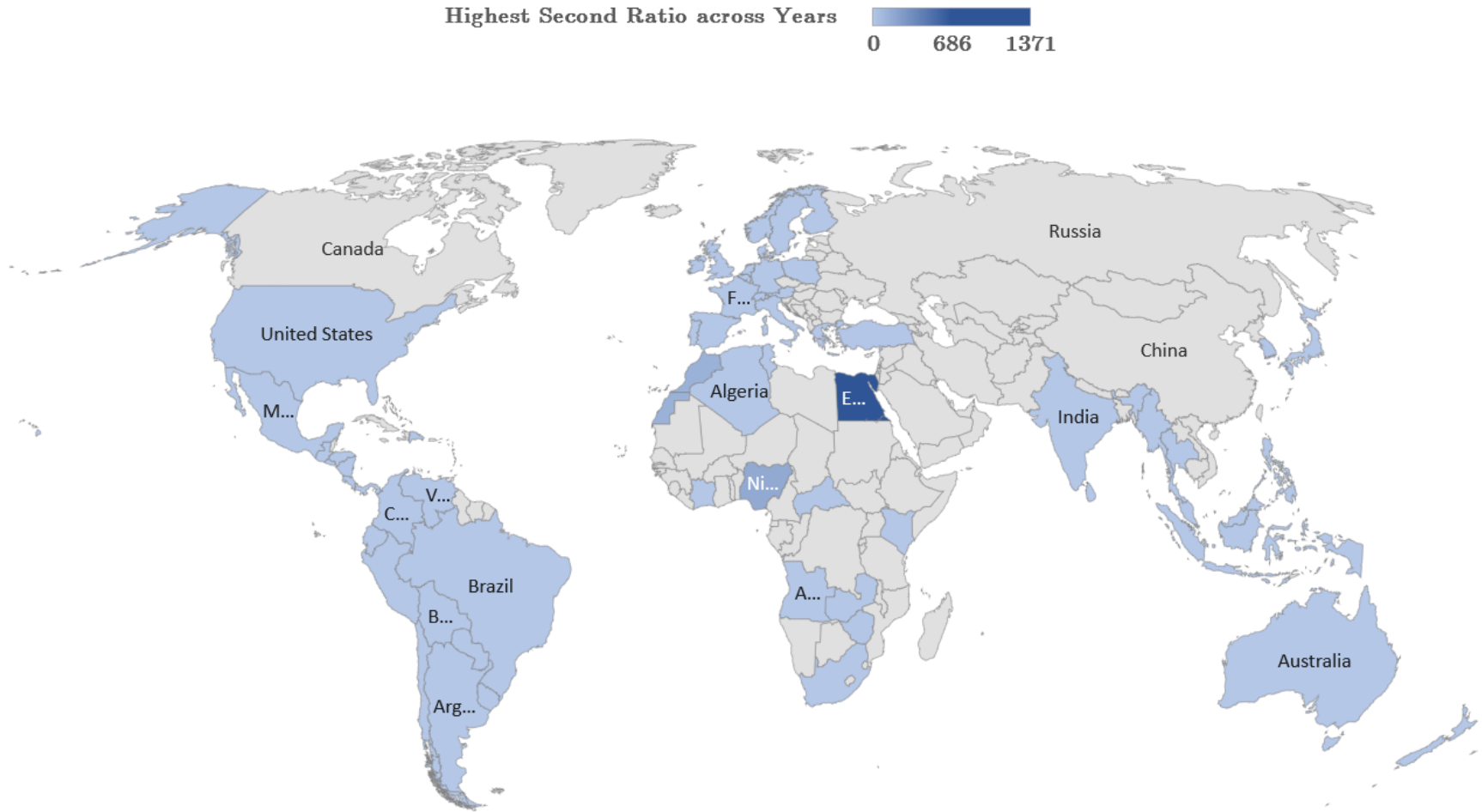
Notes: The highest Second Ratio measure (across years) is shown for each country.

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio	Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total				
Algeria	1987	0.00%	0.00%	0.00%	2.31%	0.18%	0.47%	0.0
Algeria	1988	0.03%	0.00%	0.03%	2.77%	1.19%	0.49%	0.1
Algeria	1990	0.22%	0.00%	0.22%	3.64%	5.94%	0.72%	0.3
Algeria	1991	0.00%	0.00%	0.00%	4.41%	0.04%	1.01%	0.0
Algeria	1994	0.11%	0.00%	0.11%	5.15%	2.08%	1.12%	0.1
Algeria	2002	0.00%	0.00%	0.00%	5.90%	0.01%	1.20%	0.0
Angola	1991	0.20%	1.07%	1.27%	3.08%	41.32%	0.00%	0.0
Angola	1998	0.66%	1.16%	1.82%	11.30%	16.10%	0.00%	0.0
Angola	1999	0.00%	0.02%	0.02%	17.30%	0.10%	0.00%	0.0
Angola	2002	0.07%	0.00%	0.07%	9.31%	0.76%	0.37%	0.2
Angola	2003	0.04%	0.00%	0.04%	11.73%	0.37%	0.42%	0.1
Angola	2005	0.00%	0.00%	0.00%	15.54%	0.00%	0.34%	0.0
Argentina	1962	0.11%	0.00%	0.11%	2.02%	5.53%	0.00%	0.0
Argentina	1966	0.01%	0.00%	0.01%	0.82%	0.95%	0.00%	0.0
Argentina	1971	0.02%	0.00%	0.02%	1.16%	1.77%	0.00%	0.0
Argentina	1973	0.03%	0.00%	0.03%	0.89%	2.89%	0.00%	0.0
Argentina	1975	0.06%	0.30%	0.36%	1.54%	23.30%	0.00%	0.0
Argentina	1976	0.00%	0.00%	0.00%	1.25%	0.02%	0.00%	0.0
Argentina	1978	0.01%	0.00%	0.01%	1.59%	0.64%	0.00%	0.0
Argentina	1981	0.15%	0.77%	0.92%	2.57%	35.76%	0.00%	0.0
Argentina	1983	0.00%	0.01%	0.01%	1.06%	0.68%	0.00%	0.0
Argentina	1984	0.02%	0.00%	0.02%	1.37%	1.33%	0.00%	0.0
Argentina	1987	0.01%	0.02%	0.02%	1.17%	1.87%	0.00%	0.0
Argentina	1988	0.00%	0.01%	0.01%	0.91%	1.12%	0.00%	0.0
Argentina	2002	0.05%	0.26%	0.31%	2.41%	12.95%	0.33%	0.9
Argentina	2008	0.01%	0.00%	0.01%	3.26%	0.18%	0.48%	0.0
Argentina	2013	0.09%	0.00%	0.09%	2.56%	3.57%	0.32%	0.3
Australia	1974	0.00%	0.00%	0.00%	2.95%	0.13%	0.00%	0.0
Australia	1985	0.05%	0.00%	0.05%	3.10%	1.76%	0.05%	1.1
Austria	1999	0.01%	0.00%	0.01%	7.74%	0.10%	4.03%	0.0
Austria	2005	0.00%	0.00%	0.00%	10.26%	0.01%	4.86%	0.0
Belgium	1999	0.03%	0.00%	0.03%	20.94%	0.13%	7.27%	0.0
Belgium	2005	0.01%	0.00%	0.01%	38.92%	0.02%	9.91%	0.0
Bolivia	1972	0.14%	0.00%	0.14%	3.30%	4.29%	0.00%	0.0
Bolivia	1979	0.02%	0.00%	0.02%	7.63%	0.25%	0.00%	0.0
Bolivia	1983	0.01%	0.05%	0.06%	4.67%	1.22%	0.00%	0.0
Bolivia	1988	0.00%	0.00%	0.00%	3.02%	0.08%	0.00%	0.0
Bolivia	1990	0.02%	0.00%	0.02%	3.60%	0.54%	0.00%	0.0
Bolivia	2002	0.03%	0.00%	0.03%	4.95%	0.53%	0.93%	0.0
Bolivia	2004	0.00%	0.00%	0.00%	5.53%	0.00%	1.04%	0.0
Brazil	1963	0.01%	0.00%	0.01%	1.45%	0.53%	0.00%	0.0
Brazil	1964	0.08%	0.37%	0.45%	1.37%	32.66%	0.00%	0.0
Brazil	1968	0.01%	0.00%	0.01%	1.43%	0.51%	0.00%	0.0
Brazil	1974	0.02%	0.00%	0.02%	2.97%	0.67%	0.00%	0.0
Brazil	1975	0.00%	0.00%	0.00%	2.44%	0.01%	0.00%	0.0
Brazil	1976	0.01%	0.00%	0.01%	2.02%	0.47%	0.00%	0.0
Brazil	1977	0.01%	0.00%	0.01%	1.70%	0.45%	0.00%	0.0
Brazil	1978	0.00%	0.00%	0.00%	1.69%	0.13%	0.00%	0.0
Brazil	1979	0.06%	0.00%	0.06%	1.98%	2.84%	0.00%	0.0
Brazil	1980	0.00%	0.00%	0.00%	2.40%	0.00%	0.00%	0.0
Brazil	1981	0.00%	0.00%	0.00%	2.09%	0.02%	0.00%	0.0
Brazil	1983	0.00%	0.02%	0.02%	1.95%	1.22%	0.00%	0.0
Brazil	1984	0.01%	0.03%	0.03%	1.77%	1.91%	0.00%	0.0
Brazil	1987	0.04%	0.20%	0.24%	1.33%	17.92%	0.00%	0.0
Brazil	1988	0.00%	0.02%	0.03%	1.17%	2.32%	0.00%	0.0
Brazil	1990	0.00%	0.00%	0.00%	1.14%	0.39%	0.00%	0.0
Brazil	1992	0.00%	0.00%	0.00%	1.22%	0.09%	0.06%	0.0
Brazil	1999	0.09%	0.00%	0.09%	1.91%	4.59%	0.12%	0.8
Brazil	2002	0.14%	0.00%	0.14%	2.22%	6.13%	0.13%	1.1
Canada	1977	0.01%	0.00%	0.01%	4.75%	0.30%	0.00%	0.0
Central African Republic	1994	0.03%	0.00%	0.03%	3.42%	0.95%	0.00%	6.6
Central African Republic	1999	0.01%	0.00%	0.01%	3.68%	0.23%	0.01%	0.9
Central African Republic	2005	0.00%	0.00%	0.00%	3.38%	0.08%	0.01%	0.5
Chile	1962	0.13%	0.00%	0.13%	1.98%	6.32%	0.00%	0.0
Chile	1965	0.13%	0.00%	0.13%	2.18%	5.78%	0.00%	0.0
Chile	1968	0.00%	0.00%	0.00%	2.39%	0.01%	0.00%	0.0
Chile	1969	0.00%	0.00%	0.00%	2.44%	0.03%	0.00%	0.0
Chile	1971	0.12%	0.00%	0.12%	1.94%	6.44%	0.00%	0.0
Chile	1972	0.00%	0.00%	0.00%	1.82%	0.19%	0.00%	0.0
Chile	1973	0.01%	0.06%	0.07%	1.49%	4.64%	0.00%	0.0
Chile	1982	0.09%	0.00%	0.09%	3.21%	2.78%	0.00%	0.0
Chile	1984	0.08%	0.00%	0.08%	4.14%	1.97%	0.00%	0.0
Chile	1985	0.04%	0.00%	0.04%	4.45%	0.87%	0.00%	0.0
Chile	1986	0.00%	0.00%	0.00%	4.28%	0.08%	0.00%	0.0
Chile	1987	0.01%	0.00%	0.01%	4.59%	0.29%	0.00%	0.0
Chile	1989	0.01%	0.00%	0.01%	6.12%	0.12%	0.00%	0.0
Chile	1990	0.01%	0.00%	0.01%	5.64%	0.18%	0.00%	0.0
Chile	2002	0.07%	0.00%	0.07%	5.63%	1.18%	0.69%	0.1
Chile	2008	0.00%	0.00%	0.00%	9.06%	0.02%	2.41%	0.0

Online Appendix Table A.1 - Country-Specific Results (For Online Publication)

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio	Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total				
China	1984	0.09%	0.00%	0.09%	2.13%	4.02%	0.00%	0.0
China	1985	0.01%	0.00%	0.01%	2.86%	0.24%	0.00%	0.0
China	1989	0.01%	0.00%	0.01%	3.93%	0.33%	0.00%	0.0
China	1990	0.01%	0.00%	0.01%	3.63%	0.19%	0.00%	0.0
China	1994	0.15%	0.00%	0.15%	5.64%	2.64%	0.00%	0.0
China	2003	0.01%	0.00%	0.01%	6.61%	0.12%	0.00%	0.0
Colombia	1973	0.00%	0.00%	0.00%	2.20%	0.00%	0.00%	0.0
Colombia	1974	0.00%	0.00%	0.00%	2.79%	0.13%	0.00%	0.0
Colombia	1985	0.05%	0.00%	0.05%	2.50%	2.11%	0.00%	0.0
Colombia	1986	0.00%	0.00%	0.00%	2.51%	0.00%	0.00%	0.0
Colombia	1989	0.02%	0.00%	0.02%	2.79%	0.59%	0.00%	0.0
Colombia	1990	0.03%	0.00%	0.03%	3.11%	0.87%	0.00%	0.0
Colombia	1991	0.00%	0.00%	0.00%	2.82%	0.00%	0.00%	0.0
Colombia	1995	0.01%	0.00%	0.01%	3.14%	0.25%	0.20%	0.0
Colombia	1997	0.09%	0.00%	0.09%	3.02%	2.91%	0.22%	0.4
Colombia	1998	0.04%	0.00%	0.04%	3.14%	1.28%	0.21%	0.2
Colombia	1999	0.00%	0.00%	0.00%	2.71%	0.01%	0.19%	0.0
Colombia	2002	0.00%	0.00%	0.00%	2.71%	0.01%	0.18%	0.0
Colombia	2014	0.00%	0.00%	0.00%	3.66%	0.07%	0.85%	0.0
Costa Rica	1974	0.48%	0.00%	0.48%	9.97%	4.78%	0.53%	0.9
Costa Rica	1982	0.40%	2.09%	2.49%	9.22%	27.00%	0.00%	0.0
Costa Rica	1985	0.04%	0.00%	0.04%	5.35%	0.69%	0.00%	0.0
Costa Rica	1987	0.01%	0.00%	0.01%	5.61%	0.12%	0.00%	0.0
Costa Rica	1990	0.04%	0.00%	0.04%	6.54%	0.63%	0.00%	0.0
Costa Rica	1995	0.00%	0.00%	0.00%	7.17%	0.00%	0.31%	0.0
Costa Rica	2002	0.07%	0.00%	0.07%	12.26%	0.56%	0.40%	0.2
Costa Rica	2003	0.02%	0.00%	0.02%	14.80%	0.12%	0.53%	0.0
Costa Rica	2004	0.03%	0.00%	0.03%	16.25%	0.21%	0.56%	0.1
Cote d'Ivoire	1994	0.11%	0.00%	0.11%	6.90%	1.57%	0.39%	0.3
Cote d'Ivoire	1999	0.02%	0.00%	0.02%	6.62%	0.29%	0.31%	0.1
Cote d'Ivoire	2005	0.01%	0.00%	0.01%	9.37%	0.08%	0.78%	0.0
Denmark	1999	0.01%	0.00%	0.01%	5.96%	0.14%	1.75%	0.0
Dominican Republic	1977	0.00%	0.00%	0.00%	4.54%	0.00%	0.78%	0.0
Dominican Republic	1985	0.17%	0.88%	1.05%	6.74%	15.55%	0.00%	0.0
Dominican Republic	1987	0.31%	0.00%	0.31%	7.46%	4.20%	0.00%	0.0
Dominican Republic	1990	0.25%	0.00%	0.25%	9.29%	2.67%	0.00%	0.0
Dominican Republic	2002	0.00%	0.00%	0.00%	7.49%	0.03%	0.05%	0.0
Dominican Republic	2003	0.41%	0.00%	0.41%	8.52%	4.82%	0.06%	6.7
Dominican Republic	2008	0.01%	0.00%	0.01%	7.14%	0.15%	1.07%	0.0
Ecuador	1971	0.04%	0.00%	0.04%	2.61%	1.54%	0.00%	0.0
Ecuador	1982	0.00%	0.00%	0.00%	2.27%	0.06%	0.00%	0.0
Ecuador	1983	0.05%	0.00%	0.05%	1.91%	2.43%	0.00%	0.0
Ecuador	1985	0.05%	0.00%	0.05%	2.53%	2.03%	0.00%	0.0
Ecuador	1986	0.00%	0.00%	0.00%	2.76%	0.11%	0.00%	0.0
Ecuador	1987	0.00%	0.00%	0.00%	3.50%	0.01%	0.00%	0.0
Ecuador	1988	0.01%	0.00%	0.01%	3.11%	0.26%	0.00%	0.0
Ecuador	1991	0.00%	0.00%	0.00%	3.58%	0.00%	0.00%	0.0
Ecuador	1992	0.00%	0.00%	0.00%	3.66%	0.01%	0.00%	0.0
Ecuador	1994	0.00%	0.00%	0.00%	3.93%	0.01%	0.00%	0.0
Ecuador	1995	0.11%	0.00%	0.11%	4.20%	2.72%	0.26%	0.4
Ecuador	1998	0.25%	0.00%	0.25%	4.37%	5.73%	0.29%	0.9
Ecuador	1999	0.09%	0.12%	0.22%	4.29%	5.06%	0.33%	0.7
Ecuador	2000	0.00%	0.00%	0.00%	5.06%	0.03%	0.44%	0.0
Ecuador	2003	0.00%	0.00%	0.00%	4.28%	0.01%	0.38%	0.0
Egypt, Arab Rep.	1979	0.18%	0.00%	0.18%	8.49%	2.12%	0.00%	1,371.4
Egypt, Arab Rep.	1989	0.02%	0.00%	0.02%	5.22%	0.32%	0.00%	22.5
Egypt, Arab Rep.	1990	0.03%	0.00%	0.03%	5.56%	0.53%	0.00%	17.6
Egypt, Arab Rep.	1991	0.00%	0.00%	0.00%	6.53%	0.00%	0.00%	0.0
Egypt, Arab Rep.	2003	0.11%	0.00%	0.11%	4.11%	2.74%	0.04%	2.8
El Salvador	1986	0.21%	0.00%	0.21%	5.72%	3.67%	0.00%	0.0
El Salvador	1990	0.20%	0.00%	0.20%	5.34%	3.81%	0.00%	0.0
El Salvador	2003	0.00%	0.00%	0.00%	7.97%	0.01%	0.66%	0.0
Finland	1967	0.08%	0.00%	0.08%	3.92%	1.92%	0.00%	0.0
Finland	1977	0.01%	0.00%	0.01%	5.16%	0.20%	0.40%	0.0
Finland	1992	0.01%	0.00%	0.01%	4.37%	0.12%	1.11%	0.0
Finland	1999	0.02%	0.00%	0.02%	5.99%	0.31%	2.32%	0.0
Finland	2005	0.00%	0.00%	0.00%	7.90%	0.04%	2.53%	0.0
France	1999	0.01%	0.00%	0.01%	4.72%	0.16%	2.31%	0.0
France	2005	0.00%	0.00%	0.00%	5.09%	0.04%	2.47%	0.0
Germany	1999	0.02%	0.00%	0.02%	4.93%	0.36%	1.96%	0.0
Germany	2005	0.00%	0.00%	0.00%	6.90%	0.06%	2.51%	0.0
Greece	1980	0.03%	0.00%	0.03%	4.82%	0.63%	0.00%	0.0
Greece	1983	0.02%	0.00%	0.02%	4.40%	0.52%	0.48%	0.0
Greece	1985	0.13%	0.00%	0.13%	4.52%	2.86%	0.52%	0.3
Greece	1992	0.00%	0.00%	0.00%	3.87%	0.03%	1.04%	0.0
Greece	1999	0.01%	0.00%	0.01%	4.00%	0.29%	1.04%	0.0
Greece	2005	0.00%	0.00%	0.00%	4.50%	0.04%	1.90%	0.0
Guatemala	1977	0.00%	0.00%	0.00%	4.96%	0.01%	0.61%	0.0
Guatemala	1986	0.14%	0.18%	0.32%	3.04%	10.65%	0.00%	0.0

Online Appendix Table A.1 - Country-Specific Results (For Online Publication)

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio	Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total				
Guatemala	1989	0.01%	0.00%	0.01%	4.56%	0.25%	0.00%	0.0
Guatemala	1990	0.06%	0.00%	0.06%	5.23%	1.20%	0.00%	0.0
Guatemala	2003	0.00%	0.00%	0.00%	7.98%	0.01%	0.51%	0.0
Honduras	1990	0.27%	0.30%	0.57%	8.90%	6.39%	0.00%	0.0
Honduras	1993	0.02%	0.00%	0.02%	13.16%	0.19%	0.45%	0.1
Honduras	1994	0.13%	0.00%	0.13%	16.29%	0.78%	0.52%	0.2
Honduras	1996	0.01%	0.00%	0.01%	22.51%	0.04%	0.64%	0.0
Honduras	2002	0.00%	0.00%	0.00%	16.57%	0.01%	0.80%	0.0
Honduras	2003	0.00%	0.00%	0.00%	17.00%	0.01%	0.79%	0.0
Honduras	2004	0.00%	0.00%	0.00%	18.43%	0.00%	0.80%	0.0
India	1967	0.04%	0.00%	0.04%	1.05%	3.75%	0.00%	0.0
India	1973	0.00%	0.00%	0.00%	0.75%	0.32%	0.00%	0.0
India	1986	0.00%	0.00%	0.00%	1.28%	0.15%	0.00%	0.0
India	1988	0.00%	0.00%	0.00%	1.40%	0.28%	0.00%	0.0
India	1989	0.00%	0.00%	0.00%	1.48%	0.08%	0.00%	0.0
India	1991	0.04%	0.00%	0.04%	1.48%	2.51%	0.00%	0.0
India	1993	0.01%	0.00%	0.01%	1.79%	0.45%	0.00%	0.0
India	2002	0.00%	0.00%	0.00%	2.36%	0.01%	0.00%	0.2
Indonesia	1964	0.21%	1.10%	1.30%	0.00%	0.00%	0.00%	0.0
Indonesia	1967	0.04%	0.00%	0.04%	2.50%	1.74%	0.00%	0.0
Indonesia	1978	0.16%	0.00%	0.16%	2.93%	5.41%	0.00%	0.0
Indonesia	1980	0.01%	0.00%	0.01%	3.95%	0.30%	0.00%	0.0
Indonesia	1983	0.23%	0.00%	0.23%	4.54%	5.04%	0.00%	0.0
Indonesia	1986	0.16%	0.00%	0.16%	3.09%	5.01%	0.00%	0.0
Indonesia	1997	0.16%	0.00%	0.16%	4.76%	3.30%	0.22%	0.7
Indonesia	1998	0.04%	0.00%	0.04%	9.58%	0.37%	0.49%	0.1
Indonesia	2005	0.00%	0.00%	0.00%	7.01%	0.00%	0.70%	0.0
Indonesia	2008	0.05%	0.00%	0.05%	6.31%	0.83%	1.22%	0.0
Indonesia	2013	0.08%	0.00%	0.08%	4.78%	1.61%	1.15%	0.1
Ireland	1976	0.01%	0.00%	0.01%	10.64%	0.06%	4.08%	0.0
Ireland	1993	0.05%	0.00%	0.05%	13.09%	0.40%	2.54%	0.0
Ireland	1999	0.05%	0.00%	0.05%	20.27%	0.25%	4.30%	0.0
Ireland	2005	0.00%	0.00%	0.00%	14.59%	0.02%	3.63%	0.0
Italy	1976	0.02%	0.00%	0.02%	4.18%	0.37%	0.52%	0.0
Italy	1977	0.00%	0.00%	0.00%	4.10%	0.03%	0.52%	0.0
Italy	1980	0.01%	0.00%	0.01%	4.46%	0.33%	0.59%	0.0
Italy	1981	0.00%	0.00%	0.00%	4.58%	0.07%	0.46%	0.0
Italy	1992	0.01%	0.00%	0.01%	3.05%	0.28%	0.84%	0.0
Italy	1999	0.01%	0.00%	0.01%	3.93%	0.19%	1.86%	0.0
Italy	2005	0.00%	0.00%	0.00%	4.62%	0.07%	1.97%	0.0
Japan	1974	0.00%	0.00%	0.00%	2.78%	0.06%	0.00%	0.0
Japan	1979	0.00%	0.00%	0.00%	2.22%	0.07%	0.00%	0.0
Japan	2005	0.00%	0.00%	0.00%	2.45%	0.07%	0.02%	0.1
Kenya	1981	0.05%	0.00%	0.05%	6.17%	0.79%	0.00%	0.0
Kenya	1985	0.05%	0.00%	0.05%	5.05%	0.94%	0.00%	0.0
Kenya	1987	0.06%	0.00%	0.06%	4.57%	1.26%	0.00%	0.0
Kenya	1988	0.00%	0.00%	0.00%	4.88%	0.08%	0.00%	0.0
Kenya	1990	0.06%	0.00%	0.06%	5.08%	1.16%	0.00%	0.0
Kenya	1992	0.01%	0.00%	0.01%	4.91%	0.27%	0.00%	0.0
Kenya	1993	0.29%	0.00%	0.29%	7.43%	3.90%	0.00%	0.0
Kenya	1999	0.02%	0.00%	0.02%	5.09%	0.40%	0.01%	1.7
Kenya	2003	0.00%	0.00%	0.00%	5.34%	0.04%	0.05%	0.0
Korea, South	1965	0.19%	0.00%	0.19%	3.39%	5.50%	0.00%	0.0
Korea, South	1971	0.13%	0.00%	0.13%	4.56%	2.96%	0.00%	0.0
Korea, South	1978	0.20%	0.00%	0.20%	6.14%	3.20%	0.00%	0.0
Korea, South	1980	0.01%	0.00%	0.01%	7.27%	0.10%	0.00%	0.0
Korea, South	1997	0.24%	0.00%	0.24%	5.96%	4.08%	0.00%	0.0
Korea, South	2008	0.36%	0.00%	0.36%	11.30%	3.19%	0.14%	2.6
Malaysia	1988	0.04%	0.00%	0.04%	21.23%	0.21%	0.75%	0.1
Malaysia	1997	0.26%	0.00%	0.26%	42.43%	0.61%	2.52%	0.1
Malaysia	2003	0.03%	0.00%	0.03%	0.00%	0.00%	3.94%	0.0
Mauritius	1979	0.11%	0.00%	0.11%	10.53%	1.09%	0.00%	0.0
Mauritius	1981	0.06%	0.00%	0.06%	10.78%	0.57%	0.00%	0.0
Mauritius	1988	0.04%	0.00%	0.04%	15.64%	0.28%	0.00%	0.0
Mauritius	2005	0.00%	0.00%	0.00%	11.20%	0.02%	0.37%	0.0
Mauritius	2006	0.00%	0.00%	0.00%	11.66%	0.00%	0.33%	0.0
Mexico	1976	0.07%	0.00%	0.07%	1.74%	4.10%	0.00%	0.0
Mexico	1982	0.11%	0.56%	0.66%	2.23%	29.66%	0.00%	0.0
Mexico	1985	0.12%	0.00%	0.12%	2.24%	5.45%	0.00%	0.0
Mexico	1986	0.00%	0.00%	0.00%	2.96%	0.02%	0.00%	0.0
Mexico	1987	0.00%	0.00%	0.00%	3.27%	0.00%	0.00%	0.0
Mexico	1990	0.01%	0.00%	0.01%	3.33%	0.21%	0.00%	0.0
Mexico	1994	0.01%	0.00%	0.01%	3.44%	0.41%	1.00%	0.0
Mexico	1995	0.00%	0.00%	0.00%	5.28%	0.05%	1.52%	0.0
Mexico	2003	0.01%	0.00%	0.01%	5.92%	0.22%	1.68%	0.0
Mexico	2008	0.08%	0.00%	0.08%	7.03%	1.18%	1.83%	0.0
Morocco	1974	0.00%	0.00%	0.00%	5.64%	0.06%	0.06%	0.1
Morocco	1980	0.01%	0.00%	0.01%	4.10%	0.22%	0.00%	7.7
Morocco	1983	0.01%	0.00%	0.01%	4.82%	0.12%	0.00%	5.0

Online Appendix Table A.1 - Country-Specific Results (For Online Publication)

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio	Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total				
Morocco	1985	0.10%	0.00%	0.10%	5.41%	1.77%	0.00%	128.1
Myanmar	2012	0.16%	0.82%	0.98%	4.58%	21.37%	1.63%	0.6
Myanmar	2014	0.14%	0.00%	0.14%	9.46%	1.52%	2.96%	0.0
Netherlands	1999	0.04%	0.00%	0.04%	13.43%	0.28%	4.09%	0.0
Netherlands	2005	0.01%	0.00%	0.01%	17.34%	0.08%	4.40%	0.0
New Zealand	1967	0.04%	0.00%	0.04%	3.62%	1.12%	0.00%	0.0
New Zealand	1968	0.00%	0.00%	0.00%	4.09%	0.04%	0.00%	0.0
New Zealand	1975	0.10%	0.00%	0.10%	5.27%	1.95%	0.00%	0.0
New Zealand	1984	0.10%	0.00%	0.10%	6.64%	1.52%	0.49%	0.2
New Zealand	2008	0.00%	0.00%	0.00%	5.78%	0.04%	0.55%	0.0
Nicaragua	1979	0.42%	0.00%	0.42%	6.96%	5.98%	0.00%	0.0
Nicaragua	1985	0.06%	0.33%	0.39%	7.39%	5.34%	0.00%	0.0
Nicaragua	1986	0.00%	0.00%	0.00%	5.25%	0.01%	0.00%	0.0
Nicaragua	1988	0.17%	0.93%	1.10%	5.93%	18.53%	0.00%	0.0
Nicaragua	1993	0.05%	0.00%	0.05%	8.47%	0.54%	0.78%	0.1
Nicaragua	1994	0.00%	0.00%	0.00%	4.44%	0.01%	0.38%	0.0
Nicaragua	2002	0.00%	0.00%	0.00%	7.09%	0.01%	0.75%	0.0
Nicaragua	2003	0.00%	0.00%	0.00%	7.60%	0.06%	0.85%	0.0
Nicaragua	2004	0.00%	0.00%	0.00%	9.00%	0.00%	0.89%	0.0
Nicaragua	2005	0.00%	0.00%	0.00%	9.49%	0.00%	1.03%	0.0
Nicaragua	2008	0.02%	0.00%	0.02%	11.65%	0.18%	1.94%	0.0
Nigeria	1985	0.00%	0.00%	0.00%	8.16%	0.00%	0.00%	0.0
Nigeria	1986	0.09%	0.47%	0.56%	7.01%	7.92%	0.00%	0.0
Nigeria	1987	0.00%	0.00%	0.00%	5.36%	0.00%	0.00%	0.0
Nigeria	1989	0.09%	0.00%	0.09%	6.07%	1.45%	0.00%	0.0
Nigeria	1992	0.43%	0.00%	0.43%	9.33%	4.66%	0.00%	0.0
Nigeria	1999	0.33%	1.76%	2.10%	6.09%	34.41%	0.01%	175.7
Nigeria	2002	0.00%	0.00%	0.00%	5.07%	0.08%	0.00%	5.2
Nigeria	2003	0.00%	0.00%	0.00%	5.97%	0.03%	0.00%	1.0
Norway	2014	0.02%	0.00%	0.02%	4.37%	0.49%	1.14%	0.0
Panama	2003	0.00%	0.00%	0.00%	18.83%	0.00%	0.38%	0.0
Paraguay	1984	0.05%	0.00%	0.05%	3.58%	1.26%	0.00%	0.0
Paraguay	1986	0.00%	0.00%	0.00%	5.20%	0.06%	0.00%	0.0
Paraguay	1989	0.02%	0.00%	0.02%	5.08%	0.30%	0.00%	0.0
Paraguay	2001	0.21%	0.00%	0.21%	7.37%	2.83%	1.42%	0.1
Paraguay	2002	0.09%	0.00%	0.09%	7.76%	1.16%	1.38%	0.1
Peru	1967	0.10%	0.00%	0.10%	2.92%	3.56%	0.00%	0.0
Peru	1976	0.08%	0.00%	0.08%	2.54%	3.19%	0.00%	0.0
Peru	1977	0.00%	0.00%	0.00%	2.63%	0.18%	0.00%	0.0
Peru	1978	0.00%	0.00%	0.00%	2.61%	0.00%	0.00%	0.0
Peru	1980	0.03%	0.00%	0.03%	3.98%	0.69%	0.00%	0.0
Peru	1982	0.05%	0.00%	0.05%	3.39%	1.42%	0.00%	0.0
Peru	1983	0.00%	0.00%	0.00%	3.00%	0.15%	0.00%	0.0
Peru	1984	0.00%	0.00%	0.00%	2.73%	0.01%	0.00%	0.0
Peru	1985	0.00%	0.00%	0.00%	2.37%	0.01%	0.00%	0.0
Peru	1987	0.16%	0.39%	0.55%	3.57%	15.43%	0.00%	0.0
Peru	1988	0.00%	0.00%	0.00%	3.76%	0.00%	0.00%	0.0
Peru	1992	0.01%	0.00%	0.01%	2.46%	0.48%	0.00%	0.0
Peru	2003	0.00%	0.00%	0.00%	3.32%	0.03%	0.13%	0.0
Philippines	1962	0.07%	0.00%	0.07%	3.20%	2.29%	0.00%	0.0
Philippines	1963	0.00%	0.00%	0.00%	3.44%	0.06%	0.00%	0.0
Philippines	1971	0.22%	0.00%	0.22%	4.17%	5.24%	0.00%	0.0
Philippines	1974	0.00%	0.00%	0.00%	5.49%	0.04%	0.00%	0.0
Philippines	1983	0.21%	0.00%	0.21%	5.27%	3.90%	0.00%	0.0
Philippines	1984	0.01%	0.00%	0.01%	4.53%	0.23%	0.00%	0.0
Philippines	1986	0.00%	0.00%	0.00%	4.26%	0.03%	0.00%	0.0
Philippines	1987	0.01%	0.00%	0.01%	5.20%	0.14%	0.00%	0.0
Philippines	1990	0.04%	0.00%	0.04%	6.45%	0.69%	0.00%	0.0
Philippines	1997	0.17%	0.00%	0.17%	10.86%	1.57%	0.45%	0.4
Philippines	2002	0.00%	0.00%	0.00%	13.62%	0.00%	0.61%	0.0
Philippines	2003	0.01%	0.00%	0.01%	15.58%	0.07%	0.67%	0.0
Poland	1978	0.12%	0.65%	0.77%	5.46%	14.06%	0.00%	0.0
Poland	1982	0.02%	0.00%	0.02%	3.81%	0.63%	0.00%	0.0
Poland	1985	0.06%	0.00%	0.06%	3.89%	1.43%	0.00%	0.0
Poland	1986	0.00%	0.00%	0.00%	3.66%	0.04%	0.00%	0.0
Poland	1987	0.03%	0.00%	0.03%	4.22%	0.73%	0.00%	0.0
Poland	1989	0.06%	0.31%	0.37%	3.72%	10.05%	0.00%	0.0
Poland	1992	0.06%	0.00%	0.06%	4.15%	1.55%	0.00%	0.0
Poland	1993	0.02%	0.00%	0.02%	4.45%	0.40%	0.00%	0.0
Poland	1999	0.01%	0.00%	0.01%	5.64%	0.14%	1.41%	0.0
Poland	2003	0.00%	0.00%	0.00%	6.94%	0.00%	1.63%	0.0
Portugal	1976	0.01%	0.00%	0.01%	4.10%	0.28%	0.61%	0.0
Portugal	1977	0.01%	0.00%	0.01%	4.57%	0.24%	0.67%	0.0
Portugal	1978	0.02%	0.00%	0.02%	4.44%	0.43%	0.68%	0.0
Portugal	1982	0.00%	0.00%	0.00%	6.16%	0.00%	0.12%	0.0
Portugal	1983	0.00%	0.00%	0.00%	6.13%	0.00%	0.11%	0.0
Portugal	1985	0.14%	0.00%	0.14%	6.17%	2.23%	0.11%	1.3
Portugal	2005	0.01%	0.00%	0.01%	7.01%	0.13%	3.70%	0.0
Russia	1998	0.05%	0.25%	0.30%	4.76%	6.30%	0.00%	0.0

Online Appendix Table A.1 - Country-Specific Results (For Online Publication)

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio	Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total				
Russia	2002	0.00%	0.00%	0.00%	4.44%	0.04%	0.00%	0.0
Russia	2014	0.18%	0.00%	0.18%	3.42%	5.28%	0.00%	0.0
Singapore	1986	0.03%	0.00%	0.03%	0.00%	0.00%	1.37%	0.0
Singapore	2003	0.05%	0.00%	0.05%	0.00%	0.00%	9.09%	0.0
South Africa	1967	0.08%	0.00%	0.08%	3.90%	1.93%	0.00%	0.0
South Africa	1968	0.00%	0.00%	0.00%	3.73%	0.05%	0.00%	0.0
South Africa	1976	0.07%	0.00%	0.07%	4.07%	1.77%	0.00%	0.0
South Africa	1984	0.13%	0.00%	0.13%	2.97%	4.40%	0.00%	0.0
South Africa	1985	0.00%	0.00%	0.00%	2.62%	0.00%	0.00%	0.0
South Africa	1992	0.00%	0.00%	0.00%	2.33%	0.13%	0.00%	0.0
South Africa	1996	0.07%	0.00%	0.07%	3.68%	1.81%	0.00%	0.0
South Africa	2001	0.32%	0.00%	0.32%	5.46%	5.82%	0.85%	0.4
South Africa	2008	0.27%	0.00%	0.27%	8.49%	3.23%	1.03%	0.3
South Africa	2011	0.02%	0.00%	0.02%	6.37%	0.33%	0.76%	0.0
South Africa	2013	0.12%	0.00%	0.12%	7.72%	1.52%	0.84%	0.1
Spain	1977	0.01%	0.00%	0.01%	2.75%	0.44%	0.00%	0.0
Spain	1980	0.01%	0.00%	0.01%	2.99%	0.41%	0.00%	0.0
Spain	1982	0.00%	0.00%	0.00%	3.32%	0.01%	0.00%	0.0
Spain	1993	0.00%	0.00%	0.00%	3.27%	0.01%	0.84%	0.0
Spain	1999	0.01%	0.00%	0.01%	4.89%	0.19%	2.26%	0.0
Spain	2005	0.00%	0.00%	0.00%	5.30%	0.06%	2.45%	0.0
Sri Lanka	1977	0.12%	0.00%	0.12%	3.97%	3.13%	0.00%	0.0
Sri Lanka	1980	0.07%	0.00%	0.07%	10.37%	0.71%	0.00%	0.0
Sri Lanka	1987	0.04%	0.00%	0.04%	6.71%	0.54%	0.00%	0.0
Sri Lanka	1989	0.03%	0.00%	0.03%	7.20%	0.37%	0.00%	0.0
Sri Lanka	2002	0.01%	0.00%	0.01%	8.21%	0.08%	0.40%	0.0
Sri Lanka	2003	0.01%	0.00%	0.01%	7.91%	0.10%	0.45%	0.0
Sri Lanka	2004	0.00%	0.00%	0.00%	8.76%	0.00%	0.54%	0.0
Sri Lanka	2005	0.00%	0.00%	0.00%	8.07%	0.00%	0.59%	0.0
Sri Lanka	2008	0.02%	0.00%	0.02%	7.24%	0.21%	0.65%	0.0
Sweden	1981	0.00%	0.00%	0.00%	4.83%	0.02%	0.20%	0.0
Sweden	1982	0.00%	0.00%	0.00%	5.33%	0.01%	0.24%	0.0
Sweden	1992	0.00%	0.00%	0.00%	3.76%	0.07%	1.15%	0.0
Sweden	2003	0.00%	0.00%	0.00%	6.21%	0.02%	1.80%	0.0
Sweden	2008	0.01%	0.00%	0.01%	8.39%	0.12%	2.20%	0.0
Switzerland	1999	0.01%	0.00%	0.01%	7.85%	0.17%	1.88%	0.0
Thailand	1997	0.23%	0.00%	0.23%	10.61%	2.13%	0.42%	0.5
Tunisia	1969	0.00%	0.00%	0.00%	4.22%	0.01%	0.00%	0.0
Tunisia	1976	0.04%	0.00%	0.04%	6.88%	0.51%	0.00%	0.0
Tunisia	1986	0.24%	0.00%	0.24%	6.73%	3.52%	0.00%	0.0
Tunisia	1988	0.00%	0.00%	0.00%	7.84%	0.03%	0.00%	0.0
Tunisia	1999	0.01%	0.00%	0.01%	10.02%	0.15%	2.50%	0.0
Tunisia	2005	0.01%	0.00%	0.01%	9.57%	0.08%	2.25%	0.0
Turkey	1970	0.05%	0.00%	0.05%	1.75%	2.75%	0.00%	0.0
Turkey	1977	0.02%	0.00%	0.02%	1.94%	0.88%	0.00%	0.0
Turkey	1978	0.00%	0.00%	0.00%	1.41%	0.14%	0.00%	0.0
Turkey	1979	0.00%	0.00%	0.00%	1.17%	0.11%	0.00%	0.0
Turkey	1980	0.05%	0.02%	0.07%	2.20%	3.11%	0.00%	0.0
Turkey	1983	0.00%	0.00%	0.00%	3.04%	0.12%	0.00%	0.0
Turkey	1984	0.00%	0.00%	0.00%	3.68%	0.01%	0.00%	0.0
Turkey	1985	0.01%	0.00%	0.01%	3.50%	0.32%	0.00%	0.0
Turkey	1986	0.01%	0.00%	0.01%	3.01%	0.20%	0.00%	0.0
Turkey	1987	0.00%	0.00%	0.00%	3.49%	0.12%	0.00%	0.0
Turkey	1988	0.00%	0.00%	0.00%	3.41%	0.06%	0.00%	0.0
Turkey	1990	0.02%	0.00%	0.02%	3.13%	0.71%	0.00%	0.0
Turkey	1991	0.05%	0.00%	0.05%	2.91%	1.81%	0.00%	0.0
Turkey	1992	0.00%	0.00%	0.00%	3.15%	0.05%	0.07%	0.0
Turkey	1993	0.00%	0.00%	0.00%	3.29%	0.00%	0.07%	0.0
Turkey	1994	0.04%	0.18%	0.22%	3.78%	5.89%	0.08%	3.0
Turkey	1996	0.02%	0.00%	0.02%	4.75%	0.48%	1.00%	0.0
Turkey	1997	0.00%	0.00%	0.00%	5.21%	0.00%	1.04%	0.0
Turkey	1998	0.00%	0.00%	0.00%	3.47%	0.07%	0.76%	0.0
Turkey	1999	0.00%	0.00%	0.00%	3.35%	0.03%	0.72%	0.0
Turkey	2001	0.27%	0.00%	0.27%	4.49%	5.95%	0.83%	0.3
United Kingdom	1976	0.06%	0.00%	0.06%	5.23%	1.07%	0.84%	0.1
United Kingdom	1984	0.00%	0.00%	0.00%	5.02%	0.05%	0.59%	0.0
United Kingdom	1992	0.01%	0.00%	0.01%	4.04%	0.15%	0.99%	0.0
United Kingdom	2008	0.21%	0.00%	0.21%	5.05%	4.18%	1.11%	0.2
United States	2003	0.00%	0.00%	0.00%	2.29%	0.04%	0.26%	0.0
Uruguay	1963	0.07%	0.00%	0.07%	2.44%	2.86%	0.00%	0.0
Uruguay	1965	0.09%	0.45%	0.53%	1.70%	31.39%	0.00%	0.0
Uruguay	1967	0.12%	0.00%	0.12%	2.26%	5.43%	0.00%	0.0
Uruguay	1972	0.06%	0.28%	0.34%	1.84%	18.45%	0.00%	0.0
Uruguay	1974	0.05%	0.00%	0.05%	2.47%	1.98%	0.00%	0.0
Uruguay	1977	0.03%	0.00%	0.03%	3.86%	0.68%	0.00%	0.0
Uruguay	1978	0.00%	0.00%	0.00%	3.35%	0.08%	0.00%	0.0
Uruguay	1982	0.07%	0.25%	0.31%	2.62%	11.89%	0.00%	0.0
Uruguay	1984	0.12%	0.00%	0.12%	4.14%	2.92%	0.00%	0.0
Uruguay	1985	0.01%	0.00%	0.01%	4.02%	0.20%	0.00%	0.0

Online Appendix Table A.1 - Country-Specific Results (For Online Publication)

Country	Year	Costs of Currency Crises			Costs of Autarky	First Ratio	Gains from FTAs and Common Currencies	Second Ratio
		Regular	Extreme	Total				
Uruguay	1987	0.00%	0.00%	0.00%	3.61%	0.02%	0.00%	0.0
Uruguay	1988	0.00%	0.00%	0.00%	3.36%	0.02%	0.00%	0.0
Uruguay	1989	0.00%	0.00%	0.00%	3.74%	0.00%	0.00%	0.0
Uruguay	1990	0.00%	0.00%	0.00%	3.53%	0.09%	0.00%	0.0
Uruguay	1991	0.00%	0.00%	0.00%	3.17%	0.00%	0.00%	0.0
Uruguay	1992	0.00%	0.00%	0.00%	3.56%	0.01%	0.55%	0.0
Uruguay	1994	0.05%	0.00%	0.05%	3.91%	1.32%	0.66%	0.1
Uruguay	2002	0.14%	0.00%	0.14%	4.14%	3.40%	0.78%	0.2
Venezuela	1962	0.02%	0.00%	0.02%	2.89%	0.85%	0.00%	0.0
Venezuela	1983	0.07%	0.38%	0.45%	1.94%	23.22%	0.00%	0.0
Venezuela	1986	0.14%	0.00%	0.14%	3.18%	4.35%	0.00%	0.0
Venezuela	1989	0.01%	0.00%	0.01%	4.71%	0.23%	0.00%	0.0
Venezuela	1991	0.00%	0.00%	0.00%	5.48%	0.06%	0.00%	0.0
Venezuela	1992	0.00%	0.00%	0.00%	5.45%	0.06%	0.00%	0.0
Venezuela	1994	0.07%	0.00%	0.07%	4.08%	1.75%	0.00%	0.0
Venezuela	1995	0.00%	0.00%	0.00%	3.80%	0.00%	0.17%	0.0
Venezuela	2002	0.21%	0.00%	0.21%	4.10%	5.08%	0.21%	1.0
Venezuela	2004	0.04%	0.00%	0.04%	4.18%	0.98%	0.29%	0.1
Venezuela	2010	0.01%	0.00%	0.01%	2.46%	0.38%	0.12%	0.1
Venezuela	2011	0.16%	0.00%	0.16%	4.16%	3.95%	0.16%	1.0
Venezuela	2013	0.12%	0.00%	0.12%	3.76%	3.25%	0.17%	0.7
Zambia	1983	0.04%	0.00%	0.04%	5.23%	0.75%	0.00%	0.0
Zambia	1984	0.04%	0.00%	0.04%	5.77%	0.65%	0.00%	0.0
Zambia	1985	0.27%	0.73%	1.00%	8.16%	12.30%	0.00%	0.0
Zambia	1989	0.44%	0.00%	0.44%	8.09%	5.46%	0.00%	0.0
Zambia	1990	0.00%	0.00%	0.00%	10.13%	0.00%	0.00%	0.0
Zambia	1992	0.06%	0.31%	0.37%	7.30%	5.05%	0.00%	0.0
Zambia	1995	0.01%	0.00%	0.01%	5.46%	0.22%	0.15%	0.1
Zambia	1996	0.00%	0.00%	0.00%	5.78%	0.05%	0.22%	0.0
Zambia	1998	0.28%	0.00%	0.28%	7.18%	3.85%	0.28%	1.0
Zambia	2000	0.35%	0.00%	0.35%	6.54%	5.33%	0.17%	2.1
Zambia	2004	0.00%	0.00%	0.00%	7.77%	0.00%	1.48%	0.0
Zimbabwe	1983	0.02%	0.00%	0.02%	3.25%	0.71%	0.00%	0.0
Zimbabwe	1985	0.07%	0.00%	0.07%	3.93%	1.79%	0.00%	0.0
Zimbabwe	1988	0.01%	0.00%	0.01%	3.83%	0.14%	0.00%	0.0
Zimbabwe	1990	0.05%	0.00%	0.05%	4.65%	1.01%	0.00%	0.0
Zimbabwe	1991	0.20%	0.00%	0.20%	5.05%	3.92%	0.00%	0.0
Zimbabwe	1993	0.03%	0.00%	0.03%	6.19%	0.45%	0.00%	0.0
Zimbabwe	1994	0.03%	0.00%	0.03%	7.40%	0.39%	0.00%	0.0
Zimbabwe	1997	0.21%	0.00%	0.21%	8.73%	2.38%	0.05%	3.9
Zimbabwe	1998	0.13%	0.00%	0.13%	9.54%	1.32%	0.04%	2.8
Zimbabwe	2000	0.07%	0.00%	0.07%	6.53%	1.03%	0.05%	1.4
Zimbabwe	2003	0.14%	0.76%	0.90%	5.67%	15.95%	0.58%	1.6
Mean	1990	0.06%	0.04%	0.10%	5.39%	2.21%	0.46%	4.1
Median	1989	0.01%	0.00%	0.02%	4.38%	0.35%	0.00%	0.0
Maximum	2014	0.66%	2.09%	2.49%	42.43%	41.32%	9.91%	1371.4
Minimum	1962	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.0

Notes: First Ratio represents autarky-equivalent welfare costs of currency crisis, and it is defined as the total costs of currency crises divided by the costs of autarky. Second Ratio is defined as the (negative) total costs of currency crises divided by the gains from FTAs and common currencies. Second Ratio information is missing for countries which do not have any FTAs or common currencies at the time of the currency crisis. A trade elasticity measure of 5 has been used to obtain the numbers in this table, although First Ratio and Seciond Ratio are independent of the trade elasticity.