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# TRANSITIONS IN EXCHANGE RATE REGIMES IN THE AFTERMATH OF THE GLOBAL ECONOMIC CRISIS

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# Transitions in Exchange Rate Regimes in the Aftermath of the Global Economic Crisis*

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**Abstract**

Has the global economic crisis resulted in countries shifting their exchange rate regimes and, if so, in what way? Focusing on the relevant period of 2008-12, and using the IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) classification of exchange rate regimes and database, we calculate exchange rate regime transition probabilities and test their statistical significance. Even though there is some evidence of state dependence, in the sense that transitions are relatively infrequent, we do find that these are significant, especially in the direction of fixity. Our testing procedure employs the Wilson (1927) statistic, which is appropriate for drawing inference based on relatively rare events. By examining all transitions in detail, we also find further evidence that countries that shift often flip back to their previous regime.

*Keywords:* Exchange rate regimes, Transition probabilities

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# 1 Introduction

There is considerable evidence that exchange rate regimes exhibit a high degree of state dependence (von Hagen and Zhou, 2007). Studies of regime transitions based on conventional optimum currency area criteria report results that leave much unexplained, and the models have low predictive power (Masson and Ruge-Murcia, 2005). Investigation of exchange rate regime dynamics confirms that there generally appears to be a low probability of regimes shifting. Where they do, there is a tendency for some countries to flip back to the initial regime, with the flipping often, but not exclusively, being back to a fixed rate regime (Klein and Shambaugh, 2008).

Has the enhanced international economic turbulence in the aftermath of the global crisis in 2008/09 led to a change in this pattern? Faced with severe departures from internal/external balance, governments have modified fiscal policy and monetary policy, but have they also shifted their preferred exchange rate regime, and, if so, in what direction and for how long?

The relevant theoretical priors are ambiguous. Larger macroeconomic disequilibria seem likely to be associated with a greater probability of policy change. But this does not necessarily imply a shift in exchange rate regime. The value of a currency may, of course, change under an unchanged flexible exchange rate regime. Moreover, the real exchange rate may change even under a fixed nominal rate regime. Where shifts in exchange rate regimes are countenanced, there are theoretical arguments that can be used to support shifts in either direction depending on the circumstances. A shift towards a more flexible regime may become more attractive for countries with balance of payments deficits as a way of inducing the economic adjustment needed to bring about full internal and external balance. It may become more attractive to surplus countries because of the counter-inflationary properties of currency appreciation.

A shift towards greater fixity may become more attractive for deficit countries

as a commitment device for disciplining the conduct of macroeconomic policy and anchoring inflationary expectations. For surplus countries it may become more attractive as a way of offsetting a loss of international competitiveness that would be associated with currency appreciation that might in turn, and for example, be linked to a sharp increase in capital inflows. In addition, and particularly in these circumstances, governments may, in principle, use capital controls as a short term policy instrument. However, it appears that historically and with a few exceptions, they have not used them in this way (Eichengreen and Rose, 2014).

Focusing on the period 2008-12, and using the Annual Report on Exchange Arrangements and Exchange Restrictions (International Monetary Fund, 2013) classification of exchange rate regimes and database, we calculate exchange rate regime transition probabilities. We set out to discover whether there have been significant shifts in exchange rate regimes and what form they have taken.

# 2 Methods and Results

We define a transition as the shift from one exchange rate regime to another and distinguish between two main types of regime: *flexible* and *inflexible*. The former includes crawling pegs, crawl-like arrangements, pegged exchange rates within horizontal bands, floating and free-floating exchange rates; the latter includes the category of no separate legal tender, as well as currency boards, conventional pegs and stabilised arrangements.[1] There is a third group, which contains all *other managed* arrangements.[2] The probability distribution of exchange rate regimes for the period 2008–12 is shown in Figure 1. The flexible exchange rate regime appears slightly more frequently than the inflexible one (45.2% vs 43.8%, respectively).

[FIGURE 1 ABOUT HERE]

[1]For detailed definitions of the IMF's exchange rate arrangements see Kokenyne et al. (2009).

[2]This is a residual, and, hence, less interesting group—the IMF includes all observations that could not be classified into any of the other exchange rate arrangements.

During the same period, there have been a total of 68 transitions (including moves to and from other managed arrangements) in the sample of 748 observations—evidence of relative *state dependence*. As can be seen in Figure 2, most of these transitions occurred in the beginning of the sample. The probability $p_{k,l}$ with which a transition takes place from a regime $k$ to a regime $l$ can be calculated as $p_{k,l} = n_{k,l}/N_k$, where $n_{k,l}$ is the number of transitions from regime $k$ to regime $l$ and $N_k$ is the total number of transitions away from regime $k$.

[FIGURE 2 ABOUT HERE]

Table 1 reports all transition probabilities along with the frequency of each transition. There have been 15 transitions from inflexible towards flexible regimes corresponding to 65.2% of all transitions away from inflexible regimes. There have been 15 transitions from flexible towards inflexible regimes representing 60% of all transitions away from flexible regimes. All such instances are reported in Table 2. Following a transition, several countries 'flip' back to the original regime.

[TABLE 1 ABOUT HERE]

[TABLE 2 ABOUT HERE]

Assuming that transition probabilities follow a binomial distribution, we wish to estimate suitable confidence intervals in order to gauge the reliability of the transition probability estimates.[3] First, we need to 'correct' the transition probabilities reported in Table 1 so that we can use them in the construction of Wilson confidence intervals.[4] Given the assumption of binomial distribution, these are more appropriate than simpler Wald interval estimations (Brown et al., 2001).[5]

[3]The binomial assumption is appropriate, as the potential outcome of each transition, say from $k$, is binary: there is either a shift towards a given regime, say $l$ with probability $p_{k,l}$, or towards the remaining regime with probability $1 - p_{k,l}$.

[4]See Wilson (1927).

[5]For example, under the binomial distribution, a Wald confidence interval may assume negative values, as is the case here when we consider transitions from other managed arrangements to flexible regimes at the 1% confidence level. A disadvantage of the Wilson transition probabilities is that they may not necessarily add up to 100%.

The transition probability from regime $k$ to regime $l$ using the Wilson statistic is:

$$p_{k,l}^{W} = \frac{n_{k,l} + \frac{z_{\alpha/2}^2}{2}}{N_k + z_{\alpha/2}^2}, \tag{1}$$

where $z_{\alpha/2}$ is the upper confidence limit (two-tailed) for the standard normal. The Wilson confidence ('score') interval is

$$p_{k,l}^{W} \pm c_{k,l}, \tag{2}$$

where

$$c_{k,l} = \frac{z_{\alpha/2}\sqrt{N_k}}{N_k + z_{\alpha/2}^2}\sqrt{p_{k,l}^{W}\left(1 - p_{k,l}^{W}\right) + \frac{z_{\alpha/2}^2}{4N_k}}. \tag{3}$$

If transitions do not depend on the originating state $k$, then the number of transitions from $k$ to $l$ is insignificant. This is the null hypothesis. Under the null hypothesis, the transition probability can be calculated by dividing the number of realisations of regime $l$ by the number of realisations of all regimes except $k$. We label this $p_{k,l}^{null}$ to avoid confusion with $p_{k,l}$. If $p_{k,l}^{null}$ does not fall within the Wilson score interval, then the null is rejected and the number of transitions $n_{k,l}$ is statistically significant at the chosen level.[6] Results for all transitions are reported in Table 3. Transitions from flexible to inflexible regime are significant at the 1% level, whereas transitions in the opposite direction are significant at the 10% level.

[TABLE 3 ABOUT HERE]

# 3 Conclusions

The main conclusions that emerge from our analysis are as follows. First, countries in general do not tend to alter their exchange rate regimes even when confronted with relatively severe economic circumstances. State dependence has continued to be an important feature of the choice of regime in the aftermath of the global economic

[6] This procedure is consistent with Beaver et al. (2008).

crisis. For many countries, the best single predictor of a country's future exchange regime seems to be its most recent one. An exception is a relatively small group of developing countries where there have been significant changes in regime.

Second, and for this group of countries, there have been transitions both towards greater fixity and greater flexibility. However, in the period 2008-12, the more significant shift has been towards greater fixity.

Third, of the countries that shifted their exchange rate regime, about half shifted back to their original regime within a year or two. The period 2008-12 therefore provides further evidence of regime flipping.

Fourth, assuming that each case is not individually unique, the challenge is to provide a convincing general model of transitions in exchange rate regime. However, specific individual circumstances are likely to remain important. In our sample, for example, Estonia's shift to floating was associated with joining the Eurozone, and this had relatively little to do with the particular economic environment associated with the global crisis.

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Table 1: Frequencies and Transition Probabilities (%)

| | freq & prob | **To:** *inflexible* | **To:** *fexible* | **To:** *other* | Total |
|---|---|---|---|---|---|
| **From:** *inflexible* | freq. | — | 15 | 8 | 23 |
| | prob. | — | 65.2 | 34.8 | 100.0 |
| **From:** *flexible* | freq. | 15 | — | 10 | 25 |
| | prob. | 60.0 | — | 40.0 | 100.0 |
| **From:** *other* | freq. | 16 | 4 | — | 20 |
| | prob. | 80.0 | 20.0 | — | 100.0 |
| Total | freq. | 31 | 19 | 18 | 68 |
| | prob. | 45.6 | 27.9 | 26.5 | 100.0 |

Notes. Authors' calculations. Data source: AREAER.

Table 2: Transitions by Country

| Year | Country | From regime | To regime |
|---|---|---|---|
| | | **Transitions to a less flexible regime** | |
| 2012 | Georgia | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2012 | Bolivia* | III.C.5. Crawling peg | III.C.4. Stabilized arrng. |
| 2011 | Guatemala* | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2011 | Egypt* | III.C.6. Crawl-like arrng. | III.C.4. Stabilized arrng. |
| 2010 | Belarus | III.C.7. Horizontal bands | III.C.4. Stabilized arrng. |
| 2010 | Pakistan* | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2010 | Indonesia* | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2009 | Syria | III.C.7. Horizontal bands | III.C.4. Stabilized arrng. |
| 2009 | Burundi | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2009 | Tunisia* | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2009 | Cambodia | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2009 | Jamaica* | III.C.9. Floating | III.C.4. Stabilized arrng. |
| 2009 | Iraq | III.C.5. Crawling peg | III.C.4. Stabilized arrng. |
| 2009 | Bolivia* | III.C.5. Crawling peg | III.C.4. Stabilized arrng. |
| 2009 | Sri Lanka* | III.C.9. Floating | III.C.4. Stabilized arrng. |
| | | **Transitions to a more flexible regime** | |
| 2012 | Guatemala* | III.C.4 Stabilized arrng. | III.C.9. Floating |
| 2012 | Egypt* | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2011 | Honduras | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2011 | Jamaica* | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2011 | Tunisia* | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2011 | Indonesia* | III.C.4 Stabilized arrng. | III.C.9. Floating |
| 2011 | Pakistan* | III.C.4 Stabilized arrng. | III.C.9. Floating |
| 2011 | Bolivia* | III.C.4 Stabilized arrng. | III.C.5. Crawling peg |
| 2010 | China | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2010 | Dominican Rep | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2010 | Bangladesh | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2010 | Estonia | III.C.2 Currency board | III.C.10. Free floating |
| 2010 | Rwanda | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2010 | Croatia | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |
| 2010 | Sri Lanka* | III.C.4 Stabilized arrng. | III.C.6. Crawl-like arrng. |

Notes. An asterisk indicates a country that went back to the original regime following a transition (a 'flipper'). Data source: AREAER.

Table 3: Wilson Transition Probabilities (%)

| | **To:** *inflexible* | **To:** *fexible* | **To:** *other* |
|---|---|---|---|
| **From:** *inflexible* | — | 61.8* | 34.8* |
| **From:** *fexible* | 57.9*** | — | 42.1*** |
| **From:** *other* | 72.5** | 27.5** | — |

*Notes.* One asterisk denotes significance at the 10% level, two asterisks denote significance at the 5% level and three asterisks denote significance at the 1% level. Source: AREAER.

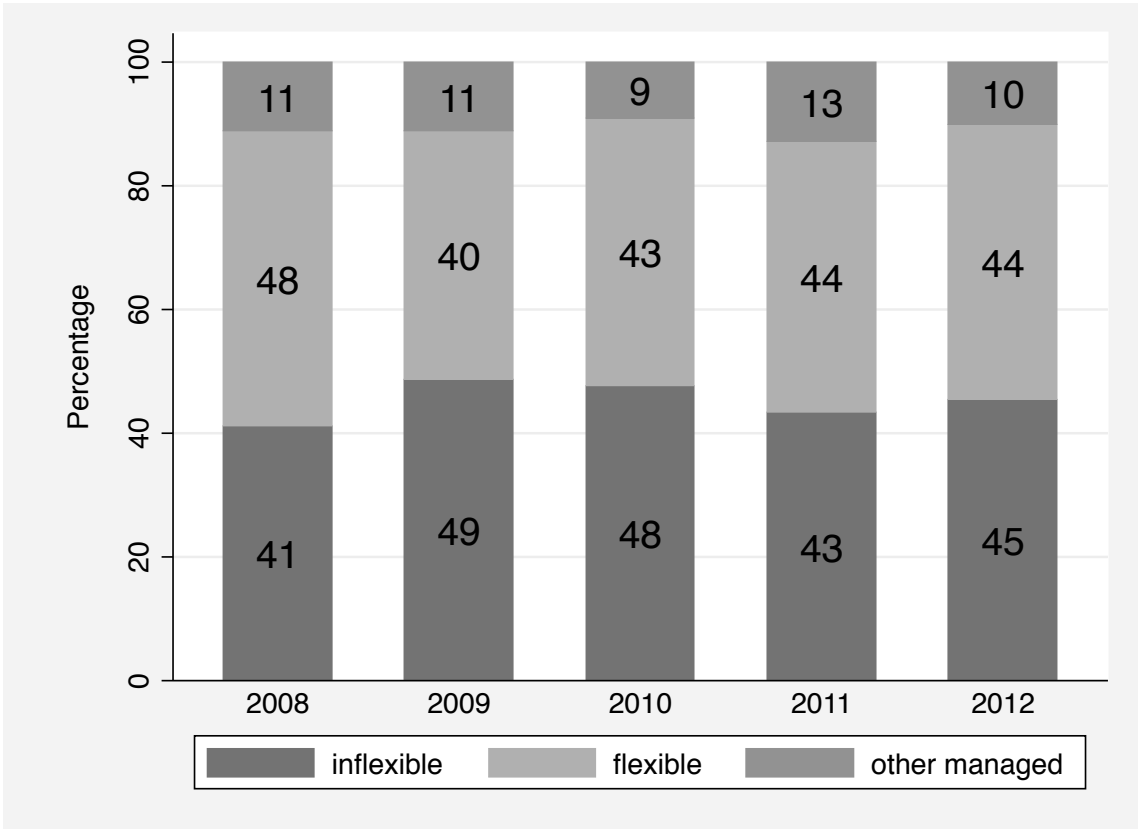


Figure 1: Exchange Rate Regime Classifications (Percent of Total)

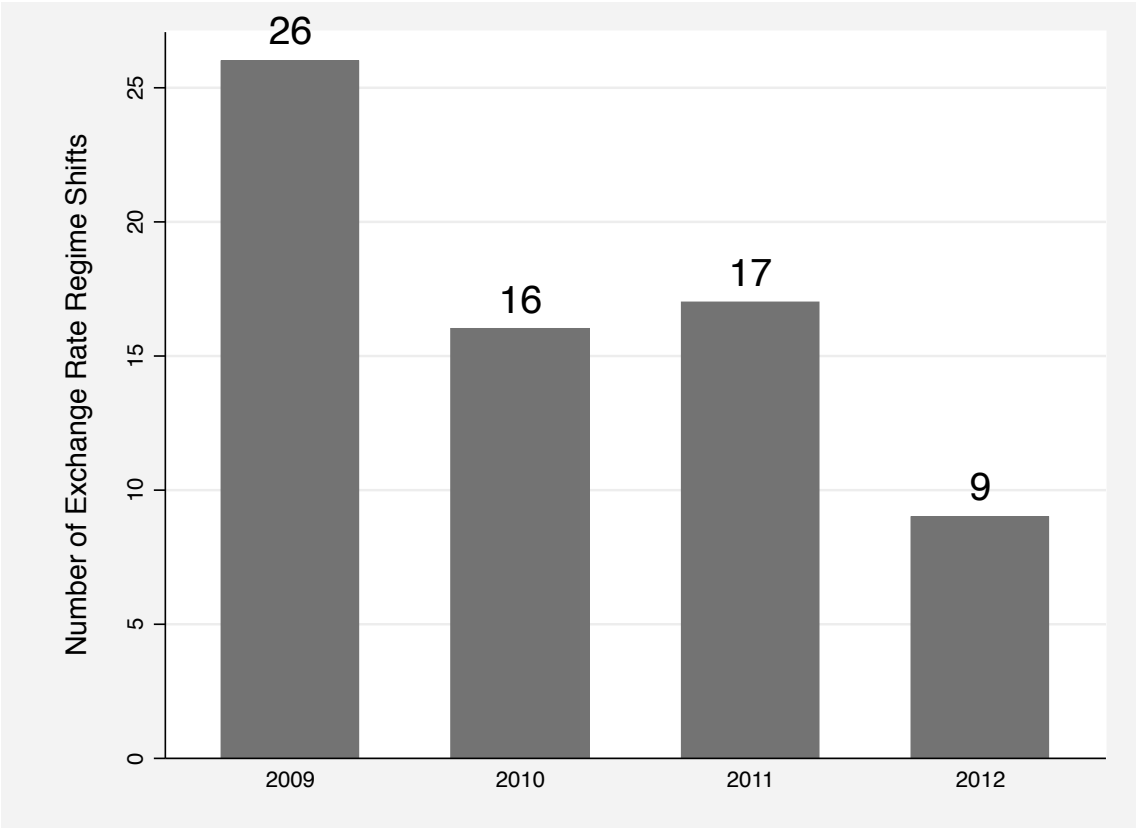


Figure 2: Frequency of Exchange Rate Regime Transitions, 2009–2012