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The empirical relationship between financial development and foreign exchange regimes: Did global financial crisis of 2007-2009 change regime preferences?

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ABSTRACT
This paper studies the empirical nexus between financial development and foreign exchange regime choices of two sets of countries as developed and developing economies. Data covers for the period of 2000-2016 and we employed ordered logistic regression models and found out that more developed financial systems contributes to greater flexibility in exchange rate regimes. We also found that domestic macroeconomic environment and the level of global economic integration play a role in the choice of exchange rate regime. Furthermore, developing countries favour more restrictive regimes while developed countries favour more flexible regimes. Global financial crisis of 2007-2009 has altered the level of influence exerted on the choice of regimes by the so called determinants of regime choice. We specifically discovered that the explanatory powers of the domestic and international macroeconomic environments on regime choice have waned post crises, suggesting that countries have chosen keep tighter control on exchange rates.

Keywords: Exchange Rate Regimes, Financial Development, Global Financial Crises, Ordered Random Effects Logistic Model
JEL Codes: F33, N20, C23

1. Introduction

The literature on the empirical relationship between financial development and other macroeconomic variables has gained a lot of ground over the past few decades. Many researchers have studied the links between financial development and various macroeconomic variables, but the central focus of all these studies has been the link between financial development and growth.

Initial studies that researched the direct link between financial development and growth, both theoretically and empirically includes (King and Levine, 1993; Levine, 1997; Levine and Zervos, 1998; Levine *et al.,* 2000; Ang, 2008). Some other researchers tried to identify the indirect channels (mechanisms) through which financial development contribute to economic growth. Some of such channels identified include domestic investments (Schich and Pelgrin, 2002; Nili and Rastad, 2007; Huang, 2011; Balcılar *et al.,* 2016), domestic savings (Loayza *et al.,* 2000; Kelly and Mavrotas, 2003; Mavrotas *et al.,*

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2005; Güngör *et al.,* 2014a), foreign direct investment (Hermes and Lensink, 2003; Alfaro *et al.,* 2004; Ang, 2009; Güngör *et al.,* 2014b), employment (Giné and Townsend, 2004; Reinhart and Rogoff, 2009; Pagano and Pica, 2012; Boustanifar, 2014), financial openness and foreign trade (Kletzer and Bardhan, 1987; Beck, 2002, 2003; Rajan and Zingales, 2003; Baltagi *et al.,* 2009), and so forth.

As the availability of data in these fields became more easily accessible, very wide range of econometric methods have been employed by researchers in attempting to figure out the channels through which financial development affects growth (or vice versa), and the findings are diverse. However, there has been a very little interest on the nexus between financial development and the choice of foreign exchange rate regimes to see the role of financial development in different foreign exchange rate regime choices of countries. In other words, does the level of financial development tell us which foreign exchange regime to choose? Or is there any hint in financial market development that can tell us about the need to change the current foreign exchange regime in any country? Furthermore has 2007-2009 global financial crises had an impact on foreign exchange regimes? Given these questions, we followed Bordo and Flandreau (2003) and Bordo (2003) and divide our sample countries as developed and developing economies. Then we used five *de facto* exchange rate regime classifications and employed ordered logistic regression method to analyse the effect of financial development on the regime choice of the countries. Furthermore, our paper extends the literature and divide the time span as pre 2007 – 2009 global financial crises period, 2007 – 2009 global financial crises period and post 2007 – 2009 global financial crises period to see the impact of this crises on the foreign exchange regime choices of both group of countries.

In order to answer the above questions, it is imperative to define the exchange rate regimes. Every country has to make a choice about the exchange rate regime that defines the rules for its currency arrangements with the rest of the world. Over time, changing economic conditions often force many countries to alter their practices about the officially accepted exchange rate regimes. Therefore, the officially accepted exchange rate regimes for many countries become time inconsistent. This results in two types of exchange rate regimes—the 'de jure' exchange rate regime that defines the rules for running the currency arrangements and the 'de facto' exchange rate regime which defines how that country actually runs currency arrangements (Calvo and Reinhart, 2002; Levy-Yeyati and Sturzenegger, 2005; Tavlas *et al.,* 2008). We therefore find, in many instances, that there are significant differences between the actual practices and the official claims concerning exchange rate regime rules.

The classification of exchange rate regimes varies from one study to another in literature and there are disagreements of which de facto classification works well with empirical research. The disagreements arise for various reasons such as methodologies employed for classifications and characteristics of countries. Discrepancies are greater in low and middle income countries. Hence, a special caution is necessary when relating financial development to the choice of exchange rate regime (Eichengreen and Razo-Garcia, 2011).

The channel through which the level of financial development affects the foreign exchange rate regime also needs to be elucidated. The volatility of market exchange rates has an impact on the earnings of the domestic firms. When foreign exchange rate appreciates against domestic currency, it reduces the earnings of the domestic firms. This in turn restricts the ability to borrow due to lower ability to pay back the debt. However, exchange rate depreciations have the opposite effect. Thus, the foreign exchange rate appreciation slows down the economic growth due to a decline in investments, especially in R&D.

Conversely, depreciation accelerates the economic growth through the same way. Financial markets serve as a medium in which exchange rate volatility is transmitted into the growth of the economy via domestic firm profits and thus investments. An important issue here however is that the level of financial development differs from one country to another and this changes the impact of volatility of the exchange rates on the earnings of the firms. In other words, financial markets serve as amplifiers in transmitting the foreign exchange rate fluctuations into domestic firms' earnings and thus growth of the economy when the choice of exchange rate regime is a flexible one in less developed financial markets (Aghion *et al.,* 2009; Huang, 2009).

2. Literature Review

Bordo and Flandreau (2003) and Bordo (2003) were the pioneers who studied periods of 1880-1913 and 1973-1997 with two sets of countries as developed and developing economies. They studied the relationship between financial development and the choice of foreign exchange rate regimes of a sample of 44 countries, where 22 were developed and 22 were developing economies. They employed cross section panel data methods and found that more financially developed countries were the floaters (implementing a floating exchange rate regime) whereas less financially developed countries were fixers (implementing a fixed exchange rate regime). This was valid for both periods of 1880-1913 and 1973-1997. They also emphasized that the global financial integration of countries plays an important role in their foreign exchange rate regime choices, and as one moves from fixed to floating, they need to develop their financial markets and get integrated with global financial system.

Another important attempt to find the relationship between level of financial development and the exchange rate regime choice of the countries was made by Aghion *et al.* (2009). They tested to see if the level of financial development matters in choosing how flexible an exchange rate regime should be when the objective is to maximize the long run economic growth where productivity growth was used as a proxy for total growth. Using cross country panel data for 83 countries for the period of 1960-2000, they employed GMM dynamic panel data estimator. Their findings show that real exchange rate volatility can have a significant impact on a productivity growth and the effect depends on the country's level of financial development, thus implying that the more financially developed a country is, the faster it will grow with a more flexible exchange rate regime.

Huang (2009) studied the Schumpeterian economic development model. He employed a GMM dynamic panel data estimator. He used panel data with sample of countries which was composed of twelve Asia-Pacific region economies and the data covered the period of 1992 – 2001. Although he made no robustness tests, he found that level financial development serve as a medium between the foreign exchange regime choice and economic growth performance of the counties.

Lin and Ye (2011) also studied the link between the financial development and the choice of the exchange rate regimes. They employed simple logit model to test for the effect of the level of financial development on the exchange rate regime choice of the countries. They further analysed the likelihood of exiting from fixed to flexible exchange rate regime, given different levels of financial development over time by employing hazard-based duration method. They used data from 102 countries for the period of 1974-2005. They find a significant influence of financial development on countries' choice of exchange rate regimes. Duration analysis showed that a country is likely to exit from fixed exchange rate regime to flexible exchange rate regime when the country is more financially developed.

Slavtcheva (2015) studied the Aghion *et al.* (2009) model and argued that under flexible exchange rate regimes, with higher level of financial development, monetary growth rate and therefore inflation rate is higher and this leads to a lower productivity growth. In other words, less financially developed countries with fixed exchange rate regimes experiences lower inflation rates due to higher required reserve ratios, lower monetary growth rate but higher productivity growth compared to former case. Furthermore, as the financial markets develop more, the growth differences between fixed exchange rate regime and flexible exchange regime are reduced. He used cross-section data for 76 countries in a general equilibrium model developed by himself.

3. Data

Our data set is made up of annual observations of 20 developed and 20 developing countries for the period 2000-2016. The list of countries is provided in the appendix. Concerning the dependent variable, we adopt the de facto exchange rate regime classification of Ilzetzki, Reinhart and Rogoff (2017). Our choice of a de facto classification rather than a de jure classification is because the former reflects the real practices and not the official claims as in the latter. The de facto classification as used in our study has 5 broad categories: de facto peg, de facto crawling peg, managed floating, freely floating and freely falling.

The distribution of exchange rate regimes as displayed in Table 1 shows that the intermediate regimes are the most widely used. This suggests that the bipolar or two-corner hypothesis is still far from being a reality. The hollowing of the middle hypothesis of Swoboda (1986) does not exist in our sample. The observed pattern of regime distribution seems to support the claim by Masson (2000) that countries trying to deal with inflation or increase international competitiveness mostly adopt intermediate

regimes. Furthermore, the transition matrix reported in Table 2 show that this pattern of regime choice distribution is not likely to change drastically in the nearest future as transition from one regime to another is limited. For example, figures reported in the main diagonal of the transition matrix show the following: 96. 91% of countries that adopted de facto peg in the previous period remained in the same regime in the following year, 92.82% of countries that adopted de facto crawling peg the year before remained in the same regime the following year, 95.56% for managed floating, 98.36% for free floating and 63.64 % for free falling.

Table 1. Distribution of exchange rate regimes

exchange rate regime	Over all (%)	Between (%)	Wit hin (%)
1	25.15	35.00	71.8 5
2	27.79	45.00	61.7 6
3	35.29	55.00	64.1 7
4	9.56	12.50	76.4 7
5	2.21	17.50	12.6 1

Table 2. Exchange rate regime transition matrix (2000 -2016)

	Regime choice in period t					
Regime choice in period t-1						Total
1	6.91	.62	.23	.00	.23	100
2	.1	2.82	.42	.00	.66	100
3	.44	.67	5.56	.44	.89	100
4	.00	.64	.00	8.36	.00	100
5	.00	7.27	.09	.00	3.64	100

Our variable of interest—financial development—has mostly been measured by past studies with variables such as domestic credit to private sector, banking sector domestic credit and financial sector domestic credit. This is mainly because these measures are easily accessible. These measures however do not take factors such as the quality of financial services, the financial sector efficiency and stability into consideration. To avoid the possible distortions that may arise in our estimations because of this shortcoming, we opt instead for the global financial development variables provided by the World Bank. The database can be accessed at

http://www.worldbank.org/en/publication/gfdr/data/global-financial-development-database .

The database provides measures for financial development on the basis of financial access, financial depth, financial efficiency and financial stability. Of the numerous measures provided on each of these 4 categories, we specifically select bank accounts per 1000 adults as the measure for financial access, private credit by deposit money banks to GDP as the measure of financial depth, bank net interest margin as the measure of financial efficiency and bank Z-score as the measure of financial stability.

We further aggregate these 4 measures into a single composite index for financial development using principal component analysis (PCA). This is specified as:

$$p_i = \sum_{i=1}^{n} a_{ij} x_i \quad (1)$$

Where: $p_i = p_1, p_2, \ldots, p_k$ = Principal Components, a_{ij} = component loadings, x = original measures.

To control for differences in units of measurements of these 4 variables we use them in their standardized forms. The composite index is then constructed as follows:

$$CI = \sum_{i=1}^{n} a_{ij} \frac{x_{ij}}{\sigma(x)_i} \quad (2)$$

Where: CI is the composite index for financial development and σ is the standard deviation.

In addition, following extant literature, we control for 4 variables generally regarded as key determinants of exchange rate regime choice. They are: GDP growth (which serves as a measure of economic status), inflation (which accounts for the level of monetary discipline), trade openness (which is a measure of the degree of economic openness), and financial openness (which is a measure of capital mobility). While the first two variables are included to control for each country's domestic macro-economy, the last two are included to control for each country's level of world economic integration.

Finally, we introduce a dummy variable for developed countries so as to determine if there is a significant difference between developed and developing countries in the choice of regimes adopted. Data on GDP growth, trade openness and inflation were obtained from the World Development Indicators (http://data.worldbank.org) database and the Chinn-Ito financial openness index which we use as the measure of financial openness can be retrieved from http://web.pdx.edu/~ito/Chinn-Ito_website.htm.

4. Methodology

Dependent variables with several categories ranked in a meaningful sequential order are best estimated using ordered logistic regressions (Hanushek and Jackson, 1977; Greene, 2003). We therefore adopt this approach for our estimations. In general, ordered logistic regression models compare all the categories greater than a given category to those lower than or equal to the given category (> vs. ≤ categories). Thus, when positive coefficients are obtained, the implication is that higher values of the regressor are associated with higher category levels of the regressand, while negative coefficients show that higher values of the regressor increase the likelihood of being in the current or a lower category of the dependent variable (Williams, 2006).

We start by specifying a latent response model in which the observed ordinal responses that indicate exchange rate regime choices (y_{it}) are generated from the underlying unobserved latent continuous responses $y_{it} = \{1,2,3,4,5\}$ for de facto peg, de facto crawling peg, managed floating, freely floating and freely falling. The model is specified as follows

$$y_{it}^{*} = X_{it}^{'}\beta + v_{it} \quad for\ i = 1,2,\dots,N; t = 1,2,\dots,T \tag{3}$$

Where y_{it}^{*} is the continuous, unobserved latent variable, $X_{it}^{'}$ represents the vector of regressors, β represents the coefficient vectors and the subscipts i and t stand for the country and time indexes.

In addition, we take into consideration the unobserved heterogeneous factors that can influence exchange rate regime choices and are country-specific by estimating the ordered logit model with random effects such that;

$$v_{it} = \mu_i + \varepsilon_{it} \tag{4}$$

Where μ_i is the country specific, time independent random effect that is distributed with a mean of zero and variance of $\sigma^2(\mu)$, and ε_{it} is the idiosyncratic error term distributed as logistic with zero mean and variance $\pi^2/_3$.

Conditional on falling within each of the exchange rate regimes, the observed ordinal variable y_{it} is related to the unobserved latent variable y_{it}^{*} and a cut-off parameter γ such that the classification of y_{it} depends on whether or not a given threshold has been crossed.

$$y_{it} = \begin{cases} 1 \text{ if } y_{it}^{*} \leq \gamma_1 \\ 2 \text{ if } \gamma_1 < y_{it}^{*} \leq \gamma_2 \\ 3 \text{ if } \gamma_2 < y_{it}^{*} \leq \gamma_3 \\ 4 \text{ if } \gamma_3 < y_{it}^{*} \leq \gamma_4 \\ 5 \text{ if } y_{it}^{*} > \gamma_4 \end{cases} \tag{5}$$

Furthermore, the associated probabilities of observing each value of y_{it} are given as:

$$P_r[y_{it} = 1|X_{it}, \beta, \gamma] = F[\gamma_1 - X_{it}^{'}\beta] \tag{6}$$

$$P_r[y_{it} = 2|X_{it}, \beta, \gamma] = F[\gamma_2 - X_{it}^{'}\beta] - F[\gamma_1 - X_{it}^{'}\beta] \tag{7}$$

$$P_r[y_{it} = 3|X_{it}, \beta, \gamma] = F[\gamma_3 - X_{it}^{'}\beta] - F[\gamma_2 - X_{it}^{'}\beta] \tag{8}$$

$$P_r[y_{it} = 4|X_{it}, \beta, \gamma] = F[\gamma_4 - X_{it}^{'}\beta] - F[\gamma_3 - X_{it}^{'}\beta] \tag{9}$$

$$P_r[y_{it} = 5|X_{it}, \beta, \gamma] = 1 - F[\gamma_4 - X_{it}^{'}\beta] \tag{10}$$

Where F is the cumulative distribution function of error term.

5. Results

The random effects ordered logistic estimation results are presented in Table 3. The first 4 columns of the table report the estimated coefficients for the different measures of financial development (access, depth, efficiency and stability respectively) alongside the other explanatory variables. The 5th column presents the estimated coefficients for the aggregate financial development index and the other explanatory variables.

With regard to the variable of interest (financial development), we find that all its different measures included in our estimations—except financial access—have statistically significant and positive effect on the probability of adopting more flexible exchange rate regimes. Specifically, the following results are reported; each unit increase in financial depth is associated with 0.2% [$e^{0.002}$=1.002] increase in the odds of adopting a free falling regime versus other regimes. Each unit increase in financial efficiency is associated with 1.41% [$e^{0.014}$=1.0141] increase in the odds of adopting a free falling regime versus other regimes. For every unit increase in financial stability, it is expected

that the odds of adopting a free falling regime versus other regimes will rise by 2% [$e^{0.020}$=1.020]. Finally, when the aggregate financial development index is considered, we find that for each unit increase in financial development, the odds of adopting a free falling regime versus other regimes increases by 2.9% [$e^{0.029}$=1.029]. In summary, the results show that countries with higher levels of financial development are more likely to adopt flexible exchange rate regimes.

Concerning the control variables, both GDP growth and trade openness have statistically significant and negative impacts on the probability of adopting more flexible exchange rate regimes in all the estimations. These findings are in tandem with existing literature. For example, Edwards (1996), Ghosh et al. (2002), Husain et al. (2005), Bleaney and Francisco (2007), and Ebeke (2015) have suggested that countries experiencing faster growth usually adopt fixed exchange rate regimes in order to avoid potential credibility problems. Also, according to the optimum currency area theory (Mundell, 1961; McKinnon, 1963), countries that engage in high volumes of international trade prefer fixed regimes since it is more suitable for trade. This finding is consistent with previous literature such as Frieden et al. (2000), Piragic and Jameson (2005), Markiewicz (2006), Frieden et al. (2010), and Rodriguez (2016). On the other hand, inflation has a positive and statistically significant impact on the probability of adopting more flexible regimes in all the estimations. This is reasonable since large fluctuations in inflation rates will naturally make fixed exchange rate regimes unsustainable. As for the development dummy, all the estimates indicate that the probability of adopting flexible regimes is higher in developed countries than in developing countries. This is similar to the findings made by Larrain and Velasco (2001) and Frankel (2003). Financial openness is predominantly insignificant in our estimations.

Table 3. Random effects ordered logistic estimates [full sample]

Explanatory variables	[1]	[2]	[3]	[4]	[5]
GDP growth	-0.048***	-0.013***	-0.018***	-0.011***	-0.012***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade openness	-0.022***	-0.019***	-0.018**	-0.018**	-0.020***
	(0.003)	(0.009)	(0.015)	(0.019)	(0.000)
Inflation	0.167***	0.162***	0.180***	0.163***	0.175***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Financial openness	0.391*	0.221	0.385*	0.219**	1.246
	(0.073)	(0.308)	(0.089)	(0.019)	(0.496)
Development	1.389**	0.269**	0.283**	0.351**	0.756**
[developed =1, developing =0]	(0.020)	(0.032)	(0.015)	(0.019)	(0.021)
Access	0.0002				
	(0.814)				
Depth		0.002**			

		(0.046)			
Efficiency			0.014**		
			(0.018)		
Stability				0.020**	
				(0.043)	
Financial development index					0.029***
					(0.002)
Number of observations	610	610	610	608	612
Number of id	40	40	40	40	40
Wald chi2 stat	78.10***	78.10***	78.10***	76.68***	50.37***
	(0.005)	(0.000)	(0.000)	(0.000)	(0.000)

*Notes: (1) ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. (2)Robust p-values are in parenthesis. (3) Wald chi2 test is a test for the null hypothesis that all coefficients are jointly equal to zero.*

5.1 **Sub-period analysis**

It is worthy of note that our sample includes the years of the global financial crisis (2007-2008). Although the period before the global financial crisis was a relatively stable one, the advent of the crisis however led to increased volatility and large depreciations in currencies of many countries, and the period after the crisis was characterized by currency wars during which many countries engaged in competitive devaluations. It is therefore important to partial out and examine the influence of the crisis in our estimations. We therefore further split our sample into 3 sub-periods that are relevant for exchange rate regime determination; pre-crisis period (2000-2006), crisis period (2007-2009) and the post-crisis period (2010-2016). We then re-estimated the regression model for the pre-crisis and post-crisis periods.

The sub-period estimation results are reported in Tables 4 and 5. In general, the signs of the variables are virtually the same as those reported in the full sample. The results again confirm the following; economic growth and trade openness have negative impacts on the probability of adopting more flexible regimes, inflation has a positive impact on the probability of adopting more flexible regimes, and developed countries are more likely to adopt flexible regimes.

The sub-period analyses however reveal some differences. First, we find that the sizes of the post-crisis coefficients are markedly smaller than those from the pre-crisis period. Particularly, we find that although higher levels of financial development are still associated with the probability of adopting more flexible regimes in both the pre-crisis and post-crisis periods, the sizes of the impact are significantly smaller in the post-crisis

period than in the pre-crisis period. We also find that the sizes of the coefficients for the development dummies are many times smaller in the post-crisis period than those in the pre-crisis period. This general drop in explanatory power post-crisis is an indication that as a reaction to the adverse effects of the crisis, countries are keeping tighter control over exchange rates and as a consequence reducing the level of flexibility in exchange rate regimes.

Table 4. Random effects ordered logistic estimates [pre-crisis]

Explanatory variables	[1]	[2]	[3]	[4]	[5]
GDP growth	-0.010***	-0.028***	-0.026***	-0.027***	-0.028***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade openness	-0.013**	-0.020**	-0.013**	-0.021	-0.032**
	(0.013)	(0.014)	(0.021)	(0.334)	(0.044)
Inflation	0.010**	0.013**	0.007**	0.011*	0.007**
	(0.017)	(0.035)	(0.032)	(0.056)	(0.040)
Financial openness	0.144**	0.111*	0.107*	0.103*	0.116*
	(0.013)	(0.060)	(0.062)	(0.085)	(0.052)
Development	0.655***	0.354**	0.411**	0.404**	0.392*
[developed =1, developing =0]	(0.001)	(0.028)	(0.038)	(0.044	(0.056)
Access	0.0006				
	(0.923)				
Depth		0.019**			
		(0.024)			
Efficiency			0.011*		
			(0.079)		
Stability				0.021**	
				(0.023)	
Fin. dev index					0.011*
					(0.085)
Number of observations	267	267	267	267	267
Number of id	40	40	40	40	40
Wald chi2 stat	46.32***	46.32***	40.03***	46.32***	40.41***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

*Notes: (1) ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. (2)Robust p-values are in parenthesis. (3) Wald chi2 test is a test for the null hypothesis that all coefficients are jointly equal to zero.*

Table 5. Random effects ordered logistic estimates [post-crisis]

Explanatory variables	[1]	[2]	[3]	[4]	[5]
GDP growth	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Trade openness	-0.003***	-0.004**	-0.002***	-0.002***	-0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation	0.003**	0.003***	0.003***	0.003***	0.003***
	(0.013)	(0.000)	(0.000)	(0.000)	(0.000)
Financial openness	0.043	0.041	0.055	0.440	0.036
	(0.994)	(0.532)	(0.388)	(0.515)	(0.591)
Development	0.506**	0.231**	0.205**	0.240**	0.222**
[developed =1, developing =0]	(0.035)	(0.021)	(0.015)	(0.011)	(0.015)
Access	0.0003				
	(0.352)				
Depth		0.003***			
		(0.000)			
Efficiency			0.011*		
			(0.082)		
Stability				0.004**	
				(0.028)	
Fin. dev index					0.009**
					(0.039)
Number of observations	276	276	276	276	76
Number of id	40	40	40	40	30
Wald chi2 stat	58.06***	58.65***	61.03***	61.03***	58.21***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

*Notes: (1) ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively. (2)Robust p-values are in parenthesis. (3) Wald chi2 test is a test for the null hypothesis that all coefficients are jointly equal to zero.*

Conclusion

This paper examined the effect of financial development on the choice of exchange rate regime in a panel of 40 countries (20 developing and 20 developed). To this end, we utilized 5 different de facto exchange rate regime classifications, 4 different measures of financial development and an aggregate of the 4 measures of financial

development and estimated ordered logistic models with random effects. The main finding is that more developed financial systems contribute to greater flexibility in exchange rate regimes. Countries with higher levels of financial development are more likely to adopt flexible exchange rate regimes.

We also considered a range of exchange rate regime determinants and found that the domestic macroeconomic environment plays a role in the choice of regime adopted by countries. Furthermore, we found that the extent to which countries are integrated into the global economy through international trade is also a determinant of regime choice. Another key finding of ours is that developing countries favour more restrictive regimes while developed countries prefer more flexible regimes.

We further discovered that the global financial crisis of 2007-2008 has altered the level of influence exerted on the choice of regimes by the so called determinants of regime choice. We specifically discovered that the explanatory powers of the domestic and international macroeconomic environments on regime choice have waned post-crisis. This suggests that post-crisis, countries have chosen to keep tighter control on exchange rates.

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Appendix: List of Countries

Developed: Australia, Belgium, Canada, Denmark, Finland, France, Germany, Holland, Iceland, Israel, Italy, Japan, Norway, Portugal, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States. **Developing:** Argentina, Brazil, China, Ghana, India, Indonesia, Iran, Kenya, Lebanon, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Russia, South Africa, Thailand, Tanzania, Turkey, Venezuela.