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Are Fixed Exchange Rates Still a Mirage?

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Abstract

In the twenty-first century, pegged exchange rates have become increasingly fixed: parity changes have become significantly rarer than in the 1980s and 1990s. Analysis of what triggers parity changes suggests that the high frequency of parity changes in the late twentieth century reflected the inflationary conditions of the time rather than a permanent shift associated with financial globalization.

Keywords: exchange rates regimes, inflation, capital flows

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1 Introduction

In the 1990s, under the influence of high-profile currency crises, the economics profession became increasingly pessimistic about the future of pegged exchange rates (Fischer, 2001; Obstfeld and Rogoff, 1995). In their article entitled "The Mirage of Fixed Exchange Rates", Obstfeld and Rogoff (1995) make two main points: (1) the growth of global capital markets has made exchange rate pegs increasingly susceptible to speculative attack, which it is usually technically possible to defeat but only at the expense of other important policy objectives; and (2) even where currencies remain pegged, parity changes frequently occur, so that few currencies remain fixed for long periods.

Klein and Shambaugh (2008) have a slightly different take on the issue. They suggest that many fixes (pegs with no parity change) are re-established after a short break, and longer fixes are more likely to survive for a further year. What is not clear from their analysis is how frequently the short departure from a fix is a genuine float and how frequently it is just a parity change with the peg being maintained, because they make no distinction between these two cases. We show below that many of these cases are simply parity changes.

A related issue is how financial globalization has affected countries' choice of exchange rate regime. Have countries shifted significantly away from pegs in recent decades? Bleaney et al. (2016) estimate a model of exchange rate regime choice from 1971 to 2011. They find that more populous countries that are less open to international trade and more open to international capital flows, and those with higher inflation rates (up to about 25%), are more likely to float. They find a persistent underlying trend towards floating for given values of these control variables, but this trend has been offset in the last two decades by the fall in global inflation rates.

In this paper we address Obstfeld and Rogoff's second point, and examine the frequency of parity changes in pegged regimes, comparing the period 1980-99 with 2000-16. We show that parity changes have become much rarer in pegged regimes in the later period, and investigate why. The results suggest, contrary to the "mirage" view, that exchange rates are capable of remaining fixed for long periods in a low-inflation environment.

The paper is structured as follows. Data are described in Section Two, and results are presented in Section Three. Section Four concludes.

2 Data

Bleaney and Tian (2017) estimate an exchange rate flexibility index by country and year as the root mean square error (RMSE) of a regression of the sort that has been used previously to identify the weights in a basket peg. The monthly log change in country *j*'s exchange rate against a numeraire currency (in this case Japan) is regressed on the monthly log change in country *j*'s exchange rate against the US dollar and the euro, and any other potential anchor currency.[1] Possible parity changes are investigated with extra regressions that add a dummy variable equal to one in a particular month in that year and zero otherwise. The principle behind the flexibility index is that this equation will be a good fit if either (a) the exchange rate is fixed with no parity change (hereafter termed a "fix"), or (b) there is a single parity change that is captured by a statistically significant dummy variable for the month in which the parity change occurred; it will be a relatively poor fit if the exchange rate is floating. A classification scheme can be generated by assuming that high values of the RMSE (in this case above 0.01) are assumed to be floats, and low values (below 0.01) are either fixes or pegs with parity changes, depending on the statistical significance of the dummy variables. In the present

[1] Up to 1998, the German mark and the French franc are used in place of the euro.

context, the most significant point is that this classification scheme distinguishes parity changes from both fixes and floats. In practice these parity changes are almost invariably devaluations.

We examine the frequency of different regimes and the matrix of regime transitions in the two periods 1980-99 and 2000-16. To gain insight into the differences, we then model the probability of a fixed exchange rate in year t-1 experiencing a parity change in year *t*. Data sources for the explanatory variables are given in the Appendix. Although regime transitions have been examined to some extent before (Ghosh et al., 2002; Klein and Shambaugh, 2008), to our knowledge what triggers a parity change in a pegged regime has not previously been investigated.

3 Empirical Model and Results

Table 1 shows the frequency of regimes across all country-years in the two periods 1980-99 and 2000-16. Both fixes and floats have increased slightly (from 59.70% to 62.65% for fixes and from 30.66% to 32.87% for floats), but parity changes have dropped by more than half, from 9.64% of the sample in 1980-99 to 4.49% in 2000-16. If we examine the transition matrix (Table 2), in 1980-99 a fix in period *t*-1 which did not become a float in period *t* was subject to a parity change 10.93% (=199/(199+1622)) of the time. In 2000-16 the equivalent figure was only 4.49% (=79/(79+1679)). So the probability of a switch from a fix to a parity change has also dropped by more than half. By comparison the probability of a switch from a fix in year *t*-1 to a float in year *t* has remained steady at about 5% in both periods (100/1921=5.21% in 1980-99 and 92/1850=4.97% in 2000-16).

Table 1. Frequency distribution of regimes 1980-99 and 2000-16

	Fix	Parity Change	Float
	1980-99		
Number	2037	329	1046
Percentage	59.70%	9.64%	30.66%
	2000-16		
Number	1969	141	1033
Percentage	62.65%	4.49%	32.87%

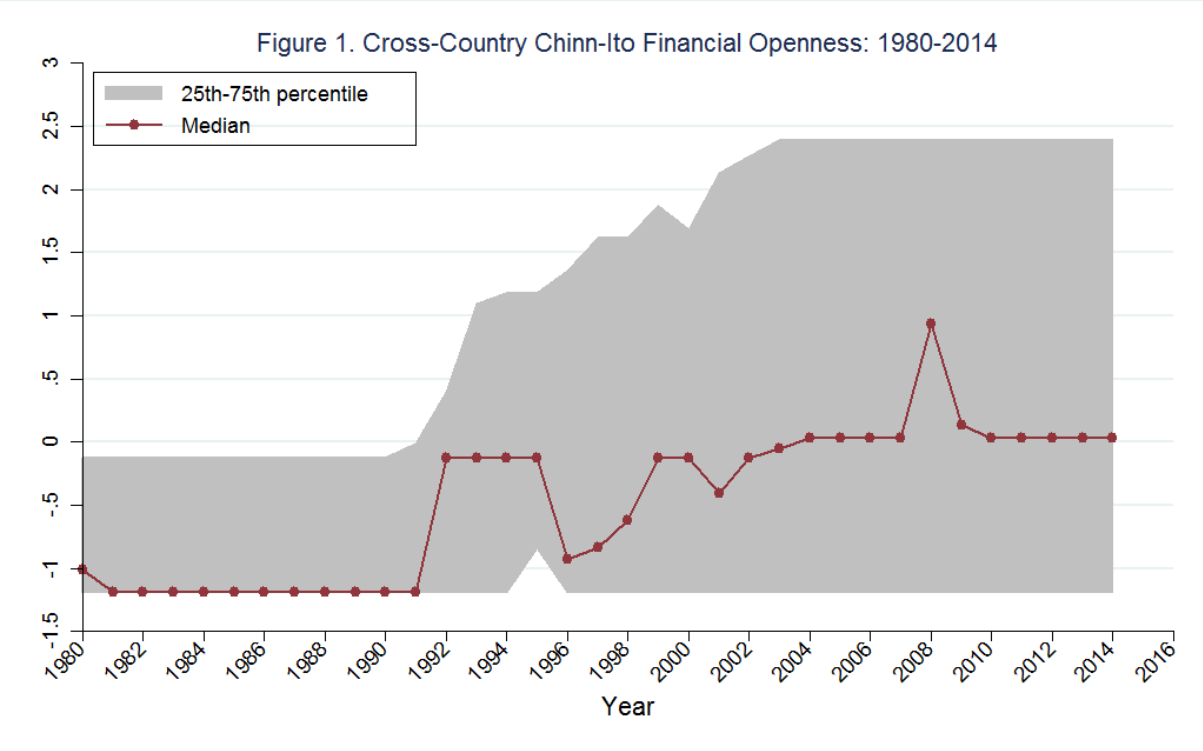
Notes. Calculated from Bleaney and Tian (2017) dataset.

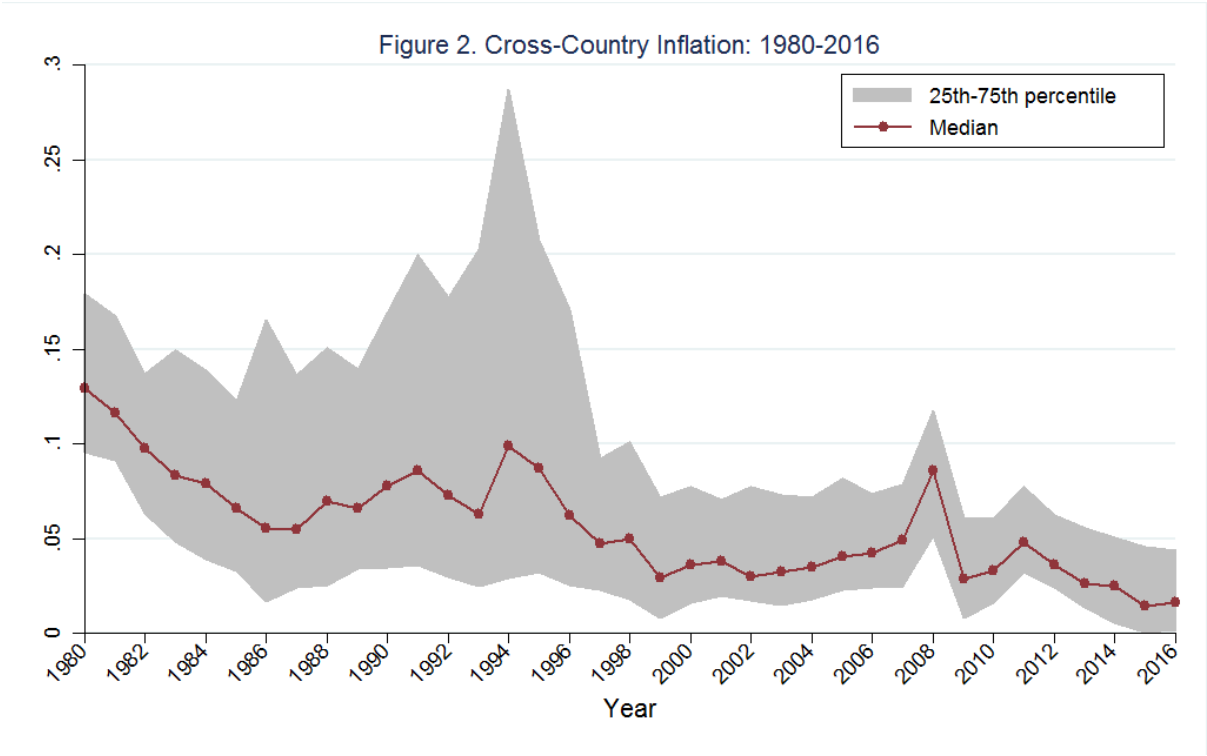
Table 2. Transition matrices 1980-99 and 2000-16

Year t regime:	Fix	Parity Change	Float	Total
Year t-1 regime				
	1980-99			
Fix	1622	199	100	1921
Parity Change	111	27	176	314
Float	171	91	726	988
	2000-16			
Fix	1679	79	92	1850
Parity Change	61	14	60	135
Float	117	37	816	970

Notes. Calculated from Bleaney and Tian (2017) dataset.

What has changed to reduce the frequency of parity changes? Global capital flows are as large as ever, and according to the Chinn-Ito (2006) index of capital account restrictions financial openness in the typical country has not fallen, but has maintained the high level reached in the 1990s (Fig. 1). One thing that has changed is the frequency distribution of inflation rates across countries. Figure 2 shows that the median and the 75th percentile of inflation rates have declined noticeably since the 1990s. That greatly reduces the pressure for a parity change.





To investigate the matter further, we model the probability of a switch from a fix in year *t*-1 to a parity change in year *t* as a function of the following variables at time *t*-1: inflation, years that the fix has lasted without interruption (up to a maximum of ten), import-weighted inflation of trading partners, openness to international trade (exports plus imports divided by GDP), population (in logs), financial openness (as measured by the Chinn-Ito index of capital account restrictions), dummy variables for advanced countries and emerging markets, and a time trend (=0 in 2000). Inflation is the change in the logarithm of the consumer price index, and is separated into two variables: Band 1 is the inflation rate truncated at a maximum of 0.2, and Band 2 is the inflation rate minus 0.2, truncated at a minimum of zero. This formulation allows for a kink in the estimated inflation effect at 0.2, or 22.1% p.a. Let the estimated coefficients of Band 1 and Band 2 inflation be respectively β_1 and β_2. If inflation ≤ 0.2, its estimated coefficient is β_1; if inflation > 0.2, the estimated marginal effect is β_2. The kink disappears if $\beta_1 = \beta_2$.

We expect smaller countries that are more open to international trade to be more reluctant to devalue because of the greater weight of import prices in the consumer price index, so the temporary inflation cost of achieving a given real depreciation through devaluation will be higher. In so far as it measures potential speculative pressures, greater financial openness should be associated with a higher probability of a parity change. Since anchor currencies tend to have relatively stable prices, inflation is likely to induce overvaluation and therefore a greater probability of devaluation, although this effect can be mitigated by higher inflation amongst trading partners.

Table 3 shows the estimated marginal effects at the mean for a logit specification.[2] The first column shows a parsimonious model that maximises the sample size. Inflation Band 1 (up to 0.20) is the most significant variable, with a *t*-statistic of 4.66. Its coefficient implies that an extra 1% of inflation in year t-1 adds 0.4% to the probability of a parity change in year t. Above 20% (Band 2), the coefficient is far smaller, and not statistically significant, which implies that, although the probability of a parity change is higher at inflation rates at 20% or more than at lower rates, the exact rate of inflation makes little difference. Countries with larger populations are significantly more likely to have a parity change: the coefficient implies that a doubling of population increases the probability by 1% (0.69 x 0.014 = 0.010). Trade openness has a negative coefficient that is not significant (but it probably would be if population were omitted, since it is strongly negatively correlated with country size). Large countries can devalue without the gain in competitiveness being eroded as much by imported inflation as in small countries. There is also a significant unexplained negative time trend of -0.15% p.a.; one reason for this may be that a longer history of inflation than just one year matters.

[2] A probit yields very similar results.

In column (2) of Table 3 the length of the current spell of fixing is added, up to a maximum of ten. This has a highly significant negative coefficient, with a *t*-statistic of -3.80. The coefficient implies that an extra year of fixing reduces the probability of a parity change by 1.3%. There is clearly some collinearity with Band 1 inflation, whose coefficient is nearly a fifth smaller than in column (1). Column (3) adds trading partners' inflation (import-weighted) and financial openness to the model. Neither variable is significant, and financial openness even has a negative coefficient, contrary to expectations.

Table 3. Probability of a Parity Change in a Previously Fixed Exchange Rate

	(1)	(2)	(3)
Inflation Band 1 (t-1)	0.403***	0.329***	0.328***
	(4.66)	(3.63)	(3.40)
Inflation Band 2 (t-1)	0.054	0.054	0.073
	(1.19)	(1.16)	(1.13)
Trade openness (t-1)	-0.015	-0.014	-0.008
	(-1.10)	(-1.08)	(-0.60)
Ln(population) (t-1)	0.014***	0.012***	0.012***
	(3.63)	(3.37)	(3.23)
Length of fix spell (t-1) (max. 10)		-0.013***	-0.010***
		(-3.80)	(-3.04)
Trading partners' inflation (t-1)			-0.004
			(-0.06)
Chinn-Ito financial openness (t-1)			-0.007*
			(-1.66)
Advanced economies dummy	-0.034**	-0.035**	-0.022
	(-2.30)	(-2.44)	(-1.33)
Emerging markets dummy	-0.015	-0.014	-0.010
	(-0.86)	(-0.87)	(-0.58)
Time trend/100	-0.147***	-0.158***	-0.128**
	(-2.90)	(-3.19)	(-2.55)
Sample size	3160	3106	2722
Pseudo-R^2	0.08	0.09	0.09
Log likelihood	-825	-809	-718

Notes. The dependent variable = 1 if there is a parity change in period t, and = 0 if the regime is a fix in period t. The sample is all country-year observations 1980-2016 that are a fix in period t-1 and are a fix or a parity change in period t. Data source: Bleaney and Tian (2017). Estimation method: logit. The coefficients reported are marginal effects at the mean of the variable. Standard errors are clustered by country. Figures in parentheses are *t*-statistics. ***, **, *: significantly different from zero at the 0.01, 0.05 and 0.10 level respectively. For explanation of independent variables see text.

Table 4. Probability of a Parity Change: a Two-way Fixed Effects Model

	(1)	(2)	(3)
Inflation (t-1)	0.125**	0.137**	0.147***
	(2.37)	(2.53)	(2.69)
Trade openness (t-1)	-0.031	-0.029	-0.035
	(-1.55)	(-1.40)	(-1.48)
Ln(population) (t-1)	0.034	0.035	0.007
	(0.933)	(0.96)	(0.16)
Length of fix spell (t-1) (max. 10)		0.006	0.009
		(0.97)	(1.47)
Trading partners' inflation (t-1)			0.021
			(0.17)
Chinn-Ito financial openness (t-1)			-0.022**
			(-2.22)
Country dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Sample size	3160	3106	2722
No. of countries	165	162	155
R^2 overall	0.06	0.06	0.07

Notes. The dependent variable = 1 if there is a parity change in period t, and = 0 if the regime is a fix in period t. The sample is all country-year observations 1980-2016 that are a fix in period t-1 and are a fix or a parity change in period t. Data source: Bleaney and Tian (2017). Estimation method: two-way fixed effects. The coefficients reported are marginal effects at the mean of the variable. Standard errors are clustered by country. Figures in parentheses are *t*-statistics. ***, **, *: significantly different from zero at the 0.01, 0.05 and 0.10 level respectively. For explanation of independent variables see text.

It is also interesting to estimate a similar model with country and year fixed effects. This can be done in a linear probability model only. This effectively removes from the sample any country, such as one with a permanent fix or a permanent float, that has never had a parity change. It effectively asks: if a country has a parity change, what variables are particularly high or low relative to their country average on the eve of the parity change? Variables with little variation over time relative to their cross-country variation, such as trade openness and population, are unlikely to be significant, and so it proves. The results are shown in Table 4. The length of the spell of fixing is now not significant; indeed its coefficient is positive. Since Band 1 and Band 2 inflation emerged with similar coefficients, indicating a linear relationship with no significant kink, the two bands have been merged. The coefficient is significant at the 0.05 level and is intermediate in magnitude between the coefficients of Band 1 and Band 2 in Table 3. The financial openness coefficient is even more negative than in Table 3.

How different are the triggers of a switch from a peg to a float from the triggers of a parity change? To the extent that the explanatory variables capture the unsustainability of a fix, the results might be quite similar; on the other hand, a float and a devaluation are two very different ways of addressing exchange rate misalignment, and one would expect the determinants of a switch to a float to resemble those that have been revealed to be associated with floating in models of regime choice. Table 5 shows the results of a logit regression for a switch from a peg to a float. The three variables that are significant are inflation (+), population (+) and the length of the spell of fixing (-): three variables that were also significant in Table 3. The length of the spell of fixing is also found to be significant by Klein and Shambaugh (2008), but they do not investigate the role of other factors such as inflation. Unlike in Table 3, though, in Table 5 there is no significant time trend. In short, the triggers for a switch to a float are rather similar to the triggers for a parity change.

Table 5. Probability of a Switch from a Peg to a Float

	(1)	(2)	(3)
Inflation Band 1 (t-1)	0.707***	0.465***	0.499***
	(6.76)	(5.65)	(5.19)
Inflation Band 2 (t-1)	0.084	0.049	0.055
	(1.49)	(0.96)	(0.93)
Trade openness (t-1)	-0.004	-0.001	0.002
	(-0.25)	(-0.07)	(0.12)
Ln(population) (t-1)	0.013**	0.008**	0.007**
	(2.39)	(1.99)	(1.91)
Length of fix spell (t-1) (max. 10)		-0.030***	-0.032***
		(-10.3)	(-10.3)
Trading partners' inflation (t-1)			-0.016
			(-0.34)
Chinn-Ito financial openness (t-1)			0.001
			(0.40)
Advanced economies dummy	0.005	-0.002	-0.004
	(0.24)	(-0.13)	(-0.23)
Emerging markets dummy	0.022	0.018	0.017
	(0.86)	(1.17)	(1.02)
Time trend/100	0.027	-0.005	-0.048
	(0.51)	(-0.14)	(-1.11)
Sample size	3528	3467	3055
Pseudo-R^2	0.11	0.18	0.17
Log likelihood	-1047	-953	-881

Notes. The dependent variable = 1 if there is a float in period t, and = 0 if the regime is a peg (with or without a parity change) in period t. The sample is all country-year observations 1980-2016 that are a peg (with or without a parity change) in period t-1. Data source: Bleaney and Tian (2017). Estimation method: logit. The coefficients reported are marginal effects at the mean of the variable. Standard errors are clustered by country. Figures in parentheses are *t*-statistics. ***, **, *: significantly different from zero at the 0.01, 0.05 and 0.10 level respectively. For explanation of independent variables see text.

4 Conclusions

Pegged exchange rates have been subject to parity changes in 2000-16 at less than half the frequency of 1980-99, making fixed exchange rates significantly more durable. Fixed exchange rates seem less vulnerable to speculative attack in the face of increasing global capital flows than appeared to be the case in the 1990s. We have investigated what triggers a parity change (almost always a devaluation) in a previously fixed exchange rate. Smaller countries are less likely to devalue, other things equal. This makes sense because they are more exposed to imported inflation, rendering wage and price deflation a relatively more attractive adjustment option than devaluation. The most consistent predictor of the probability of a parity change is the previous year's inflation rate. This is true whether or not the model contains country fixed effects. After controlling for these factors, a longer history of fixing also makes a parity change less likely. These results strongly suggest that the short average duration of fixes during the 1980s and 1990s was a product of the inflationary environment of the time, rather than a permanent shift associated with global financial integration. This is good news for smaller countries that are more likely to prefer to peg their exchange rate.

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Appendix – Data Sources

Exchange rate regimes – Bleaney and Tian (2017), data updated to 2016 available at http://www.nottingham.ac.uk/economics/people/michael.bleaney.

Inflation: the change in the log of the consumer price index - WDI

Trade openness: exports plus imports divided by GDP – WDI

Population - WDI

Financial Openness – Chinn and Ito (2006), data updated to 2014

Trading partners' inflation import weights – DOTS

Length of fix spell is counted from 1971 and is truncated at a maximum of ten