

## The economic determinants of an exchange rate regime choice: a Logit and descriptive analysis

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### Abstract

In this paper, we are making attempt to measure the main determinants of the fixed or flexible exchange system for a sample consisting of emerging countries. Through the use of Logit model with reference to the [Quan \(2003\)](#) methodology, we are interested on the sample of Great Maghreb countries such as Tunisia, Morocco, and Algeria. Our objective is to identify the most discriminating variables among those domestic and external factors in choosing the optimal exchange rate regime relative to a recent period, ranging from 1974 to 2010. In addition, a descriptive analysis is going to be conducted in order to better explain the nature of this correlation. The results are consistent with some studies carried out by [Poirsson, \(2001\)](#) and [Honig, \(2005\)](#) demonstrated that there exists a support for the role of domestic variables. Regarding the external variables, we are according a great support for the role of foreign exchange reserves due to its positive correlation with the choice of favourable exchange rate regime.

**Keywords:** Monetary policy, exchange rate regime, emerging economy, Logit, descriptive analysis.

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### 1. Introduction

For many years, economists, and policy makers as well as banking sector authorities in developed countries have had a very little interest in the regime exchange issue prevailing in the emerging countries. The persistent belief has been that the regime exchange in these countries had no specificity and that all developing countries, whether in transition phases or emerging economies, had to follow the policies pursued by the developed countries. But with the emergence of such crises as those accruing in Mexico (1994), Asia (1997), Russia (1998), Brazil (1999) and Argentina (2002), it has become necessary forced in developing countries to pay some special head and certain considerations to such serious cases. Hence, the persistent underlying question has frequently been that which exchange rate regime can be appreciated for the case of emerging countries.

First of all, regime exchange can be defined as being a set of rules governing the exchange of currencies on a special market called the foreign exchange market. The mutual duality between the offers and demands for various currencies in this market identifies the determination of a certain price, called the exchange rate. The exchange rate reflects the changes in the external value of a country

currency. However, exchange rate may be influenced by many variables and its growth evolution is strongly correlated with the dealings rules of taking place in the foreign exchange market.

For the emerging countries, the choice of any exchange rate regime would inevitably lead to a major currency crisis. In the early 1970's, with the collapse of Bretton Woods, the major recurrent key words were flexibility and independence of monetary policy. The explosion of inflation in the 1980's in many countries of Latin America has shifted the debate focus to the virtues of stabilization policies by the nominal exchange rate anchorage.

In the 1990's, however, inflation was no longer a major problem in most countries, the advantage of the fixed exchange credibility has lost its importance. In fact, the debate has taken new dimensions with the liberalization of capital movements' namely moral hazard, robustness of financial system, and speculative attacks. Following the crises, the most spreader propagated idea was except for free floating and final connect, all other monetary exchange systems policy were unstable.

In line with this theory, unstable environment and financial globalization should eliminate the intermediate regimes to cede the way for two extremes systems that of free floating and

institutional linkage. The debate seemed to be closed until the Argentine crisis (2002), which highlighted the effects of rigid attachment. The question has also rebounded on the importance of flexibility and the replacement of nominal exchange rate policy by inflation targeting. According to [Velasco and Roberto \(2000\)](#), the opportunity to gain in inflation terms is appropriate when the presence of fixed regimes is illusory and elusive. The author argues that no system of exchange could be a substitute for sound macroeconomic policies.

On the other hand, the approach based on the fear of floating just explains why some countries de jure floating exchange rates, setting de facto currency in which their foreign debts are assessed. [Reinhart, \(2000\)](#) analyzed the behaviour of exchange rates, foreign exchange reserves, money supply and interest rates according to different exchange rate regimes adopted for the aim of checking whether the latter's represent faithfully the actual countries practices. They have concluded that most of the countries concerned that have floated their currencies were opposed to the idea and that the widespread fear of floating is closely linked to credibility problems.

The root causes of the pronounced reluctance of emerging market countries to float their currencies are numerous. With presence of favourable circumstances (i.e. in the presence of capital inflow and various favourable terms of trade, for instance), these countries are often reluctant to leave the nominal exchange rate and real appreciation. This might be mainly due to their fear of a competitiveness loss and to the decline in the diversification of their exports. When the circumstances are unfavourable, the arguments against a sharp depreciation are even stronger. In fact, [Reinhart, \(2000\)](#) as well as [Hausmann et al., \(2000\)](#) have all promoted some dollarization schemes as compared to pure float. [Ghosh et al., \(2000\)](#) were in favor of the currency board; [Williamson, \(2000\)](#) has advocated the BBC regime and [Fisher, \(2001\)](#) adopted the bipolar thesis.

Nevertheless, [Honig, \(2005\)](#) presents empirical evidence that liability dollarization is associated with less exchange rate flexibility. [Frankel, \(2005\)](#) argues that devaluations are contractionary in emerging markets, essentially, because of the effects of exchange rate movements on the balance sheets of both private and public sectors in foreign currency countries.

[Hausman et al., \(2000\)](#) noticed that countries with high foreign currency debts and not hedged against the exchange risk to which they are exposed, are encouraged to fix their currency in terms of the foreign exchange which they borrowed, even if ,it is officially floating. Furthermore, the predominance of a substitute currency also tends to encourage them to fix the exchange rate levels, such as an arrangement can protect the economy from the effects of a

potential excessive volatility in exchange rates and foreign exchange markets.

On the other hand, other studies have introduced and taken into account the considerations of optimal macroeconomic stability ([Melvin, \(1985\)](#), [Savvides \(1990\)](#) and [Cuddington and Otoo \(1991\)](#)). The latter's having discovered that the choice of a system depends on the nature and the source of shocks it has had on the economy. Indeed, the presence of domestic nominal shocks increases the probability of a money anchorage, against the actual reduced shocks.

Furthermore, empirical literature considers the latest political and institutional variables influences on the choice of a fit exchange rate regime, ([Collins, \(1996\)](#); [Edwards, \(1996\)](#); [Berger et al., \(2000\)](#); [Meon and Rizzo \(2002\)](#), and [Poirson, \(2001\)](#)). [Collins, \(1996\)](#) and [Edwards, \(1996\)](#) have set their empirical models within a context where political costs associated with devaluation, play an important role in the presence of a fixed regime.

While [Collins, \(1996\)](#) considers no direct political economy variables in his analysis, [Edwards, \(1996\)](#) introduces certain variables that measure the degree of political stability and government strength. Thus, their econometric results demonstrate the following fact:

Political instability makes it difficult to anchor a fixed line support for the theory, and therefore, encourages the adoption of flexible arrangements.

- In most of the relevant studies, inflation is combined with a floating regime. It has been generally lower and less volatile in the case of fixed regimes;
- Terms of trade and foreign exchange reserves represent important incentives to switch to a floating exchange rate;
- Moreover, [Meon and Rizzo \(2002\)](#), in their turn, have examined the relationship between political instability and sustainability of exchange rate regimes as a pattern part relative to the monetary policy credibility. They have found that political uncertainty is well correlated with the adoption of a flexible exchange rate regime.

In addition, a debate about the gap between exchange rate regimes as regulated by law and actual practices of Central Banks has been the subject concern of several studies. The most important contributions in this field are those elaborated by [Levy and Sturzenegger \(2002\)](#) who have highlighted the link between the exchange rate regime, on the one hand, and the volatility of exchange rates, international reserves and interest rates, on the other. In fact, a floating exchange rate regime is normally accompanied by an increase in nominal exchange rate volatility and to a lower degree in international reserves and interest rates.

Recently, [Güçlü \(2008\)](#) exposed that the choice of exchange rate regime was influenced more by the level of economic development, inflation differential

and political factors, and less by the current account deficit/surplus and capital account openness. Petreski, (2009) explained that the exchange rate regime influenced the economic growth all the way through the channels of trade, investment and productivity. He also recommended that policy makers must find a balance between reduction of exchange regime policy uncertainties and adjustment mechanism in time of shocks

An increasing number of emerging countries are abounding the actual management of their exchange rate policies to adopt a strategy of inflation targeting and currency floating. This latest craze leads us to wonder if such decisions or announcements are actually flexible *de facto*. Then, we might wonder here, have the emerging economies abandoned the management of their exchange rate policies, or is it simply slight towards a disguised management policy? Have they actually applied a strict inflation targeting, or rather a monetary policy without any exchange rate target?

This paper's primary goal is to analyze the choice of optimum exchange rate regime fit to the emerging economies. By applying the Logit model along with the qualitative descriptive analysis, we are going to measure the major determinants of both fixed and flexible exchange corresponding to a sample of some emerging countries using the Quan, (2003) method. Our objective is to identify the most discriminating variables among the domestic and external variables in choosing the most optimum exchange rate regime for the Great Maghreb Countries sample and concerning a recent period, ranging from 1974 to 2010.

## 2. Materials and method

### 2.1. The choice of an optimum exchange rate regime: a Logit model and descriptive analysis (Presentation of the sample countries)

The currencies of the Maghreb countries, strongly attached to different baskets reflecting trade with multi-partners, were originally the subject of a highly centralized management during the years 1970s and 1980s. The Dollar, as an invoicing currency of export earnings and principal of debt denominated in foreign currencies, played a major role in these countries dealings on transactions. Trade imbalances, mainly due to deteriorating terms of trade, have induced the monetary authorities to conduct devaluations of the nominal exchange rate in Algeria and Morocco.

Moreover, to better reflect market forces and support the process of trade liberalization, a more flexible management of exchange rate was adopted in the mid-1990s. These measures have helped to bridge the gap narrow the margin between the official exchange rate and parallel exchange rate. Tunisia and Morocco have ultimately established the convertibility of their operations in 1993, while Algeria put it in place in 1997.

Currently, the Maghreb countries are adopting exchange rate regimes. The systems established in Algeria, Morocco and Tunisia are of managed floating type with no prior announcement of the exchange rate trajectory, securing conventional sticking with a basket of currencies and slippery parity. In fact, the euro-zone countries are major trading partners of the great Maghreb countries. They are also a most important source of significant portion of tourism revenues, remittances by residents abroad and foreign investment flows.

In the past, part of the trade transactions with the euro zone countries of the euro area (in particular with the southern European countries) was charged in U.S. dollars. The maghrebian structure of international regulations was, therefore, largely dominated by the Dollar. This is no longer the case, ever, since the adoption of the Euro currency.

Really, before appearance of the euro, the European capital markets were unattractive because of their fragmentation and poor liquidity. The advent of the euro and the integration of markets have led to a decrease in the cost of indebtedness to the European capital market. Moreover, the indebtedness structure of the Maghreb is increasingly amended in favour of the Euro.

In short, the European Union (especially the northern Mediterranean countries belonging to the Euro zone) has become the largest trading partner of the Maghrebian countries. The new trade tendency would therefore justify an anchoring policy favouring the Euro, yet a country's exterior situation doesn't depend entirely on its external competitiveness as it carries an external debt denominated in other foreign currencies.

Indeed, we note that trade transactions with the United States are almost equal as well to zero and that nearly three-quarters of trade dealings are accomplished with the Euro Zone. However, the dollar's share in the wording of debts is still larger than that of the euro. This imbalance raises the question of strategy anchoring and, hence, the choice of a reasonable exchange rate regime.

However, the object of our study is not whether the Maghrebian countries should anchor on a currency or a basket policy, nor to determine the relative weights of different currencies in the basket but, specifically, to check whether their trade relations affect their choice of certain exchange rate regimes.

### 2.2. Data

Retracing the path pursued by the recent works dealing with the study of the determinants of exchange rate regime, we are adopting the Quan, (2003) approach. After having identified the different interactions existing between the various theoretical relationships among the fixed and flexible systems and the currency anchor policy is identified, we set

out, the probability of selecting either the relatively fixed or flexible plan as a function of economic attributes and policies.

It is reminding that the tested model has two relevant equations. The first of which involves just the country's domestic characteristics as explanatory variables. As for the second model, it also includes, as well, such control variables as the foreign exchange reserves, external debt and foreign direct investment.

It is worth noting, that the study covers the period 1974-2010 relevant to the three emerging maghrebian countries study (Tunisia, Morocco and Algeria) and is based on the exploitation of the database provided by the World Development Indicators 2011.

For this aim, we resort to the Logit model, estimating a choice system between two schemes, the dichotomous dependent variable coded as 1 if the country chooses a fixed one and 0 otherwise. The explanatory domestic conditions variables include:

- Openness measured by trade (imports + exports) / Gross Domestic product.
- Economy size measured by the Napierian logarithm of GDP converted into constant Dollars.
- Differential inflation measured by deflated gross domestic product.
- Domestic credit converted to the Napierian logarithm.
- Investment account measured by the Gross Fixed Capital Formation turned into a Napierian logarithm.

Regarding the external explanatory variables, they are:

- Foreign Direct investment noted FDI as a percentage of Gross Domestic Product.
- Exchange reserves translated into current Dollars.
- External debt converted into current Dollars.

In reality, the first model has introduced the regime change as a function of various attributes of the domestic variables country. Once the model is estimated, we get the predicted probability that integrates into our basic model attempting to measure whether the international relations and more specifically the conditions within a non-domestic currency influence the great Maghrebian countries choice of their exchange rate regimes.

In addition, a descriptive analysis will be conducted for the sake of better understanding and clarifying the correlation phenomenon between the choice of certain exchange rate regimes while the presence of domestic and external variables.

### 3. Result and discussion

#### 3.1. Logit model and optimum exchange rate regime: results and interpretations

The estimates results are presented in the two following tables below. Table 1 shows the results of regressions used to test our hypothesis.

**Table 1** Domestic characteristics and choice of exchange rate regime

Regime change	Indicators used	Sig.	Probability
Company Size	Ln PIB US \$ current	-	0.000*
Differential Inflation	GDP of inflation	+	0.002
Trade openness	Imports + exports / GDP	+	0.000
Domestic credits	DC current LCU	-	0.618
Investment	FGCF current LCU	+	0.000
Constant	-----	-	0.000

\*significance at 1% risk

Firstly, we notice that a negative (positive) and statistically significant coefficient indicates that the variable reduces (increases) the probability of choosing an anchor with respect to a more flexible regime. The first results of Table 1 appear to confirm when the theoretical predictions about the links between the country's characteristics and the choice of an exchange regime, such as [Cuddington and Etoo \(1991\)](#) and [Collins, \(1996\)](#).

Moreover, it is mentioning that the choice of a flexible regime is more appropriate for these countries, as most domestic variables are positive and significant (differential inflation, Gross fixed capital formation and trade openness). Table 2 referring below demonstrates other results when it was linked the domestic variables, to the other external ones.

It is clear, from the above results of Table 2, that domestic variables are more viable in determining the choice of a certain exchange rate regime than other types of external features as the majority of domestic variables are significant.

Moreover, it should be noted that most of the domestic variables have not changed in significance until the introduction of external control variables (i.e trade openness, differential inflation, economy size).

Though, in conformity with some other studies dealing with the determinants of exchange rate regime, the results do not seem to be very robust. Also, it was emphasized by [Mauro and Juhn \(2002\)](#) that there are no robust empirical regularities for the countries selection of their exchange rate regimes. This is observable from the above table when examining the positive and negative domestic and control variables.

**Table 2** Domestic and external characteristics and choice of exchange rate regime

Regime change	Indicators used	Sign	Probability
Company size	Ln GDP US \$ current	+	0.005**
Differential Inflation	GDP of inflation	-	0.000
Trade openness	Imports + exports / GDP	+	0.135
Domestic credits	DC current LCU	-	0.003**
Investment	GFCF current LCU	-	0.004**
External Debt	E D current US \$	+	0.438
Foreign Direct investment	FDI in % of GDP	-	0.125
Exchange Reserves	ER current US \$	+	0.000*
Constant	-----	-	0.000

\*significance at 1% risk \*\* significance at 5% risk

Then, we shall support the role of domestic variables as they play a very crucial role in selecting a substitute regime when change appears to be necessary. As for external control, we must not underline the role that foreign exchange reserves play as they have a positive correlation with the choice of a fit exchange rate regime, along with a significance observed between the two variables. As for the other two variables (external debt and foreign direct investment), they have not confirmed a well-founded correlation with the variable object of

study. These results are consistent with some empirical attempts made by Edwards, (1996) and Poirsson, (2001).

### 3.2 Descriptive analysis and optimal choice of exchange regime: results and interpretations

For the sake of determining the nature of consistent domestic and external variables which are necessary for the choice of an optimal exchange rate regime to the Great Maghreb Countries, a descriptive analysis will be conducted. The results appeared in Table 3 as listed below.

**Table 3** Descriptive statistics of domestic and external variables

Variables	Observations	Mean	Std. dev.	Min.	Max.
Size of company	111	23.6857	0.941009	21.08738	25.46582
Differential Inflation	111	2.089579	0.881319	-0.3407955	3.985062
Trade openness	111	4.131826	0.257235	3.486903	4.688334
Domestic credits	111	23.08345	1.893998	19.64574	26.83566
Investment	111	22.3233	1.008006	19.50329	23.91565
External debt	111	21.35478	5.307246	3.3523	24.23911
Foreign direct investment	111	17.93626	2.5011	9.21034	21.90814
Exchange reserves	111	20.76169	1.186425	17.90815	23.75778

According to the above results in Table 3, we discover that most of domestic variables show a very low standard deviation ie an attempt to adjust sound quality with the variable object of study concerning an exchange rate regime (economy size, differential inflation, openness trade and foreign exchange reserves). These results confirm those attained by the Logit model.

As for the results of the total correlation depicted in the table 4 below, between the regime change and the

domestic and external variables, there is a greater weight accorded to the exchange reserves variable on the choice of regime change at the order of (0.6243), followed by the weight of economy size at (0.5092), domestic credit at (0.46 87), investment at (0.4478) and trade openness (0.4015). This result confirms the dominant persistence always accorded to domestic variables in addition to the control variable of foreign exchange reserves. The results of this estimate are presented in Table 4 below.

**Table 4** Total correlation between the exchange rate regime and macroeconomic variables

	Size	Ldifinl	Lope	Lcredi	Lcapital	CR	Ldebt	Linvest	Reserve
Size	1								
Ldifinl	-0.0036	1							
Lope	0.0124	-0.3235	1						
Lcredi	0.5514	-0.0177	0.0505	1					
Lcapital	0.9761	-0.0074	0.0553	0.4352	1				
CR	<b>0.5092</b>	-0.3293	<b>0.4015</b>	<b>0.4687</b>	<b>0.4478</b>	1			
Ldebt	-0.1533	0.2323	-0.2572	-0.1607	-0.1235	-0.3076	1		
Linvest	0.0591	-0.2514	0.5444	0.2046	0.0432	0.3052	-0.3551	1	
Reserve	0.6958	-0.0847	0.3838	0.7694	<b>0.6243</b>	0.7280	-0.3749	0.4123	1



For just a partial correlation of the domestic variables with the exchange rate regime, we note that there exists a major particular burden related to the variable trade openness and economic size in relation to the dependent

variable. This result, as table 5 below indicates, is always in tandem with the results already mentioned in the qualitative Logit model.

**Table 5** Partial correlation of the exchange rate regime in the presence of domestic variables

Variables	Correlation	Significativity
Size	0.3843	0.000*
Differential Inflation	-0.2817	0.003
Trade openness	0.4599	0.000
Credits	0.0473	0.628
Investment	-0.3175	0.001

\*significance at 1% risk

In the same spirit, the results of Table 6 are also very important as they state persistent crucial role which plays the variable exchange reserves (an average correlation of 0.46 and a significance of zero). As mentioned above, the

external debt and foreign direct investment variables have not shown such a correlation. On the contrary, they reported a disagreement of coordination with the dependent variable of exchange rate regime.

**Table 6** Partial correlation of the exchange rate regime of domestic and external variables

Variable	Correlation	Significativity
Size	0.2585	0.008
Differential Inflation	-0.3818	0.000*
Trade openness	0.1404	0.155
Credits	-0.2671	0.006
Investment	-0.2630	0.007
External debt	0.0734	0.459
Foreign Direct investment	-0.1442	0.144
Reserves	0.4675	0.000

\*significance at 1% risk

#### 4. Conclusion

The issue of choosing convenient exchange rate regimes corresponding to the emerging economies has been a considerable revival in the wake of the recent financial crises that hit these countries. Previously regarded as bearing a bright future, these countries have often been unable, in an environment dominated by high mobility of capital, to adopt appropriate policies enabling them to begin their peace and establish harmony with economic and financial integration. Our analysis seems to validate the idea of Frankel, (1999) that "no regime change is universal and eternal", as all schemes whether fixed or flexible intermediaries present some advantages and disadvantages.

Although this proposal, as such, does not resolve the issue of choosing a certain fit regime change, it, nonetheless, highlights the fact that the life of any regime change depends on contribution of certain structural determinants as well as, macroeconomic and financial policies. The monetary authorities of every country have to be convinced that no matter what form of exchange rate regime is set and operating in practise. It is likely to collapse if it is not supported by appropriate

macroeconomic policies, structural reforms and appropriate financial strategies. These countries authorities must also take account of the need to gradually introduce greater flexibility of the exchange rate, as the capital account has been liberalized for the sake of maintaining a certain degree of monetary independence, avoiding giving implicit guarantees to foreign investors and being able to cope with shocks as to the terms of trade.

Finally, in order to avoid the misalignments of exchange rate and ensure a highly competitive level real exchange rate, it is imperative for the authorities to implement a prudent sequencing policy in managing massive capital and improving efficiency and depth of the foreign exchange market.

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