EXCHANGE RARE REGIMES AND EXTERNAL ADJUSTMENT: NEW ANSWERS TO AN OLD DEBATE

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Introduction

During the birth and infancy of the Bretton Woods system, the debate on exchange rate regimes was dominated by systemic arguments and concerns. The fathers of Bretton Woods believed that a centrally supervised system of fixed exchange rates was key for postwar prosperity, as it would shield international trade both from exchange rate volatility and from exchange rate manipulation by individual countries. Against this view, a classic 1953 article by Milton Friedman argued that exchange rate volatility was a symptom rather than a cause of economic imbalances. Fixing the exchange rate would not remove these problems but merely suppresses them, until they became so virulent that they erupted, in the form of a currency crisis, or painful domestic adjustment. Flexible exchange rates, in contrast, provided a mechanism for adjustment on an ongoing basis. "Changes in it occur rapidly, automatically, and continuously and so tend to produce corrective movements before tensions can accumulate and a crisis develop." Friedman also argued that with good macroeconomic management, exchange rates were unlikely to be very volatile, and very unlikely to burden trade in goods and services, which in any case could avail itself from futures markets to hedge exchange rate risk.

More than half a century after Friedman's article, and over 30 years after the end of the Bretton Woods era, many of Friedman's claims have been clearly proven either right or wrong. On the one hand, floating exchange rates did in fact turn out to be volatile—more so than Friedman anticipated. A celebrated article by Michael Mussa (1986) documented conclusively that flexible exchange rate regimes do indeed display much higher real exchange rate variability than pegged regimes—especially for advanced economies, where exchange rates were driven mainly by capital flows. On the other hand, Friedman turned out to be right in his conjecture that flexible exchange rates would, at most, impose a modest burden on trade. Although currency unions retained their fans and triumphed in continental

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Europe, flexible exchange rates did not hinder the growing trade and financial integration of Europe, the North America, and Japan.

However, there has been no closure on Friedman's central claim—namely, that flexible exchange rate regimes would, for most countries, permit smoother adjustment of external imbalances. This omission is surprising because there is an enormous theoretical and empirical literature on the implications of the exchange rate regime for other aspects of macroeconomic performance and policy-making—including Alexander Swoboda's many contributions to this subject.[2] Will a particular regime help a country stabilize from high inflation? Which regime is most conducive to economic growth? Which will do a better job in isolating the economy against specific types of shocks, given the structure of the economy? While the link between exchange rate regimes and external stability briefly returned to the forefront following during the emerging market crises between 1995 and 2001, this was often cast in terms of vulnerabilities to various types of crisis, including currency crises, debt crises, and banking crises. The relationship between the exchange rate regime and external adjustment—Friedman's original claim—has received much less attention.

A welcome exception is a provocative recent paper by Menzie Chinn and Shang-Jin Wei (2008). Their main finding is that current account balances under flexible regimes seem to be no less persistent than under fixed regimes. Chinn and Wei (2008) also provide a simple interpretation: while nominal exchange rate flexibility may contribute to real exchange rate volatility, it does not seem to contribute to real exchange *adjustment*, in the sense that it does not seem to make the real exchange rate more mean-reverting. If this is true, it would seem to undermine the empirical basis for Friedman's argument.[3]

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[2] Alexander's research in this area has focused mostly on the implications of exchange rate regimes for monetary and fiscal policies; see, in particular, Swoboda 1971, 1973; Genberg and Swobod 1983, 1987, 1989; Mussa et al 2000 for a survey. For a comprehensive treatment of the macroeconomic implications of the exchange rate regime, see Ghosh, Gulde and Wolf (2003) who find strong evidence that the commitment to a pegged exchange rate contributes to better inflation performance because of monetary discipline and credibility effects. On growth, they find few robust results, though there is evidence that countries with hard pegs (currency boards) grow faster (Wolf et al 2008). By contrast, Levy-Yeyati and Sturzenegger (2003), using a de facto classification, find that pegged exchange rates are associated with slower growth. Rogoff, Husain, Mody, Brooks, and Oomes (2004) survey the empirical literature and, using a different de facto classification, argue that the main inflation benefit of pegging accrues to developing countries, and only for advanced economies do they find any effect on growth (which is higher for floating regimes).

[3] Evidence in Ghosh, et al (2003, chapter 5), however, suggests that floating exchange rates help offset inflation differentials, contributing to lower real exchange rate volatility—especially for developing countries and at longer horizons.

Is this the last word, and should we dismiss Friedman's case for flexible exchange rates as superficially plausible, but ultimately wrong? In this paper, we argue that this would be premature, as the answer to the question of whether floating regimes facilitate external adjustment appears to be sensitive to how exactly the question is asked. We first show, using a different classification of exchange rate regimes, that Chinn and Wei's finding does indeed appear to be robust, in the sense that on average, current accounts in floating regimes do not appear to exhibit significantly greater mean reversion than in fixed regimes. However, if the question is posed differently—namely whether floating regimes are associated with smaller external imbalances than fixed regimes—than the answer turns out to supportive of Friedman's views. Furthermore, large current account imbalances (as captured by subsequent abrupt reversals) are far less frequent, and tend to be less disruptive under flexible regimes.

How can these facts be reconciled with Chinn and Wei's findings regarding current account persistence? A possible answer points in the direction of nonlinearities in the adjustment of current account imbalances. We show that current account dynamics differ depending on whether current accounts are in deficit or in surplus, and on whether imbalances are large or small. Flexible exchange rate regimes seem to be associated with faster adjustment of both *small* deficits and surpluses, and, in particular, of *large* surpluses. In contrast, flexible exchange rated do not lead to faster adjustment of *large deficits:* here, intermediate regimes exhibit by far the lowest persistence, perhaps reflecting currency crises. We conclude that, when allowing for these threshold effects, exchange rate regimes seem to be highly relevant for current account dynamics, in ways that generally support Friedman's thesis.

Does nominal exchange rate flexibility lead to faster external adjustment?

Following Chinn and Wei (2008), we estimate current account *persistence* using a simple first order autoregressive model

$$CA_{it} = \rho_0 + \rho_1 CA_{it-1} + \nu_{it} \qquad (1)$$

where CA_{it} stands for the current account-to-GDP ratio in country *i* and year *t*. The closer ρ_1 is to one, the slower the adjustment in response to shocks, i.e. the more persistent is the current account.

To see whether the persistence of the current account is influenced by the exchange rate regime, equation (1) can be augmented with an exchange rate regime variable and an interaction term between this variable and the current account balance:[4]

[4] This variable codes pegged, intermediate, and floating regimes based on the IMF's de facto classification. This classification seeks to describe the actual behavior of the central bank in managing the exchange rate (as opposed to its stated commitment, which is captured by the de jure classification). While all de facto classifications (Levy-Yeyati and Sturzenegger, Reinhart and Rogoff (2004), and Shambaugh (2004)) differ from

(continued)

$$CA_{it} = \rho_0 + \rho_1 CA_{it-1} + \rho_2 XRR_{it} + \rho_3 (XRR_{it} \times CA_{it-1}) + \nu_{it} \quad (2)$$

where XRR_{it} takes on the value 0 for floating regimes, 1 for intermediate regimes, and 2 for fixed regimes. We estimate (1) and (2) with annual data for 151 countries from 1980-2007,[5] using pooled OLS, fixed effects, and both fixed and time effects.[6,7] To allow for heterogeneity across country samples, we show results separately for advanced countries, emerging market countries and other developing countries.[8] Results are presented in Table 1. The coefficient of interest is the interaction term between the exchange rate regime and the lagged current account. If floating regimes help countries adjust—that is, make current accounts less persistent—we would expect this coefficient to be positive and statistically significant.

As it turns out, the coefficient is almost never statistically significant, and has inconsistent signs across country groups. For developing countries, the sign is positive, indicating that current accounts are more persistent the more fixed the regime, as predicted by Friedman. However, this effect is (borderline) statistically significant only for one country group, emerging markets, and only when country fixed effects are included. For advanced countries the coefficient is negative (albeit very small and statistically insignificant).

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each other, the IMF de facto classification has a high degree of concensus with the other classifications. Chinn and Wei use two alternative de facto classifications, namely, by Sturzenegger and Levy-Yeyati (2003) and Reinhart and Rogoff (2004), with similar results.

[5]Chinn and Wei (2008) employ a larger dataset comprising over 170 countries during the 1971-2005 period.

[6] The standard estimation of models with lagged dependent variables, however, can produce biased estimates of the coefficients when the number of time series observations, T, is small—in particular, the OLS estimator is biased upwards and the FE and FE/TE estimators are biased downwards. Judson and Owen (1999) argue that even with T close to 30, as in our case, the bias could reach as much as 20% of the true value of the coefficients. Despite this, they find that the FE and FE/TE perform no worse than other methods including GMM.

[7] In most cases we found evidence of significant country and time effects, suggesting that pooled OLS might be inappropriate.

[8] The advanced economies comprise the core OECD countries plus Hong Kong, Israel, and Singapore. The emerging markets comprise the remaining countries listed in either the JPMorgan's EMBI Global Index (2005) or the International Finance Corporation's Major Index (2005). Finally, other developing countries comprise the remaining countries.

Table 1. Current Account Persistence
(Dependent variable: current account, in percent of GDP)

	Pooled		FE		FE/TE	
	(a)	(b)	(a)	(b)	(a)	(b)
All						
CA_{t-1} [1/]	0.645***	0.453*	0.448***	0.227	0.444***	0.220
	(0.094)	(0.265)	(0.101)	(0.235)	(0.1)	(0.232)
CA_{t-1} [1/] x XRR [2/]		0.131		0.156		0.159
		(0.129)		(0.113)		(0.112)
XRR [2/]		-0.126		0.195		0.264
		(0.425)		(0.447)		(0.433)
Observations	3700	3700	3700	3700	3700	3700
Advanced Countries						
CA_{t-1} [1/]	0.944***	0.968***	0.801***	0.811***	0.795***	0.805***
	(0.017)	(0.032)	(0.03)	(0.056)	(0.028)	(0.067)
CA_{t-1} [1/] x XRR [2/]		-0.023		-0.01		-0.011
		(0.027)		(0.046)		(0.053)
XRR [2/]		-0.015		-0.346		-0.391
		(0.139)		(0.207)		(0.242)
Observations	701	701	701	701	701	701
Emerging Markets						
CA_{t-1} [1/]	0.703***	0.574***	0.634***	0.419***	0.607***	0.379***
	(0.045)	(0.109)	(0.061)	(0.113)	(0.062)	(0.107)
CA_{t-1} [1/] x XRR [2/]		0.091		0.148*		0.155**
		(0.076)		(0.079)		(0.07)
XRR [2/]		0.07		-0.047		0.304
		(0.242)		(0.345)		(0.311)
Observations	984	984	984	984	984	984
Other Developing Countries						
CA_{t-1} [1/]	0.588***	0.3	0.407***	0.128	0.407***	0.129
	(0.099)	(0.289)	(0.104)	(0.242)	(0.103)	(0.242)
CA_{t-1} [1/] x XRR [2/]		0.196		0.196		0.196
		(0.148)		(0.121)		(0.122)
XRR [2/]		0.545		0.794		0.705
		(0.839)		(0.837)		(0.819)
Observations	2015	2015	2015	2015	2015	2015

[1/] Current account balance as percent of GDP, lagged.

[2/] De facto exchange rate regime according to IMF, XRR, where 0= floating, 1= intermediate, and 2= Standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The FE regression includes country dummies and the FE/TE regression includes country and time dummies.

Hence, by and large, Table 1 confirms the "negative" findings of Chinn and Wei (2008), who show that the flavor of these results is robust in a number of dimensions: different definitions of the de factor exchange rate regime; stratifying the regression samples by regime, adding additional controls, and attempting to deal with the endogeneity of regimes. As far as our borderline significant result for emerging markets is concerned, this could be driven by our specific regime definition (the IMF de facto classification) and disappear for the definitions used by Chinn and Wei; or—more interestingly—represent a robust finding for this particular country group (which is not considered by Chinn and Wei). This remains to be explored in future work.

How should the lack of interaction between current account persistence and the exchange rate regime be interpreted? Chinn and Wei rerun equation (2) for real effective exchange rates instead of current account, and find, again, that nominal exchange rate regimes are irrelevant for real exchange rate adjustment. If this is true, it is not very surprising that current accounts persistence is not modified by the exchange rate regime. But is it reconcilable with the Mussa (1986) finding that showed that real exchange rate variability is highly sensitive to the exchange rate regime? It surely is, if all that flexible exchange rates do is to increase noise, i.e. to act on the variance error term of the real exchange rate adjustment equation, rather than on the persistence parameter.

In short, based on this evidence, the answer to Friedman's empirical conjectures seems to be that although nominal exchange rates may make real exchange rates more flexible, they do not generate flexibility of the useful kind, at least from the perspective of the "real" economy. They simply add noise, and hence are not conducive to faster current account adjustment.

Do flexible exchange rate regimes lead to smaller external imbalances?

Before writing off Friedman's argument, however, it is useful to look at the empirical evidence from a different angle, namely, to look at the size of external imbalances across regimes. Arguably, this is an even more direct test of Friedman's claim the flexible exchange rates encourage "corrective movements before tensions can accumulate and a crisis develop" than testing the persistence properties of the current account balance.

Table 2 presents some facts about the distribution of current account deficits and surpluses across regimes and country groups. It shows that on average, and for every country group except for emerging markets, current account balances are much smaller in absolute size in floating regimes than in fixed regimes. In addition, there is a monotonic relationship between regimes and current account imbalances, with the size of absolute deviations rising the more fixed the regime. Importantly, emerging markets are only a seeming exception to this pattern, as fixed regimes are associated both with very large average deficits and large average surpluses, which tend to cancel across countries. Once the sample is stratified in terms of

deficit countries and surplus countries, the association between regime "fixedness" and current account imbalances is visible for all country groups except advanced countries with surpluses, and is very strong in both emerging markets, and other developing countries.

Table 2. Current Account Balances
(De Facto Exchange Rate; Sample Statistics)

	Current Account Balance			Deficits			Surpluses		
	Mean	Standard Deviation	Obs. 1/	Mean	Standard Deviation	Obs. 1/	Mean	Standard Deviation	Obs. 1/
All Countries									
All	-3.6	10.3	3851	-7.2	9.2	2768	5.7	6.6	1083
Fixed	-4.6	11.6	1492	-9.0	10.3	1061	6.2	6.3	431
Intermediate	-3.2	9.9	1901	-6.4	8.7	1400	5.7	7.4	501
Floating	-2.0	6.4	458	-5.0	4.9	307	4.2	4.1	151
Advanced Countries									
All	0.2	5.7	728	-3.6	3.1	404	4.9	4.6	324
Fixed	1.9	5.7	174	-3.7	3.5	65	5.3	3.9	109
Intermediate	-0.6	5.4	370	-3.4	2.9	237	4.5	5.2	133
Floating	0.0	5.8	184	-3.9	3.2	102	5.0	4.3	82
Emerging Markets									
All	-1.6	6.0	1024	-4.5	3.8	696	4.6	5.0	328
Fixed	-0.8	7.6	305	-5.5	4.7	180	5.9	5.6	125
Intermediate	-2.1	5.4	608	-4.4	3.5	446	4.2	4.7	162
Floating	-0.8	3.1	111	-2.7	1.7	70	2.4	2.1	41
Other Developing Countries									
All	-5.9	12.4	2099	-9.3	11.0	1668	7.2	8.5	431
Fixed	-6.8	12.6	1013	-10.2	11.3	816	7.0	7.6	197
Intermediate	-5.0	12.9	923	-8.6	11.3	717	7.7	9.5	206
Floating	-5.1	7.4	163	-7.1	6.2	135	4.6	5.0	28

Note: The sample comprises 151 countries (27 advanced countries, 40 emerging market economies, and 84 developing countries) over the 1980-2007 period.
1/ Number of observations.

Although Table 2 is suggestive, it is too crude to serve as a "test" of Friedman's hypothesis, particularly because it does not tell us whether the accumulation of larger average imbalances were a problem in any sense among the countries with fixed regimes. To address this point, we use criteria commonly used in the literature on current account reversals (among others, Milesi-Ferretti and Razin, 1998; Freund, 2005; Freund and Warnock, 2005, and Eichengreen and Adalet, 2005) to identify episodes of sudden, large reversals in the current account.[9] If

[9] In particular, we say that a country experiences a current account reversal if: (a) the current account deficit (surplus) exceeds γ percent of GDP before the reversal; (b) the average deficit (surplus) improves (deteriorates) by γ percent of GDP over three years; (c) the maximum (minimum) deficit (surplus) in the five years after the

(continued)

Friedman is right that flexible rates encourage corrective movements in the current account before imbalances get large and disruptive adjustments occur, we should be observing two things. First, large, sudden current account reversals should be a lot less frequent in flexible regimes. Second, on average, current account reversals should occur starting from larger initial imbalances if regimes are fixed. As it turns out, both of these predictions are strongly supported by the data (Table 3 and Figure 1).

Table 3 shows, first, that with only one exception (large surpluses in "other" developing countries) large imbalances have been far more frequent in fixed and/or intermediate regimes than in floating regimes. Indeed, in the emerging market sample, there have been no large imbalances as defined here—whether from surpluses or from deficits—in floating exchange rate regimes. Even more significantly, as shown in both the table and Figure 2, the average imbalances prior to the current account reversal were much larger, in all country groups, under fixed regimes compared to floating regimes. The ratio between pre-reversal imbalances under fixed and floating regimes is 2.1 and 2.0, respectively, for advanced country and "other" developing country surpluses, and 1.4 and 1.7, respectively, for advanced country and "other" developing country deficits (for emerging markets, these ratios are not defined because no reversals occurred in our sample under floating regimes). When comparing intermediate regimes and floating regimes, the ratios are smaller (though still positive) for advanced countries, and about the same for developing countries. Hence, this provides strong support in favor of Friedman's contention that under fixed regimes (and, to a perhaps lesser extent, intermediate regimes) imbalances are allowed to fester and grow much more than under flexible regimes.

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reversal is not larger (smaller) than the minimum (maximum) deficit (surplus) in the three year before the reversal; and (d) the deficit (surplus) improves (deteriorates) by at least one third. We set γ=2 for the advanced countries and γ=4 for the emerging economies and other developing countries. These rules follow those used by Freund (2005) in her analysis of current account deficit reversals.

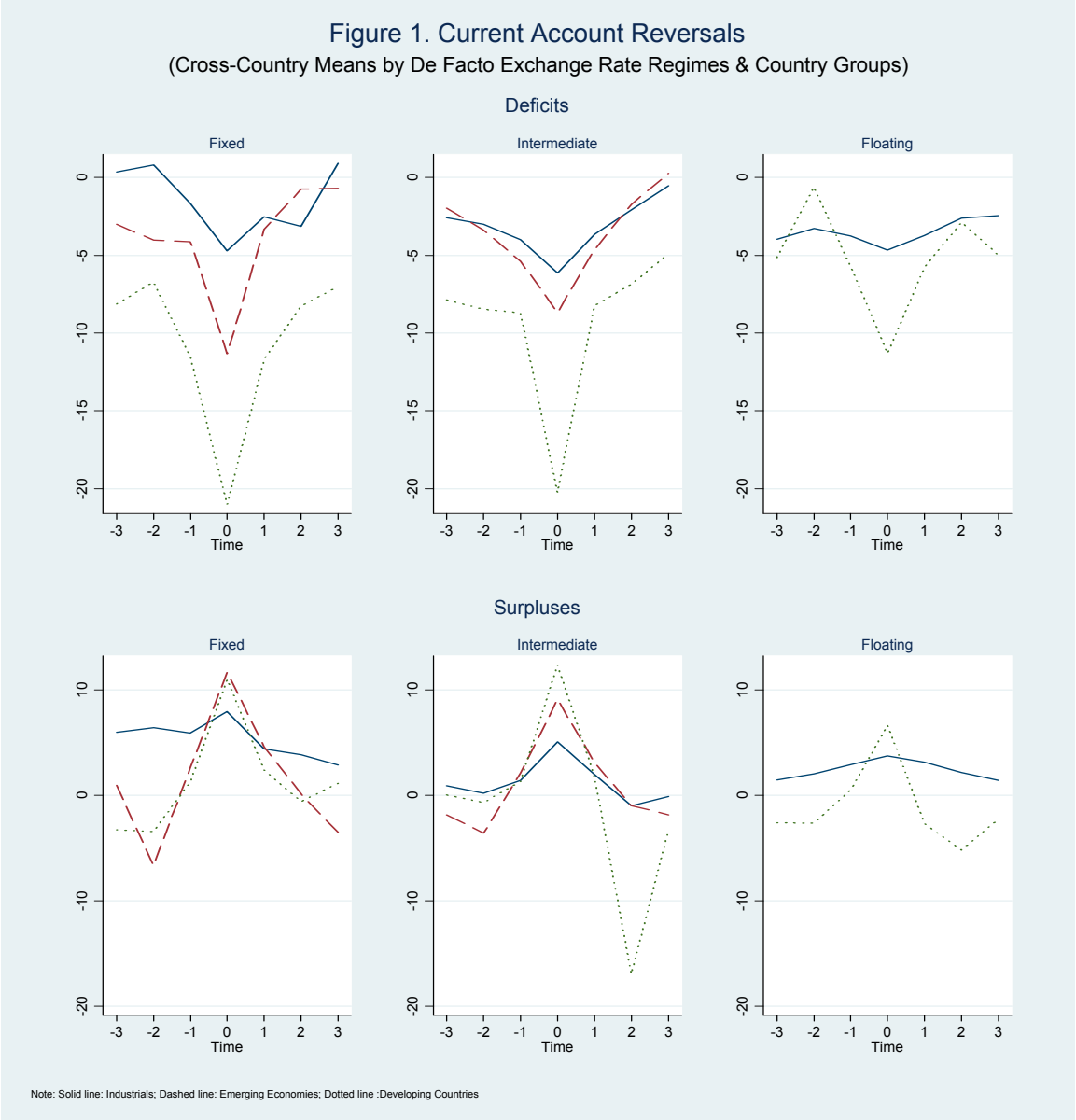
Table 3. Current Account Reversals
(Sample Statistics by Country Groups and De Facto Exchange Rate) 1/

	Number	Frequency	Mean	Median	Top 25 %	Bottom 25 %
Advanced Countries						
Surplus reversal						
Fixed Exchange Rate	6	3.45	7.85	7.65	9.16	4.76
Intermediate Exchange Rate	7	1.89	4.44	4.16	4.83	3.22
Floating Exchange Rate	2	1.09	3.72	3.72	4.26	3.19
Deficit reversal						
Fixed Exchange Rate	1	0.57	-6.28	-6.28	-6.28	-6.28
Intermediate Exchange Rate	20	5.41	-5.98	-5.47	-3.81	-8.18
Floating Exchange Rate	2	1.09	-4.65	-4.65	-3.39	-5.92
Emerging Markets						
Surplus reversal						
Fixed Exchange Rate	11	0.83	10.41	9.41	14.81	7.16
Intermediate Exchange Rate	15	0.98	8.82	7.73	11.72	5.28
Floating Exchange Rate	0	0.00	…	…	…	…
Deficit reversal						
Fixed Exchange Rate	10	0.76	-11.40	-9.66	-8.52	-12.48
Intermediate Exchange Rate	29	1.89	-8.64	-7.97	-6.35	-9.94
Floating Exchange Rate	0	0.00	…	…	…	…
Other Developing Countries						
Surplus reversal						
Fixed Exchange Rate	12	0.91	11.52	9.90	14.17	7.03
Intermediate Exchange Rate	16	1.05	11.66	6.60	14.53	5.40
Floating Exchange Rate	3	1.09	6.63	6.31	8.51	5.08
Deficit reversal						
Fixed Exchange Rate	60	4.55	-20.60	-14.29	-9.57	-21.70
Intermediate Exchange Rate	45	2.94	-20.79	-13.14	-9.94	-22.09
Floating Exchange Rate	8	2.92	-10.42	-9.93	-9.09	-11.92

Note: Reversals are defined as in Freund (2005). A minimum threshold of 2 (-2) was used to identify surplus (deficit) reversals for advanced countries. A minimum threshold of 4 (-4) was used to identify surplus (deficit) reversals for emerging markets and other developing countries.

1/ Sample statistics (means and percentiles) refer to the level of the current account at the time of the reversal.

2/ For advanced countries: number of reversal years in each exchange rate regime group as a percentage of total number of observations for advanced countries. For emerging and other developing countries: number of reversal years in each exchange rate regime/country group as a percentage of total number of observations in both country groups.



We also found some evidence suggesting that current account deficit reversals are more costly under fixed regimes. Following Eichengreen and Adelet (2005), Table 4 compares changes in growth—defined as the difference between three year average growth after a reversal and growth in the reversal year—across the three regimes. The more floating the regime, the lower the growth cost or (in the case of surplus reversals) the larger the growth benefits. These findings are not surprising, as more floating regimes are associated with smaller adjustments (second column of Table 4) and lower initial imbalances, and the empirical literature on current account reversals suggests a robust link between the size of the

initial imbalances and the output cost of reversals (Freund and Warnock, 2005).[10] A more interesting question is whether adjustment under flexible regimes is less costly even controlling for the size of external imbalances (for example, because it allows relative prices to adjust more easily in the presence of nominal rigidities). This remains to be explored in future work.

Table 4. Cost of Current Account Reversals
(Medians, by De Facto Exchange Rate Regime)

	$\Delta gy^{1/}$	$\Delta CA^{1/}$
Surplus reversal	0.31	-8.38
Fixed Exchange Rate	-0.56	-9.38
Intermediate Exchange Rate	0.21	-7.50
Floating Exchange Rate	2.23	-5.18
Deficit reversal	-0.80	6.25
Fixed Exchange Rate	-1.30	7.36
Intermediate Exchange Rate	-0.95	5.84
Floating Exchange Rate	-0.19	4.16

Note: Reversals are defined as in Freud (2005). A minimum threshold of 2 (-2) was used to identify surplus (deficit) reversals for Advanced Countries. A minimum threshold of 4 (-4) was used to identify surplus (deficit) reversals for Emerging Markets and Other Developing

1/ Change in output growth and current account balance as percent of GDP, respectively. Changes refer to the difference between the three-year average after the reversal and the period of the reversal.

Reconciling the findings: nonlinearities and threshold effects

How can these results be reconciled with the earlier finding that the exchange rate regimes does not affect the dynamics of the current account? One interpretation that could be consistent with both sets of results is that the effects of the exchange rate regime on the current account vary with the size of the current account, in particular, with more persistence of fixed and intermediate regimes in the presence of moderate deficits or surpluses—leading to larger imbalances on average—but more mean reversion, in the form of large current account reversals, once current account balances exceed certain thresholds. In other words, our findings may be suggestive of the presence of "threshold effects," or more generally, of nonlinearities in the interaction between current account dynamics and exchange rate regimes, which are not picked up in simple linear regressions along the lines of Table 1.

[10] See also Edwards, 2004, who provides some direct evidence for linking flexible rates to smaller output costs of deficit reversals in developing countries.

Table 5 presents a preliminary attempt to test for the presence of such threshold effects. We allow for nonlinearities—or more precisely, for breaks in linear relationships—of two kinds. First, we distinguish between current account dynamics when balances are in surplus and when they are in deficit. There is no reason to think that these should be the same, particularly when we are interested in the reversals of large imbalances (unlike current account deficits, the reversal of surpluses cannot be forced on a country by a currency crisis). Second, we try to test for threshold effects by including an interaction term between past current accounts and variable that indicates if the current account is in a large deficit (less than 25th percentile of the current account distribution) or surplus (more than 75th percentile of the distribution). To avoid overloading the model with interaction terms, we run the regressions separately for fixed, intermediate, and floating regimes. We show only the FE and FE/TE results that control for country and time effects, as the pooled OLS results are likely to be misspecified in this context, we show only fixed effects estimates, with and without controlling for country and time effects.

The results are highly instructive, and can be summarized as follows.

First, threshold effects do not seem to matter for floating regimes (at least for the threshold that is assumed here). Neither does the distinction between surplus and deficit dynamics matter. Regardless of whether the current account is in surplus or in deficit, and regardless of whether these surpluses or deficits are large or small, the autoregressive coefficient in flexible regimes is always in the order or 0.4 to 0.5.

Second, threshold effects do matter in both fixed and intermediate regimes, where they are highly significant, and go in opposite directions, depending on whether deficits or surpluses are present. With current accounts in deficit, threshold interaction effects are negative and quite large, suggesting that in pegged/intermediate regimes, large deficits unwind much faster than small deficits. By contrast, when the current account in surplus, threshold interaction effects are large and positive, suggesting that once surpluses have become very large, they are highly persistent under these regimes.

Third, taking into account these threshold effects, there are large and significant differences in the persistence properties of fixed, intermediate, and floating regimes, as follows:

- *Large surpluses* are much more persistent in fixed and intermediate regimes than in floating regimes. Adding the coefficients on the main effects and the interaction terms, we obtain a persistence parameter for about 0.8 for fixed/intermediate regimes and about 0.4 for floating regimes. If we base the comparison only on the statistically significant coefficients, the persistence parameter is 0.8 for fixed regimes, 0.6-0.7 for intermediate regimes, and 0.4 for floating regimes.

Table 5. Nonlinear Effects in Current Account Persistence
(Dependent variable: current account, in percent of GDP, all countries)

	FE		FE/TE	
	Deficit	Surplus	Deficit	Surplus
1. Fixed				
CA_{t-1} [1/]	0.644***	0.503***	0.648***	0.505***
	(0.057)	(0.05)	(0.058)	(0.051)
CA_{t-1} [1/] x $1(CA_{t-1} \leq q.25)$ [2/]	-0.108	...	-0.108*	...
	(0.066)	...	(0.064)	...
CA_{t-1} [1/] x $1(CA_{t-1} \geq q.75)$ [2/]	...	0.297***	...	0.303***
	...	(0.103)	...	(0.103)
Observations	1298	1298	1298	1298
2. Intermediate				
CA_{t-1} [1/]	0.569***	0.163	0.578***	0.136
	(0.051)	(0.134)	(0.047)	(0.121)
CA_{t-1} [1/] x $1(CA_{t-1} \leq q.25)$ [2/]	-0.365***	...	-0.395***	...
	(0.138)	...	(0.137)	...
CA_{t-1} [1/] x $1(CA_{t-1} \geq q.75)$ [2/]	...	0.605***	...	0.666***
	...	(0.165)	...	(0.16)
Observations	1683	1683	1683	1683
3. Floating				
CA_{t-1} [1/]	0.489***	0.404***	0.509***	0.404***
	(0.073)	(0.138)	(0.066)	(0.126)
CA_{t-1} [1/] x $1(CA_{t-1} \leq q.25)$ [2/]	-0.147	...	-0.167	...
	(0.148)	...	(0.135)	...
CA_{t-1} [1/] x $1(CA_{t-1} \geq q.75)$ [2/]	...	0.015	...	0.041
	...	(0.18)	...	(0.152)
Observations	373	373	373	373

[1/] Current account balance as percent of GDP, lagged.

[2/] 1(.) is the indicator function that takes value 1 if the argument of the function is true and 0 otherwise; q.x refers here to quantile x based on the full sample of current account balances (3354 observations)

Robust/clustered standard errors in parentheses. The symbols *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively. The FE regression includes country dummies and the FE/TE regression includes country and time dummies.

- *In contrast*, *large deficits* exhibit *less* persistence in intermediate regimes than in floating regimes. Adding the coefficients on the main effects and interaction terms, the persistence parameter is about 0.2, whereas it is 0.3-0.5 in floating regimes and 0.5-0.6 in fixed regimes (depending on whether insignificant interaction terms are considered or not). The fact that the persistence parameter in the case of large deficits is lowest for intermediate regimes may reflect the fact that these include soft pegs that

are most likely to experience currency crises (Table 3 showed that by far the greatest number of current account reversals were concentrated in this category).

- Finally, for *moderate surpluses and deficits*, current accounts are in most cases less persistent under flexible regimes than under fixed and intermediated regimes, with persistence coefficient 0.4-0.5 in flexible regimes and about 0.6 in fixed and intermediate regimes. The only exceptions are small surpluses in intermediate regimes, which have a small persistence parameter which is insignificantly different from zero, perhaps because there are few observations in this category.

Conclusions

More than fifty-five years after the publication of Milton Friedman's famous essay advocating a system of flexible exchange rates, the question of whether exchange rate flexibility contributes to the prevention and orderly resolution of external imbalances remains controversial. While much of the policy community nowadays appears to embrace Friedman's view, flexible exchange rates do not, on average, seem to speed up the rate at which current accounts revert to their means (Chinn and Wei, 2008). This constitutes prima facie evidence against Friedman's hypothesis.

However, as we showed in this paper, Friedman's hypothesis does enjoy considerable empirical support when looked at from a slightly different angle, namely, based on cross-country evidence on the size of current account imbalances and the frequency of large current account reversals. Large current account reversal very rarely occur under flexible regimes. Furthermore, when they do occur, they involve much lower initial imbalances than current account reversals that take place in intermediate and fixed regimes. This is precisely what Friedman seems to have had in mind when he argued that flexible exchange rates "tend to produce corrective movements before tensions can accumulate and a crisis develops."

How, then, can the two pieces of evidence be reconciled? Our preliminary answer points to nonlinearities in the adjustment of the current account, both across surpluses and deficits, and in relation to the size of current account imbalances. We showed, first, that *large* current account surpluses are much more persistent in fixed and intermediate regimes than in floating regimes. The difference is substantial, with persistence coefficients in fixed regimes of about twice the size of those in floating regimes. Second, *small* and moderate surpluses and deficits are also more persistent in floating and intermediate regimes than in floating regimes, although the difference is not as large (persistence parameters of about 0.6 compared to 0.4-0.5). Only in the case of *large deficits* do floating regimes not exhibit the lowest persistence. Intermediate regimes, in particular, appear much less persistent here. We interpret this as reflecting sharp current account reversals, perhaps via currency crises, which tend to occur most frequently in intermediate regimes compared to both floats and (harder) pegs.

In conclusion, the evidence presented in this paper supports Friedman's 1953 view regarding the role of flexible exchange rates in the prevention and resolution of current account imbalances. Both large current account imbalances and large reversals are far less prevalent under floating regimes. Furthermore, there is evidence that *small* current account imbalances

are less persistent under flexible regimes than under fixed and intermediate rates. These regularities appear not to show up in average linear regressions because flexible exchange rates turn out not to be associated with faster reversals from *large* current account *deficits*. However, these faster reversals under non-floating regimes appear to reflect precisely the kind of abrupt, delayed adjustment, that Friedman wanted to avoid. Finally the evidence appears even more supportive of present-day Friedmanesque views regarding the role of flexible exchange rates in the reduction of global imbalances are concerned, as *large* current account *surpluses* appear to be highly persistent in fixed and intermediate regimes, and much less persistent in floating regimes. Chinn and Wei (2008) may be right that official pronouncements about the virtues of floating rates in this context may so far have been largely been "faith-based;" however, this faith ultimately seems borne out by the evidence.

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