Choice of exchange rate regime in a selection of African countries

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Abstract

An exchange rate regime has an important impact on macroeconomic policies within developing countries and therefore essential in macroeconomic policy formation. The main research question is to determine how the variety of determinants would influence the exchange rate regime choice for a selection of 19 African developing countries. A distinction is made between three groups of variables, namely economic fundamentals, economic stabilisation aspects and currency crises factors, all affecting a country's exchange regime choice. The probability of these determinants is then estimated to establish whether the selected countries would choose a fixed, an intermediate or a flexible exchange regime.

Key words: Exchange rate regime, African countries, determinants of exchange regime choice

INTRODUCTION

The choice of exchange rate regimes is a controversial issue among practitioners and academics alike. An exchange rate regime has an important impact on macroeconomic policies within developing countries and therefore regarded as an essential ingredient in macroeconomic policy formation. Since the end of Bretton Woods, a large body of literature has developed around the choice of exchange rate regimes, which became one of the main concerns of empirical international economists (Eichengreen and Razo-Garcia, 2011). Recently, exchange rate determination has received increased academic attention of note through research and discussion (Berdiev, Kim and Chang, 2012). A recent book by Klein and Shambaugh (2010), *Exchange Rate Regimes in the Modern Era*, provide compelling evidence of the importance of exchange rate regimes. The choice of the exchange rate regime

has always been a source of great debate and has recently resurfaced owing to a weak US dollar and volatile crude oil prices (Rafiq, 2011). According to Frieden, Leblang and Valev (2010), the type of exchange rate regime is very important as it provides a significant impact on price stability, international trade and monetary policy of a country. The exchange rate of a country is probably the most important asset price and choosing an exchange rate regime is like choosing a monetary policy. In addition, the operation of fiscal policy is dramatically affected by the chosen exchange rate regime of a country. In a paper by De Vita and Kyaw (2011), the macroeconomic consequence of a country's exchange rate regime choice is addressed by focusing on the choice of exchange rate regime and the long-term growth of developing countries. Therefore, the issue of exchange rate regimes is a captivating issue that will definitely intrigue economists for the conceivable future (Rose, 2011). Furthermore, the effective communication of policy objectives is critical in monetary policymaking and a country's official exchange rate regime is one of the most important signals of a government's economic policy preferences (Guisinger and Singer, 2010). As the world still suffer from the consequences of the global financial crises, raising concerns about inflationary pressures in developing countries may need them to revisit the impact of the exchange rate regime (Ghosh, Qureshi and Tsangarides, 2011).

The choice of an exchange rate regime is subject to various aspects and influenced by both the prevailing global economic condition and the domestic economic situation. After the collapse of the Bretton Woods System in 1973, the choice of a country's exchange rate regime expanded between freely floating regimes to some kind of exchange rate peg. When considering developing countries, the end of the 1970s suggests the first stage of free choice of exchange rate regimes. During the early 1980s most developing countries were confronted with difficulties such as exogenous shocks and international credit limitations. Although a

movement towards a more flexible (floating and flexible would be used interchangeably in this paper) regime occurred since the mid 1980s, the developing countries in general did not follow this trend. The fashion of different types of intermediate arrangements was rather pursued with a mixture of exchange rate stability and flexible policies. In the years following, the International Monetary Fund and the World Bank exercised a great deal of influence. At the end of the 1980s and early 1990s two conflicting theories within the two institutions emerged with one favouring flexible rates and the other a return to fixed rates (Rizzo, 1998).

In general, countries have a choice between a floating exchange rate, a fixed exchange rate or a blend of the two. Many countries prefer this blend, called an intermediate path, where the central bank stabilise the exchange rate but also allow it to sometimes shift, often called a "soft peg". A lesson emerged after the East Asian financial crisis of 1997-1998 where countries faced a bipolar choice between a framework for credibly guaranteeing a fixed exchange rate, known as a "hard peg", or accept a freely floating exchange rate. In essence, a floating exchange rate simply means that the regime will allow some exchange rate flexibility. It merely rules out a fixed exchange rate but not much more. Various monetary policy strategies may be pursued in a country where a floating exchange rate is implemented. In most developing economies, exports, imports and international capital flows makes up a large share of the economy. This means that large fluctuations of the exchange rate may cause significant swings in the real economy. A country with a high level of US dollar denominated loans can experience serious injury to their financial system in case of large depreciations and therefore a reluctance to allow totally free fluctuations in the nominal or real exchange rate (Calvo and Mishkin, 2003).

Although the choice of the exchange rate regime is important, the wellbeing of the fundamental macroeconomic institutions must also be emphasised, including institutions related to fiscal, financial and monetary stability. The deeper institutional arrangements in a country is therefore also of great importance. Most studies on the choice of exchange rate regimes do not make a distinction between developing and developed countries (Rizzo, 1998). However, the focus in this paper is specifically on developing countries only as they are usually more vulnerable to currency volatility and are also more harmful to their economies (Ghosh and Ostry, 2009). Empirical evidence shows substantial difference regarding the choice of exchange rate regimes between developed and developing countries (Hefeker, 2009). This is echoed by Ghosh, Ostry and Chamon, (2015) which claimed that the global financial crisis prompted an unprecedented degree of policy activism, amongst other, exchange rates regimes. According to them, exchange rate plays a more important role in developing and emerging countries than developed countries. Discrepancies between the classifications of exchange rate regimes are in general greater among developing countries than developed countries (Eichengreen and Razo-Garcia, 2011). Any deviation between public assurances and actual exchange rate movements can be catastrophic for developing countries (Guisinger and Singer, 2010). As studies about exchange rate regimes and African countries only is basically non-existent, this paper will focus solely on countries within the African continent and their choice of a fixed, intermediate or flexible exchange regime. An attempt is thus made to isolate not only a group of developing countries but specific those from Africa to provide some insight into the approach followed by these countries.

The rest of the paper is organised as follows: Section 2 discusses the optimum choice of exchange rate regimes, while Section 3 describe the classification of exchange rate regimes and regime determinants. In Section 4 the estimation procedure is explained using a logit

model which indicates the probability of a country to choose one of the three exchange rate regimes. The results are also provided and discussed in Section 4. The conclusions drawn from the analysis is discussed in Section 5.

OPTIMUM CHOICE OF EXCHANGE RATE REGIME

Over time, theoretical investigation on exchange rate regime choice includes the Optimum Currency Area theory to maintain external balance (Mundell, 1961), while McKinnon (1963) focussed on the maintenance of price stability. Both these authors identify the main costs of joining a currency block as the loss of flexibility provided by a separate currency in response to adverse shocks. An important aspect, affecting these costs is the nature of the shocks. A country sharing common shocks with other countries may have less need for an independent monetary policy and exchange rate adjustments. Countries may abandon its own currency or move to a rigidly fixed exchange rate if the benefits exceed the costs. The biggest potential benefit for a rigidly fixed exchange rate in case of a developing country is policy credibility and confidence gains, causing a permanently lower inflation rate. Several studies indicate that giving up exchange rate flexibility may not be very costly for developing countries. It seems that contrary to conventional wisdom, devaluations in these countries reduce output and therefore destabilise the economy (Ahmed, 2003).

Since the late 1970s, empirical research on exchange rate regime choice expanded as more diverse regime choices became possible. Following these, the size and nature of economic shocks (Fischer, 1977) and the automatic-stabiliser property of exchange rates and structure of the economy became more evident (Dreyer, 1978, Flood, 1979 and Turnovsky, 1983). The analysis was based on the fact that countries experiencing large foreign price shocks should

rather opt for flexible exchange rates. Domestic monetary and demand shocks should be financed out of reserves with no exchange rate adjustments. These studies were later supplemented by additional variables in studies on shocks and stabilisation strategies (Savvides, 1990). Different types of shocks have been included recently and support for the influence of the size of domestic and foreign shocks on exchange rate regime choice has been found (Melvin, 1985, and Cuddington and Otoo, 1991).

Studies such as Eichengreen and Hausmann (1999), Calvo and Reinhart (2001) and Frankel (2006) questioned the sensibility of floating exchange rate regimes for developing countries. Floating regimes may exhibit high short-term exchange rate volatility which tends to be substantially higher in developing countries with poorly developed foreign exchange markets. This volatility creates uncertainty, increases transaction costs and interest rates, discourages international trade and investment and generally fuels inflation. Therefore, the closer one moves to the fixed exchange regimes, the stronger and credible institutional arrangements that guarantee nominal exchange rate stability. The intermediate exchange regimes provide a balance between exchange rate stability and flexibility (Yagci, 2001).

A key concern in choosing an exchange rate regime is the vulnerability of the regime to currency attack and contagion. The risk of a currency attack and contagion is lower under the fixed and flexible exchange regimes. A properly managed intermediate regime can significantly reduce the risk of currency attacks and contagion. Floating exchange regimes are generally more successful in applying monetary policy to manage the domestic economy. Under a fixed regime monetary autonomy are either surrendered to another country or strictly tied to rigid rules, while the intermediate regimes impose some constraints on monetary policy. Countries experiencing prolonged problems with high inflation may opt for a pegged

exchange rate to reduce inflation without too high costs. When inflation is brought under control, confidence returns and increased integration into international capital markets may require more flexibility in the exchange regime (Yagci, 2001). This would reduce vulnerability to currency crises and allow monetary policy to impact on the domestic economy. Regarding the vulnerability to shocks, the floating regimes may be able to absorb the impact of adverse external or domestic shocks. However, the shock absorption capacity of the fixed regimes is fairly limited with changes mainly in economic activity and employment which could be a painful process.

A very important aspect in selecting an exchange rate regime is also the degree of economic integration among countries. Countries that are highly integrated regarding trade, economic and political relations, with high labour mobility, symmetric shocks and high income correlation are likely to constitute an optimum currency area. The level of integration will determine the benefits they may derive from their own monetary policy. Small countries would probably be better off pegging their currencies to a large neighbouring country or adopt the neighbour's currency. These arrangements would reduce transactions costs and interest rates, eliminate exchange risks, and encourage higher levels of integration and growth (Yagci, 2001).

There are three main approaches to regional exchange rate cooperation (Yagci, 2001; Lin, 2006; Levy-Yeyati, Sturzenegger and Reggio, 2010, Frankel, 2012). The mutual exchange rate pegging arrangement is the first approach where members of the group agree to limit fluctuations of their exchange rates within set bands. They also agree on coordinated economic policies when exchange rates near the edges of the bands. The European Monetary System which was established in 1979 was a good example. The regional currency union is a

more ambitious approach because it may involve sacrificing national currencies and establishing regional monetary institutions. The largest currency union is the European Economic and Monetary Union with the euro as its single currency. Other examples include the CFA franc zone and the Common Monetary Area in sub-Sahara Africa. The CFA franc zone consists of two separate monetary unions with Benin, Burkina Faso, Ivory Coast, Guinea-Bissau, Mali, Niger, Senegal and Togo in the first and Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon making up the second. Both unions have their own central banks to conduct the common monetary policy for the groups. Each group maintains a separate currency, pegged at the same fixed rate against the euro (previously the French franc) with financial support from the French Treasury. The Common Monetary Area includes four southern African countries namely South Africa, Lesotho, Namibia and Swaziland. The South African rand circulates freely in Lesotho, Namibia and Swaziland along with each country's own currency. The last approach is the common links to an outside currency or basket of currencies as the monetary standard for the regional group. Although intra-regional institutions are avoided, it requires close policy coordination among members.

Institutional and political variables were added in later studies (Edwards, 1996). Recent studies on regime determinants include Rizzo (1998); Juhn and Mauro (2002); von Hagen and Zhou (2002); von Hagen and Zhou (2007); Carmignani, Colombo and Tirelli, (2008); and Fiess and Shankar, (2009). From these studies it seems as if the empirical results are sensitive to the composition of the sample, construction of the data used and the specification of the model. The question of which exchange rate regime is right for developing countries remains a controversial issue.

Fixed versus flexible exchange rates

Most theoretical models assume that the key difference between flexible and fixed exchange rate regimes is that nominal exchange rates can not be adjusted under a fixed regime. A common characteristic of countries with a fixed exchange rate regime is that they do allow the option of nominal adjustments. The problem of adjustments under a fixed regime is that it is seen as a government decision which will be highlighted by the political opposition. Under a managed exchange rate the adjustments would be easier to disguise and less costly politically. In addition, in a more flexible exchange rate system, it would be more difficult to distinguish between exchange rate adjustments within the system or as a consequence of government intervention. Blaming politics thus become more difficult and therefore countries that anticipate the probability of frequent adjustments should rather opt for more flexible regimes (Collins, 1996). Some authors like Williamson (1982) argues that independent floating was undesirable for most developing countries because of limited capital markets, restrictions on capital flows and the occurrence of real shocks which was to be financed from reserves. However, this view changed over time and Kan (2007) indicated that developing countries were able to adopt a flexible regime given that they had a wide range of structures. It seemed as if small open economies in the Latin and Caribbean region that did change to more flexible exchange rates, did quite well. Although no consensus exist, some studies have shown that the clearest role for the exchange rate as a nominal anchor is in the case of very high or hyper inflation. Many authors argued that a fixed exchange rate is a useful tool for a stabilisation programme, compared to a flexible one which makes it difficult to change domestic price and wage settings to reduce inflation (Collins, 1996). In an environment of high inflation, pegging to a currency of a country with low inflation was seen as a pre-commitment mechanism to anchor inflationary expectations. On the other hand, most countries during the emerging market crises in the 1990s, had pegged exchange rates. Many

observers felt that the only option for these countries is super hard pegs or floating (Bordo, 2003).

The choice between a fixed or more flexible exchange rate regimes emphasise the trade-offs between credibility and flexibility (Frankel, 2012). It seems that a country with a flexible regime allows a country to have an independent monetary policy, providing the flexibility to accommodate domestic and foreign shocks. In contrast, a fixed exchange rate regime reduces the level of flexibility but emphasise a higher degree of credibility. Furthermore, it is suggested that a more volatile foreign economy can be an argument in favour of a fixed exchange rate regime once similarities in the business cycles in both countries are taken into account. The reason for this is that under fixed exchange rates, the pegging country loses the ability to stabilise domestic shocks and it tend to import monetary policy from the country to which it pegs. The higher level of foreign output variance will support the choice of a fixed exchange rate because foreign monetary policy is, at least in principle, targeting the same real shocks as the home economy (Berger, Sturm and de Haan, 2000).

Mundell-Fleming model

If an economy predominantly faces a nominal shock, that is shocks that arise from money supply or demand, a fixed exchange rate regime becomes appealing, based on the Mundell-Fleming model. If a monetary shock causes inflation it will most probably lead to a depreciation of the exchange rate and then transmit a nominal shock into a real one. In this scenario, a fixed exchange rate provides a mechanism to accommodate a change in the money demand or supply with less output volatility. However, if shocks are real, like a shock to productivity or terms of trade where export and import prices shifts due to changing demand or supply, some form of floating regime becomes attractive. Here, an economy needs

to respond to a change in relative equilibrium prices like between tradable and non-tradable goods. A shift in the nominal exchange rate provides a quick way of implementing such a change and thus restores the impact of these shocks on output and employment. However, in case of an economic downturn driven by real factors under a fixed regime, the demand for domestic money drops and the central bank is compelled to absorb excess money supply in exchange for foreign currency. The result is that this lower demand for domestic money causes an automatic outflow of hard currency and higher interest rates. The depth of the economic downturn will therefore be exaggerated by a fixed exchange rate regime (Calvo and Mishkin, 2003).

Lahiri, Singh and Vegh, (2006), however, state that the most critical assumption of the Mundell-Fleming model namely imperfection in the goods market and undistorted capital markets (i.e. perfect capital mobility) posts a problem. In developing countries, asset market frictions appear to be equally, if not more important than goods market frictions. A very large section of the population (referred to as traders) in developing countries does not necessarily have access to asset markets. Therefore one needs to revisit the Mundell-Fleming model in a situation with flexible prices but segmented asset markets. One has to take cognisance of the fact that a fraction of the population in a developing country has access to asset markets, while the rest of the population does not (non-traders). This means that contrary to the Mundell-Fleming model, in the case of a real shock, fixed exchange rates are perceived to be optimal whereas if shocks are monetary, flexible exchange rates are preferred. Flexible exchange rates allow for costless adjustments to monetary shocks by altering the real value of existing nominal money balances. Under fixed rates, asset market segmentation prevents non-traders from rebalancing real money balances by accessing asset markets, which impacts on the consumption path. In case of real shocks, fixed rates allow purchasing power to be

transferred across periods, which cause some consumption smoothing. Under flexible rates, non-traders are forced to consume their current endowment (Lahiri, Singh and Vegh, 2006). They therefore conclude that the optimal exchange rate regime should depend on both the type of shock (real versus monetary), as indicated by Mundell-Fleming and on the type of distortion (goods markets versus asset markets friction). The optimal exchange rate regime thus becomes an empirical issue that depends both on the type of shock experienced in a particular economy and on the relative distortions present in goods and asset markets.

Although there are many exceptions, some generalisations about the conditions under which different regimes would function could be made. According to Yagci (2001) and Frankel (2012) the floating regimes would be appropriate for medium and large industrialised countries and some developing countries with import and export sectors that are relatively small compared to GDP. However, they should be fully integrated into the global capital markets with diversified production and trade sectors and a deep and broad financial sector. The fixed exchange regimes (hard and soft pegs) are more appropriate for countries under the optimum currency area criteria (European Economic and Monetary Union), small countries already integrated in larger neighbouring countries or countries with a history of monetary disorder, high inflation and low credibility of maintaining stability. The soft peg regimes would be best for countries with limited links to international capital markets, less diversified production and exports and shallow financial markets. The intermediate regimes which aim to feature the benefits of the floating and fixed (pegged) regimes while avoiding their weaknesses are better suited for developing countries with relatively stronger financial sectors and more disciplined macroeconomic policy (Yagci, 2001).

All exchange rate regimes offer benefits as well as costs. The flexible regimes are less vulnerable to currency crises, absorb adverse shocks and a country can pursue an independent monetary policy. The problem is that flexible regimes have high short term exchange rate volatility and large medium term swings associated with misalignment. The fixed regimes provide maximum stability and credibility for monetary policy with low transactions costs, exchange rate risk and interest rates but suffer from the loss of lender of last resort. If the country is open to international capital flows, they are inherently vulnerable to currency crises. The intermediate exchange regimes give up some nominal stability for greater flexibility. These countries provide limited nominal anchor for inflationary expectations but avoid volatility and overvaluation and reduce the risk of currency crises. No single exchange regime is best for all countries at all times and the choice would depend on the specific country circumstances (Yagci, 2001, Frankel, 2012).

CLASSIFICATION OF EXCHANGE RATE REGIMES

This section describes a simple model of exchange rate regime choice including the measure of regime. The International Monetary Fund (IMF) provides a classification of exchange rate regime for all member countries. This classification refers only to the main official rate for each country. The available classifications, however, do not necessarily provide detail information to distinguish between the actual degree of flexibility or the extent of intervention. In this study a simple distinction between three exchange arrangements will be made to distinguish between fixed regimes, intermediate ones and freely floating regimes to simplify the analysis.

Another important issue is how exchange rate regimes are classified. It can either be de jure or de facto. There is a substantial difference between de jure and de facto classifications, between what countries say they do and what they actually do. The former classifies countries by what they say they do and it has been the traditional approach of the IMF and authors like Gosh, Gulde and Wolf (2003). The latter approach, as described by Levy-Yeyati and Sturznegger (2005), start with the principle that countries often do not do what they say they do which may be because of their "fear of freedom" or lack of credibility. Most countries listed as having a floating exchange rate in fact intervene in the foreign exchange market frequently. On the other hand, most countries classified as pegged have in fact has realignments within the last 10 years (Frankel, 2003).

The description of the exchange rate regime used in many countries does not necessarily fit into a well-defined conventional regime, making the specific classification somewhat of a problem. A related problem that is often experienced is that the exchange rate, declared by a country, differs from the actual exchange rate regime that is applied (Alesina and Wagner, 2006; Carmignani, Colombo and Tirelli, 2008). Countries report their exchange arrangements to the IMF and this classification system, in effect since 1999, is based on the members' actual, de facto arrangements as identified by the IMF staff (IMF, 2012). The report of these regime classifications by the IMF is published in the Annual Report on Exchange Arrangements and Exchange Restrictions (IMF, 2012). Shortly after the end of the Bretton Woods System, the IMF classified all exchange arrangements under either a pegged regime or a more flexible regime. In 1999, the IMF changed the classification scheme to take the actual behaviour of the exchange rate into account with the two extremes set between no separate legal tender and independently floating (Von Hagen and Zhou, 2007). The IMF classification system is now based on the member's actual, de facto arrangements which may

differ from their officially announced, de jure arrangements. The system classifies exchange rate arrangements primarily on the basis of the degree to which the exchange rate is determined by the market rather than by official action. A distinction is made between four major categories namely hard pegs, soft pegs, floating regimes and a residual category called other managed (IMF, 2012).

This study will make a distinction of exchange rate arrangements according to the IMF classification. The following would provide an explanation of the various categories. A fixed arrangement will include the Exchange arrangements with no separate legal tender and Currency board arrangements according to the IMF classification [Bordo (2003) classify it as the CFA franc zone, currency boards, dollarization and currency unions]. An intermediate arrangement will include Other conventional fixed-peg arrangements, Pegged exchange rates within horizontal bands and Crawling pegs [Bordo (2003) classify it as an adjustable peg, crawling peg, basket peg and target zones or bands]. The floating exchange rates would include Managed floating with no pre-determined path for the exchange rate and Independently floating [Bordo (2003) classify it as free floats and managed floats]. The distinguishing line between fixed and intermediate arrangements would be if the policy to fix is an institutional commitment. Between intermediate and floating the distinction would be if there is an exact target zone where intervention will occur (Bordo, 2003).

African countries

It seems as if most African countries operate some form of flexible exchange regime, however, these are significantly different from free floats operated by major developed countries. Calvo and Reinhardt (2002) have shown that a discrepancy exist between *de jure* and *de facto* exchange rate regimes. They have dubbed this behaviour "fear of floating" and

showed that it differs across regions and levels of development. The group of countries falling within the managed float are also bigger than the independent float group of countries. The scope of countries operating within the intermediate regimes (between the fixed and float regimes) is probably higher in Africa than in many other parts of the world because of capital controls and low integration with world capital markets. Although a shift towards flexible exchange rates have been noted on the African continent, Masson and Pattillo (2005) indicated that the increase is rather small which may indicate a "fear of floating". The main reason for this seems to be the financial sector weaknesses. Slavov (2011) reveals that many sub-Saharan African countries show signs of "fear of floating".

Slavov (2011) states that many sub-Saharan African countries claimed to have *de jure* floating exchange rate regimes. These countries include Ethiopia, Gambia, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa, Tanzania, Uganda and Zambia. This represents 11 of the 19 countries used in this study and they have been consistently classified as *de jure* floaters over the period of investigation. This classification, however, differs from the IMF classification. The remaining countries are pegged to a single currency or a basket of currencies. The first group of countries are pegged to the euro and include the West African Economic and Monetary Union (WAEMU) countries namely the Ivory Coast and Senegal, and the Central African Economic and Monetary Union (CEMAC) countries of Cameroon and Gabon (Thiam, 2011). The last group of countries are from Southern Africa, namely Lesotho, Namibia and Swaziland and they are pegged on par to the South African rand. Lastly, Botswana is pegged to a basket of the South African rand and the SDR. The classification of countries is reported in the Appendix, Table A2.

The question arises why so many countries claim to have a flexible exchange regime and then in fact do not have. This "fear of floating" seems to be mainly because of a poorly developed financial system by most sub-Saharan African countries. Given that sub-Saharan Africa are exposed to frequent and large external shocks such as terms of trade or donour flows, one would expect a more, rather than less flexible exchange regime. According to Slavov (2011), numerous reasons for the existence of this "fear of floating" may provide some insight into this puzzling question. Depreciations are generally associated with financial distress and not, as conventional theory predicts, with export-led growth. Policy makers in many developing countries also suffer from a persistent lack of credibility and thus want to limit exchange rate volatility as a way to re-gain credibility. In that way they can convey a message of monetary discipline to financial markets. A condition of access to global financial markets for developing countries is also sometime aligned to currency stability. A sharp depreciation in the nominal exchange rate may cause a sudden pause of capital flows into the country and thus adjustments in the current account and collapse of credit ratings.

Many developing countries have a higher exchange rate pass-through (ERPT) than developed countries, meaning that the general price level is more sensitive to exchange rate fluctuations, given that they are smaller and more open to trade. Therefore, monetary authorities would try and keep exchange rates more stable. Another aspect is that a stable exchange rate stimulates international trade as it reduces risk and transaction costs. This is more so with developing countries as they tend to have less developed financial markets and less instruments available to hedge exchange rate risks. Lastly, sharp fluctuations in the nominal exchange rate combined with sticky prices give way to unstable relative prices between trade and non-traded goods. Considering all these aspects, the question then still remains why so many sub-Saharan countries maintain that its currency is freely floating. A possible answer may be that

they try to avoid speculative attacks associated with an explicit commitment to a particular level of exchange rate (Slavov, 2011).

Determinants of regime choices

Regime choices are influenced by a vast array of determinants. Yagci (2001) argues that the selection of an exchange rate regime depend on a variety of factors which include the size and openness of a country, financial flows, structure of its production and exports, stage of financial development, its inflationary history and the nature and source of shocks it faces. In addition, the political conditions and the credibility of its policy makers and institutions are also important factors. It simply means that no single ideal exchange rate regime would be appropriate for similar countries. The final choice would therefore depend on the relative weight given to each of these factors.

In line with the work of Von Hagen and Zhou (2002), a distinction is made between three groups of factors affecting a country's exchange rate regime, namely economic fundamentals, stabilisation aspects and currency crises factors.

Under the economic fundamentals, economic openness (OPENNESS, measured by the ratio of trade to GDP), economic size (SIZE, measured by GDP), level of economic development (ECONDEV, measured by per capita GDP) and degree of financial development (FINDEV, measured by the ratio of broad money to GDP) are included as variables. According to Von Hagen and Zhou (2002), economic openness and economic size can be seen as important fundamentals and it seems in general that small and open economies are more likely to adopt fixed exchange rate regimes than large and relatively closed ones. In addition, a country is more likely to adopt a fixed exchange rate regime, if trade is heavily concentrated on a

particular currency area. Furthermore, a country with a very concentrated production structure is more likely to adopt a flexible exchange rate compared to countries with a highly diversified production structure. This is so because as exchange rate changes are almost equivalent to changes in the relative output prices and thus more useful to cope with demand shocks for the former. Lastly, the development of a country's financial sector is important and countries with poor developed financial sectors often opt for fixed exchange rate regimes. This is mainly because of the lack of market instruments to conduct domestic open market operations and they want to shield their banking industry against large exchange rate fluctuations.

The stabilisation aspects include the annual rate of inflation (INFLATION, measured by $\pi/(1+\pi)$), real exchange rate volatility (REER, measure by the real effective exchange rate) and domestic monetary shocks (MONEY, measured by broad money growth rate). Boyer (1978) argues that fixed exchange rates perform better in terms of output stability in the presence of monetary shocks originating in the domestic economy with flexible rates performing better in the presence of real shocks. Countries that are more exposed to large supply-side shocks should rather consider flexible exchange rates, while countries enduring large monetary and financial market disturbances should peg their exchange rate. However, some countries use their exchange rate policies to achieve low inflation rates. Following Melitz (1988), some authors argued that countries whose monetary authorities experience low credibility of low-inflation policies can import central bank credibility by adopting a fixed exchange rate with a more stable currency.

Currency crises factors included are international reserves (RESERVES, measured by the broad money to total reserves ratio), public finance achievement (PUBFIN, measured by the

government consumption expenditure to GDP) and current account status (CA, measured by current account balance to GDP). Recently, the shift towards full or large capital mobility has highlighted the impact of capital movements for the choice of exchange rate regimes. A high degree of capital mobility, linked to a fixed exchange rate regime is exposed to speculative attacks resulting from fundamental policy inconsistencies (Krugman, 1979) or self-fulfilling expectations that arise in the context of multiple equilibrium (Obstfeld, 1996). The important point is to avoid unstable combinations of capital mobility and fixed exchange rates. A country with a fixed exchange rate can reduce the risk of speculative attacks by maintaining both high levels of foreign currency reserves to protect it and consistent macroeconomic policies. Sustainable public finances are an important aspect in this case.

EMPIRICAL ESTIMATION

In making the correct exchange rate regime choice some empirical evidence on economic performance is very important. In line with Von Hagen and Zhou, (2002), a distinction between three groups of factors affecting a country's exchange rate regime choice will be made. These three groups include economic fundamentals, variables relating to macroeconomic stabilisation and variables relating to the risk of currency crises. The study area would be a selection of 19 sub-Saharan African countries, selected on data availability, and the time period under consideration is between 2000 and 2010. The list of countries is reported in the Appendix, Table A1.

Several recent studies point to the advantages of multinomial probit relative to multinomial logit models. Dow and Endersby, (2004) argue that the simpler logit is often preferable to the more complex probit. Their argument include that within the limits of typical data neither

model will clearly appear to have generated the observed data. In addition, the probit model is prone to a number of estimation problems as it is often weakly identified in application. Weak identification is difficult to detect and may lead to plausible, yet arbitrary or misleading inferences and thus researchers are justified in using the logit specification. The probit also presents a difficult maximum likelihood optimisation problem that sometimes fails to converge at a global optimum or produces parameter estimates that are suitably imprecise causing the statistical inferences to be suspect. Except for cases of profound mis-specification, the logit likelihood will optimise at its global maximum and is not prone to optimisation errors. There are few a priori factors present to consider the one method superior to the other in typical application. Given the effort invested to argue the merits of each method, the probit and logit models are remarkably similar in important respects. The desirable statistical properties of both models include consistency, normality and efficiency.

The choice of exchange rate regimes will be described using a discrete variable, $y(i,t)$, which takes a value of $y(i, t) = 1$ if a fixed regime is selected by country i in year t, $y(i, t) = 2$ for an intermediate regime and $y(i, t) = 3$ for a floating regime. This choice is based on the economic variables discussed above and will indicate which regime is desirable for which country. A value for the discrete variable of 1 or smaller will indicate the preferred regime is a fixed regime and a value of 3 or bigger will indicate the regime of choice is a floating regime. Any value between these two would indicate an intermediate exchange regime is chosen.

A static model of exchange rate regime choice will be considered. It is assumed that the variable, $y(i,t)$ is a linear function of a vector of contemporaneous explanatory variables, $Z(i, t)$,

$$y(i,t) = Z(i, t)'\beta + u(i,t), \qquad i=1,2\ldots,N, \qquad t=1,2\ldots,T(i),$$

where β is a row vector of coefficients, N is the number of countries and T(i) denotes the total number of observations for country i. The error term u(i,t), is assumed to be independently and identically distributed (i.i.d) across countries, years and regimes with a logistic distribution function. This gives rise to a logit model which provides the probability of a country to choose one of the three exchange rate regimes given Z(i, t), (Von Hagen and Zhou, 2002).

The multinomial logistic regression is a classification method with more than two possible discrete outcomes. It is a model that is used to predict the probabilities of the different possible outcomes of a categorically distributed dependent variable, given a set of independent variables. The logit model can be justified by the fact that it is similar to a normal distribution but has a much simpler form and slightly heavier tails.The dependent variable is categorical, so it falls into any one of a set of categories which cannot be ordered in any meaningful way and for which there are more than two categories. The multinomial logit model assumes that data are case specific; that is, each independent variable has a single value for each case.

A static version of the basic pooled effects in a panel model was used in the estimation to determine how the variables discussed impacted on the choice of exchange rate regimes. The differences in the standard errors showing differences per year in each country were corrected by applying the cluster time approach.

Results

The model performed relatively well overall according to the "goodness of fit" tests. The

significant value is less than .05, given a chi-square of 235.475 with 20 degrees of freedom.

The Cox & Snell R Square (.676) and the Nagelkerke R Square (.787) provide an indication

of the amount of variation in the dependent variables explained by the model. This pseudo R

square statistics of .676 and .787, suggests that between 67.6 per cent and 78.7 per cent of the

variability is explained. The likelihood ratio tests are shown in Table 1 which seems to

confirm the goodness of fit of the model.

Table 1: Likelihood ratio tests

Effect	Chi-square	df	Sig
Intercept	41.204	2	.000
openness	7.458	2	.024
size	21.971	2	.000
econdev	27.965	2	.000
findev	34.141	2	.000
inflation	7.506	2	.023
reer	6.042	2	.049
money	9.446	2	.009
reserves	11.877	2	.003
pubfin	40.268	2	.000
ca	29.096	2	.000

The signs of the coefficients are most important as it will indicate the probability of whether a

variable will promote the choice of a country towards a specific exchange regime or not. The

flexible exchange rate regime was taken as the base outcome and therefore the estimation

only shows the results for the fixed and intermediate exchange regimes. The results of the

probability of choosing a fixed exchange regime are reported in Table 1 and the results of the

probability of choosing an intermediate exchange regime are reported in Table 2. A negative coefficient will therefore indicate that an increase in the level or value of a variable will deter a country to adopt that specific exchange regime. A positive sign will show a positive probability associated to that specific exchange regime in a country.

Table 2: Basic pooled panel – Fixed exchange regime

Variables: Fixed	Coefficient	Std.Error	z	P value
OPENNESS	-2.38926	1.1647	-2.05	0.040***
SIZE	-2.1110	3.9811	-5.30	0.000***
ECONDEV	0.00039	0.0004	0.85	0.397
FINDEV	-0.09400	0.0293	-3.20	0.001***
INFLATION	-1.33540	2.7933	-0.48	0.633
REER	-0.07122	0.0271	-2.62	0.009***
MONEY	-0.098332	0.0349	-2.81	0.005***
RESERVES	0.46374	0.1308	3.54	0.000***
PUBFIN	-0.56222	0.1101	-5.11	0.000***
CA	31.36549	6.8236	4.60	0.000***
CONSTANT	20.50383	4.3797	4.68	0.000***

Author's calculations. Notes: */**/***/ significant at 10%/5%/1% level

Table 3: Basic pooled panel – Intermediate exchange regime

Variables: Intermediate	Coefficient	Std.Error	z	P value
OPENNESS	0.68517	0.3122	2.19	0.028***
SIZE	-2.5511	4.0012	-6.38	0.000***
ECONDEV	0.00091	0.0004	2.14	0.033***
FINDEV	-0.11191	0.0294	-3.79	0.000***
INFLATION	0.19145	0.845	2.26	0.024***
REER	0.00923	0.0113	0.81	0.416
MONEY	-0.03695	0.0185	-1.99	0.047***
RESERVES	0.39454	0.0964	4.09	0.000***
PUBFIN	0.13025	0.0345	3.77	0.000***
CA	14.7223	2.5654	5.74	0.000***
CONSTANT	-1.78511	1.5917	-1.12	0.262

Author's calculations. Notes: */**/***/ significant at 10%/5%/1% level

The estimation suggests that the economic fundamental variables play an important role in the choice of the selected countries. These variables include economic openness (OPENNESS), economic size (SIZE), economic development (ECONDEV) and the level of financial development (FINDEV). The OPENNESS variable is statistically significant and bears a negative sign for the fixed regime and a positive sign for the intermediate exchange regime. This confirms the expectation of choosing an intermediate or a flexible exchange rate regime the more open the economy. The results therefore suggest that the more open an

economy to foreign trade, the more likely they are to adopt an exchange regime other than a fixed exchange regime.

The SIZE variable is statistically significant and has a negative sign for both the fixed and intermediate exchange regimes. This variable increases the likelihood of choosing a flexible exchange rate regime which is in line with traditional theory. This confirms that the larger the country's GDP the more likely that it will adopt a flexible exchange regime.

The coefficient of the ECONDEV variable is extremely small and has a positive sign for fixed exchange regimes. The coefficient for intermediate exchange regimes is also positive and very small while it is statistically significant. This means that the probability of choosing an intermediate exchange regime increases for a country with a higher per capita income. According to theory in general, larger developing countries are less likely to peg, probably showing a reluctance to surrender monetary autonomy. Richer developing countries favour intermediate regimes and will choose flexible regimes with the lowest probability.

The FINDEV variable is statistically significant and has a negative sign for both the fixed and intermediate exchange regimes. This implies that countries with well-developed financial markets tend to favour a flexible exchange regime. However, this seems to be in conflict with other studies where FINDEV is showing a tendency towards a fixed regime by countries with more developed financial markets. A possible explanation for the contradiction from these countries is that rich countries have deeper and broader financial markets, which provide support to maintain stable exchange rates.

The variables testing macroeconomic stabilisation include the annual rate of inflation (INFLATION), real exchange rate volatility (REER) and domestic monetary shocks (MONEY). The coefficient of the INFLATION variable is negative for the fixed exchange regime showing a tendency for countries to move away from a fixed exchange regime when confronted with high inflation levels. In case of the intermediate exchange regime, the coefficient is positive and statistically significant, indicating that countries would prefer an intermediate or a flexible exchange regime rather than a fixed exchange regime. This seems to be in line with other studies where high inflation tends to raise the probability of choosing intermediate or flexible regimes.

The REER variable is statistically significant and has a negative sign for the fixed exchange regime meaning that countries would rather opt for intermediate or flexible exchange regimes. The coefficient for the intermediate exchange regime is positive. This variable thus increases the likelihood of an intermediate or flexible exchange rate regime which is in line with traditional theory. The volatility of real shocks thus increases the likelihood of a flexible exchange regime. If exchange rate fluctuations are the main source of relative price movements, fixing the nominal exchange rate eliminates a major source of real exchange rate variations.

The coefficient of the MONEY variable is negative and statistically significant under both the fixed and intermediate exchange regimes, encouraging countries to rather choose a flexible exchange regime. In general, domestic monetary shocks point to the direction of flexible regimes when the size of the shock is large.

Among the currency crises factors, international reserves (RESERVES), public finance achievement (PUBFIN) and current account status (CA) are included. The RESERVES variable is statistically significant and has a positive sign for both the fixed and intermediate exchange regimes meaning that countries would rather opt for a fixed or intermediate exchange regime. This indicates that the level of foreign exchange reserves makes the choice of an exchange rate peg more likely.

The coefficient of the PUBFIN variable is negative and statistically significant under the fixed exchange regime while the sign is positive and statistically significant for the intermediate exchange regime. The probability is therefore higher that countries would rather choose an intermediate or flexible exchange regime if the government expenditure is higher. This is in line with theory where public finance achievement, associated with increased risks of crises cause a lower probability for fixed exchange regimes.

The CA variable has a positive sign and is statistically significant for both the fixed and intermediate exchange regimes. Countries strongly favour a fixed or an intermediate exchange regime in case of current account balance variability. Most of the countries experienced current account deficits and chose fixed exchange regimes which are somewhat puzzling, as it is expected that they would rather choose flexible regimes. However, it probably reflects a reverse causality as countries with more flexible regimes are more able to maintain external competitiveness and have less balance of payments problems. In general, intermediate regimes are more vulnerable to currency crises compared to fixed or flexible regimes.

Table 4: Probability of variables

Variables: Fixed	Coefficient		Variables: Intermediate	Coefficient
Positive values			Positive values	
CA	31.36549		CA	14.7223
RESERVES	0.46374		OPENNESS	0.68517
ECONDEV	0.00039		RESERVES	0.39454
			INFLATION	0.19145
			PUBFIN	0.13025
			REER	0.00923
			ECONDEV	0.00091
Negative values			Negative values	
OPENNESS	-2.38926		SIZE	-2.5511
SIZE	-2.1110		FINDEV	-0.11191
INFLATION	-1.33540		MONEY	-0.03695
PUBFIN	-0.56222			
MONEY	-0.098332			
FINDEV	-0.09400			
REER	-0.07122			

Author's calculations

Table 3 provide a summary of the signs of the variables indicating the probability of choosing a specific exchange regime. The probability of choosing a fixed exchange regime is associated with the current account balance, level of foreign reserves and the level of

economic development. All the remaining variables are associated with the probability of not choosing a fixed exchange regime.

The probability of choosing an intermediate exchange regime is positive in the case of the following variables namely the current account balance, openness of a country, level of foreign reserves, inflation rate, government consumption expenditure to GDP, real effective exchange rate and the level of economic development. The probability of not choosing an intermediate exchange regime is associated with the size of the economy, broad money levels to GDP and broad money growth.

It is interesting to note that the probability of choosing only a flexible exchange regime is associated with the size of the GDP (SIZE), broad money levels to GDP (FINDEV) and broad money growth (MONEY) of a country. These three variables are negatively associated with both the fixed and intermediate exchange regimes. The probability of choosing a fixed or an intermediate exchange regime, rather than a flexible exchange regime, is associated with the current account balance (CA), level of foreign reserves (RESERVES) and the level of economic development (ECONDEV).

CONCLUSION

Under the economic fundamental variables, it is only the level of economic development that would increase the probability to choose a fixed or intermediate exchange regime. Higher levels of economic openness would also cause a higher probability of an intermediate exchange regime. The remaining variables all tend to favour a flexible exchange regime. Among the macroeconomic stabilisation variables, only the annual rate of inflation and the

real exchange rate volatility would make countries opting for an intermediate exchange regime. The remaining variables again favour a flexible exchange regime. Lastly, the currency crises factors including the level of foreign reserves and current account status all promote the probability of choosing a fixed or intermediate exchange regime. The public finance achievement variable also increases the probability of adopting an intermediate exchange regime but not a fixed exchange regime.

When choosing between exchange rate regimes, one size does not seem to fit all. An informed choice of exchange rate regimes requires a deep understanding of a country's economy, institutions and political set-up. Other very important aspects to also evaluate are a country's development of good fiscal, financial and monetary institutions. Focus should be placed on institutional reforms like improved bank and financial sector regulation, fiscal restraint, sustainable and predictable monetary policies and increased trade openness. Efficient institutional reforms may cause developing countries to be less prone to crises in general.

Although not tested in this paper, the scope for operating an intermediate exchange regime is a great probability in Africa due to a higher degree of capital controls and low integration with world capital markets. It is important to realise that an exchange rate regime that is fitting for a country may change over time, depending on the economic situation in the country.

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APPENDIX A:

Table A1: Selection of sub-Saharan African countries

African regions	19 Countries included (UNECA classification)
South	Botswana, Lesotho, Mauritius, Mozambique, Namibia, South Africa, Swaziland, Zambia (8 countries)
East	Ethiopia, Kenya, Madagascar, Seychelles, Tanzania, Uganda (6 countries)
West	Ivory Coast, Gambia, Senegal, (3 countries)
Central	Cameroon, Gabon, (2 countries)

Source: www.uneca.org

Table A2: Classification of *de jure* exchange rate regimes

African regions	19 Countries included
De jure floating	Ethiopia, Gambia, Kenya, Madagascar, Mauritius, Mozambique, Seychelles, South Africa, Tanzania, Uganda, Zambia (11 countries)
Pegged to the euro (WAEMU)	Ivory Coast, Senegal, (2 countries)
Pegged to the euro (CEMAC)	Cameroon, Gabon, (2 countries)
Pegged to the rand	Lesotho, Namibia, Swaziland, (3 countries)
Pegged to the rand & SDR	Botswana (1 country)

Source: Slavov, 2011