POLICY CENTER FOR THE NEW SOUTH

THINK • STIMULATE • BRIDGE

RESEARCH PAPER

May 2019

Current Account Adjustments and Exchange Rate Arrangements: What Regime for African Countries?

Abdelaaziz AIT ALI
Mohamed OBAIDY

RP-19/02

About Policy Center for the New South

Policy Center for the New South, formerly OCP Policy Center, is a Moroccan policy-oriented think tank based in Rabat, Morocco, striving to promote knowledge sharing and to contribute to an enriched reflection on key economic and international relations issues. By offering a southern perspective on major regional and global strategic challenges facing developing and emerging countries, the Policy Center for the New South aims to provide a meaningful policy-making contribution through its four research programs: Agriculture, Environment and Food Security, Economic and Social Development, Commodity Economics and Finance, Geopolitics and International Relations.

On this basis, we are actively engaged in public policy analysis and consultation while promoting international cooperation for the development of countries in the southern hemisphere. In this regard, Policy Center for the New South aims to be an incubator of ideas and a source of forward thinking for proposed actions on public policies within emerging economies, and more broadly for all stakeholders engaged in the national and regional growth and development process. For this purpose, the Think Tank relies on independent research and a solid network of internal and external leading research fellows.

One of the objectives of Policy Center for the New South is to support and sustain the emergence of wider Atlantic Dialogues and cooperation on strategic regional and global issues. Aware that achieving these goals also require the development and improvement of Human capital, we are committed through our Policy School to effectively participate in strengthening national and continental capacities, and to enhance the understanding of topics from related research areas.

Policy Center for the New South

Suncity Complex, Building C, Av. Addolb, Albortokal Street, Hay Riad, Rabat, Morocco.
Email : contact@policycenter.ma
Phone : +212 5 37 54 04 04 / Fax : +212 5 37 71 31 54
Website : www.policycenter.ma

POLICY CENTER FOR THE NEW SOUTH
THINK • STIMULATE • BRIDGE

Current Account Adjustments and Exchange Rate Arrangements: What Regime for African Countries?

Abdelaaziz Ait Ali
Mohamed Obaidy

About the Authors

Abdelaaziz AIT ALI

Abdelaaziz Ait Ali is a resident Senior Economist who joined Policy Center for the New South after five years' experience at The Central Bank of Morocco. He worked as an economist at the Economics and International Relations Department. He was in charge of analyzing the Real Estate Price Index and was assigned to monitor several assets prices, including stocks markets, for monetary policy and financial stability objectives.

Abdelaaziz is interested also in energy challenges for the global and national economy and long term growth. Abdelaaziz holds a Master degree in econometrics from the University of Hassan II in Casablanca.

Mohamed OBAIDY

Mohamed Obaidy is a PhD student in economics at The New School for Social Research, New York, USA. His areas of research include macroeconomics, international finance, development and political economy. He is currently a consultant at UNICEF (New York) working on Children Multidimensional Poverty. In the past, he held positions at several multilateral organizations such as the United Nations Department of Economic and Social Affairs (New York) and the New Development Bank (Shanghai). In addition, he has been an adjunct lecturer at the City University of New York, and a graduate teaching assistant and research assistant at The New School for Social Research.

Abstract

This paper empirically examines the impact of exchange rate arrangements on current account imbalances within the African context. Following Friedman's hypothesis (Friedman, 1953), we test the propositions stating that flexible exchange rate regimes limit the magnitude of real external shocks and permit smoother adjustments of external imbalances. Using a new de facto exchange rate regime classification, we employ two empirical methodologies to test this hypothesis: we first apply an event study to identify current account reversal episodes and observe growth and real exchange rate behaviors across exchange rate arrangements. Second, we run an econometric model to estimate current account persistence and test to what extent it differs per exchange rate regime. Our sample comprises 48 African countries for the period 1980-2017. Our results confirm two propositions: (1) Current account imbalances are smaller and probably less costly in countries with a flexible exchange rate regime, and (2) flexible exchange arrangements permit faster current account adjustments.

Current Account Adjustments and Exchange Rate Arrangements: What Regime for African Countries?

1. Introduction

Trade and financial liberalization exposed most African countries to new challenges that range from financial instability to export competitiveness. In the context of globalization, national institutional arrangements are a key factor to spark and sustain economic growth (Rodrik, 2007). Thus, the adoption of the right exchange rate regime is an important ingredient for African countries to ultimately achieve living standards convergence with advanced countries.

The conventional wisdom in international economics is to promote the benefits of flexible exchange rate arrangements. International institutions – especially the IMF – frequently recommend African countries to move toward a flexible exchange rate regime in order to foster external stability and facilitate adjustments. For instance, the Central Bank of Morocco (Bank Al Maghrib) recently announced its transition to an intermediate exchange rate regime that would allow its currency to fluctuate within a 5% band. This policy reform is part of a broader monetary plan the IMF urged Morocco to implement in order to boost its competitiveness and endorse external stability[1].

Milton Friedman was first to introduce the benefits of flexible exchange arrangements in modern economics in his 1953 articl[2]. Open economies with a fixed exchange rate regime – he argues - are exposed to more frequent balance of payment crises and more costly adjustments – in terms of GDP - due to price stickiness (Friedman, 1953). Since then, this theory has become prominent among policy makers and academic practitioners. However, has this theory been empirically verified – especially across developing countries? What are the ramifications of implementing such a policy with regard to development goals?

This paper tries to empirically assess the validity of this hypothesis within the African context. We argue that African countries which adopt a more flexible exchange rate regime observe smaller and less costly external imbalances, where cost is measured in terms of GDP growth losses. We provide evidence suggesting that current account adjustments are faster in countries having a more flexible exchange rate regime than countries with a fixed exchange arrangement. We use two empirical methodologies to support our argument: we first apply an event-study analysis to determine current account reversal episodes and observe the behavior of macroeconomic indicators across exchange rate regimes. We then run an econometric model to estimate African countries' current account persistence following three estimations techniques: Difference GMM, Pooled OLS and Fixed effects.

1. https://www.bloomberg.com/news/articles/2018-01-12/morocco-adopting-more-flexible-exchange-rate-to-boost-standing
2. We can find a classical version in Adam Smith's specie-flow mechanism.

To develop our argument, this paper is organized as follows. Section 2 presents the theoretical review of models of open economies with rigid prices, and an empirical literature review on the calibration of these models. Section 3 introduces the data we use for our empirical analysis and some descriptive statistics on African external imbalances. Section 4 puts forward the two empirical methodologies we employ in this paper. Section 5 shares the results and findings of our analysis. Finally, section 6 concludes.

2. Literature Review: Theory and Empirics

Milton Friedman made his case for a flexible exchange rate arrangement in the early 1950s. In a world of price stickiness – the argument goes – a floating institutional arrangement for nominal exchange rate protects the economy against real exogenous shocks. Thus, flexible regimes possess an automatic and continuous adjustment mechanism that limit the magnitude of real shocks and permit faster adjustments (Friedman, 1953).

The rationale behind Friedman's original intuition is the following. Flexible regimes allow the central monetary authority to respond to exogenous shocks by depreciating its currency and increase its exported goods domestic prices. This price increase would offset the international price decrease of these goods initiated by the negative shock. Moreover, negative shocks reduce output, which provokes a fall in the labor demand. In parallel, currency depreciation puts a downward pressure on real wages, which allow a smoother adjustment in the labor market, and goods and services market (Dornbusch, 1980). In contrast, central monetary authorities under fixed exchange rate regimes cannot respond to negative shocks by depreciating their currency due to the peg requirement.

Given a greater financial integration and increasing capital mobility, the impossible trinity or macroeconomic trilemma holds that a country with an open capital account that opts to fix its exchange rate must abandon its monetary policy and subjugate it to that of the anchor currency (Fleming and Mundell (1964)). Consequently, output keeps falling until wage and price fall are slowed down by nominal stickiness. This process makes the adjustment slower and more costly (Obstfeld and Rogoff, 1995).

Since then, many economists - such as Turnovsky (1983), and Flood and Marion (1989)- have built on Friedman's idea by adopting a framework assuming price or wage stickiness. Others adopted a Mundell-Fleming model with price stickiness in an open economy – like Dornbusch (1980) and Borda (2002) – or a dynamic general equilibrium model with nominal rigidity – such as Obstfeld and Rogoff (1996), and Corsetti and Pesenti (2001).

These theories have a particular empirical implication for the choice of exchange rate arrangement and its important role for macroeconomic stability. Namely, given real exogenous shocks, economies with flexible exchange rate regimes should experience (i) smaller external imbalances and (ii) faster and smoother recovery, than economies with fixed exchange rate regimes. Especially, exchange rate regimes have been playing a detrimental role in developing countries since current and capital account liberalization. Thus, the policy implications of this set of theories are of first importance to developmental needs of developing countries.

Recently, there has been an empirical literature that tests the role played by exchange rate regimes during real or nominal exogenous shocks. For instance, Borda (2002) assesses the impact of terms-of-trade shocks on real GDP, real exchange rate and prices across different exchange rate regimes on a post-Bretton Woods sample (1973-96) of 75 developing countries. He found that in response to negative terms-of-trade shocks countries with fixed exchange rate regimes experience significant declines in real GDP and large real exchange rate depreciation. In contrast, the shock has less negative impacts on countries with flexible regimes.

In comparison, Gervais, Schembri and Suchanek (2011) applied an event-study analysis on a large set of Emerging-Market economies for the 1975-2008 period, and found that (i) nominal exchange rate flexibility allows faster real exchange rate adjustment, and (ii) real exchange rate adjustment significantly contributed to reducing current account imbalances.

In contrast, Chinn and Wei (2008) found no evidence that current account balances under flexible exchange rate regimes are less persistent than under fixed regimes for a sample containing 175 countries and the period 1971-2005. According to them, nominal exchange rate flexibility may enhance real exchange rate volatility but it does not permit real exchange rate adjustment or make it more mean reverting.

Similarly, Gosh, Terrones and Zettelmeyer (2008) found that flexible nominal exchange rates are no more conducive to rapid current account adjustments in Advanced Countries, Emerging Markets and Other Developing Countries for 151 countries for the 1980-2007 period. However, their findings suggest that flexible exchange arrangements lead to smaller and less frequent external imbalances compared to fixed exchange regimes.

In a more recent work, Martín (2015) found robust evidence that flexible exchange rate arrangements deliver a faster current account adjustment among non-industrial countries, using a panel of 180 countries over the 1960–2007 period.Regarding the operating channel, he argued that exports respond to expenditure-switching behavior by consumers when faced with changes in international relative prices.

The diversity of the empirical results suggest that the debate around the appropriate exchange rate regime – particularly for developing countries – has not come to an end, despite official stands taken by the IMF and other policy circles. Particularly, debates around capital and current account openness, as well as the type of exchange rate regimes tend to neglect developmental needs for developing countries by fetishizing financial environment safety over economic growth and standards of living convergence (Rodrik, 2000). Especially, poorly managed exchange rates can have dire ramifications on economic growth and by extension development prospects (Rodrik, 2008).

In this paper, we singularly concentrate on African countries and empirically examine the importance of exchange regimes on current account imbalances. We follow two empirical methodologies previously used in the literature, an event-study (following Feund and Warnock (2005)) and an econometric model based on Gosh, Terrones and Zettelmeyer (2008) and Debasish (2016). However, our approach has four new contributions: (1) to our knowledge, these methodologies have not been used to comprehend the role of exchange rate regimes in Africa per se. Previous literature also grouped African countries with Emerging Markets, Developing Countries or Other Developing Countries. Our sample includes all of

African countries when data is available. (2) We classified our sample by separating African resources from non-resources countries to examine the role played by the different exchange arrangements. (3), we use a new exchange rate regime classification based on Ilzetzki, Reinhart and Rogoff (2017). To our knowledge, empirical exercises of this nature either used IMF conventional classification or Reinhart and Rogoff (2004) classification. (4) Finally, unlike Gosh, Terrones and Zettelmeyer (2008), the exchange regime variable in our econometric model is split into different dummy variables, referring to each specific exchange regime. This codification allows us to capture the effect of each exchange rate regime separately (without assuming such effect to be the same across all exchange regimes)[3]. Consequently, the combination of these four new elements makes the interpretation of our results relevant from a methodological point of view. The next section will introduce some data description and explain our empirical methodology in detail.

3. Data and Descriptive Statistics

In this section, we introduce the data and exchange rate regimes classification we use for our empirical analysis. Furthermore, we sketch some raw observations on African countries' external balances, exchange rate and economic growth to set the contextual landscape of our empirical analysis.

3.1. Data

We use annual data for all the variables we analyze in this paper. For the real exchange rate (RER) and nominal exchange rate (NER), we use the most recently updated Bruegel database[4]. The RER is calculated using the nominal exchange rate and Consumer-Price-Index (CPI) of each country and its trading partner[5]. For GDP and current account data, we use the most recent IMF World Economic Outlook database[6]. Also, the current account of each country is expressed in percentage of its nominal GDP. These data are available for the 48 African countries we examine and range from 1969 to 2017. For capital accounts liberalization measure, we use the Chinn-Ito index. Trade openness represents the sum of imports and exports to nominal GDP available on the World Development Indicators platform. The Commodity price indexes are extracted from the World Bank commodity prices database "Pink Sheet"[7]. We notify the reader when there are missing data for a particular set of countries and during a period of time

3.2. Exchange Rate Classification

As mentioned in the previous section of this paper, the empirical literature examining the impact of exchange rate regimes on countries' external imbalances adopt either the IMF conventional classification or the Rogoff and Reinhart (2004) classification. The IMF's Annual Report on Exchange Arrangements and Exchange Restrictions (AREAER) used de jure exchange rate arrangements until

3. With n exchange regime, we will have n-1 dummy variable. When considering one multinomial variable, we implicitly assume that the transition from the regime 1 to 2 exerts the same impact over the independent variable as moving from the regime 2 to 3 - which is a strong assumption.
4. http://bruegel.org/2012/03/real-effective-exchange-rates-for-178-countries-a-new-database/
5.For further details about this methodology, refer to Darvas, Zsolt, "Real Effective Exchange Rate for 178 Countries: A New Database", Bruegel Working Paper, 2012.
6. https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/index.aspx
7. http://www.worldbank.org/en/research/commodity-markets

very recently[8]. However, de jure arrangements often depart from reality and countries' actual behavior. Thus, self-declared floating regimes are hardly distinguishable from intermediate regimes in reality (Calvo and Reinhart, 2001).

The de facto exchange arrangement classification has proliferated in the literature during the last two decades. For instance, Reinhart and Rogoff (2004) categorize countries based on the degree of exchange rate variability, while taking into account parallel markets. Levy Yeyati and Sturzennegger (2005) incorporate the behavior of reserves. Shambaugh (2004) also studies exchange rate variability, but allows for regime changes in higher frequency.

In this paper, we use the most recent and up to date de facto exchange rate regimes classification, done by Ilzetzki, Reinhart and Rogoff (2017). In their paper, they compile a new and large dataset on exchange rate regimes and capital mobility for 194 countries over seven decades (1946-2016). In addition, they construct an algorithm that operates two tasks. First, the algorithm identifies the adequate anchor currency for each country in the sample. Second, the exchange rate arrangement is defined by metrics that measure its degree of flexibility. Thus, the algorithm first determines if the country under study has a dual exchange rate arrangement, multiple exchange rate regimes or an important parallel market. Then, the algorithm examines if official declarations – de jure regime – match the actual (de facto) exchange rate regime. Finally, if a country has virtually no variability in its exchange rate for four months (or longer), it is classified as a de facto pegged regime. Figure 1 illustrates the mechanism of the algorithm to determine exchange rate arrangements classification.

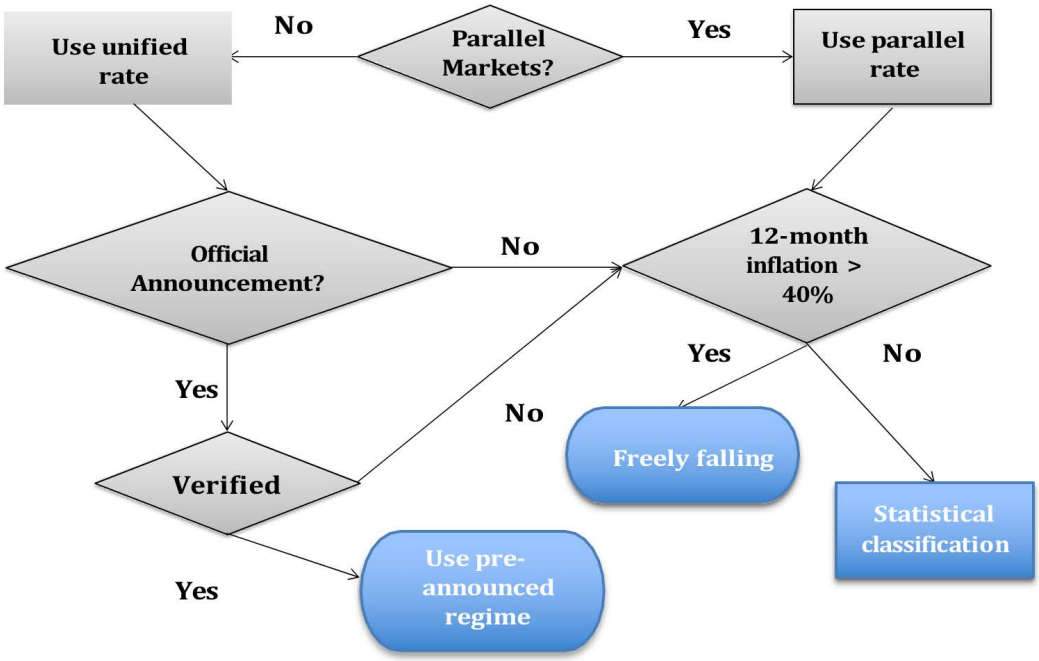
Following the algorithm's results, the authors provide fifteen types of exchange arrangement for a fine classification, and six types of exchange regimes for a coarse classification, going from "no separate legal tender or currency union" to "dual market in which parallel data is missing" (Table 1). There is one separate category – freely falling - for regimes experiencing very high inflation (over 40% annually)[9]. In this paper, we use the coarse classification for our empirical analysis for methodological reasons explained in the empirical methodology section.

8. A e Jure regime is what a country officially declares as its exchange rate arrangement, while a de facto regime is what the country actually does in the foreign exchange market

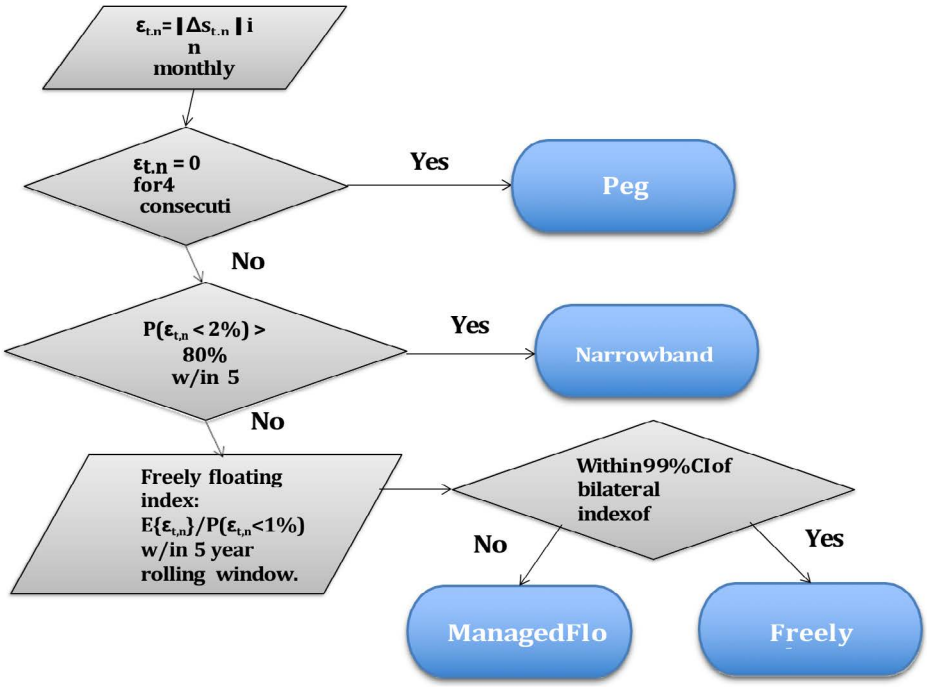
9. For further details, refer to Ilzetzki, Reinhart and Rogoff (2017). The authors form an index whose numerator captures the mean absolute exchange rate change over a five year rolling window, while the denominator is the probability of exchange rate changes less than one percent. To qualify as "managed float", the index must take on an extremely low value relative to the volatility of the world's major floating exchange rates.

Figure 1: Exchange Rate Arrangement Classification Algorithm

Sequence and general scheme



Statistical tests



Source: Ilzetzki, Reinhart and Rogoff (2017)

Table 1: Fine and Coarse De Facto Exchange Rate Arrangement Classification

The fine classification codes are:

1	•	No separate legal tender or currency union
2	•	Pre announced peg or currency board arrangement
3	•	Pre announced horizontal band that is narrower than or equal to+/-2%
4	•	De facto peg
5	•	Pre announced crawling peg; de facto moving band narrower than or equalto +/-1%
6	•	Pre announced crawling band that is narrower than or equal to+/-2% or de facto horizontal band that is narrower than or equal to+/-2%
7	•	De facto crawling peg
8	•	De facto crawling band that is narrower than or equal to+/-2%
9	•	Pre announced crawling band that is wider than or equal to+/-2%
10	•	De facto crawling band that is narrower than or equal to+/-5%
11	•	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation overtime)
12	•	De facto moving band +/-5%/ Managed floating
13	•	Freely floating
14	•	Freely falling
15	•	Dual market in which parallel market data is missing.

The coarse classification codes are:

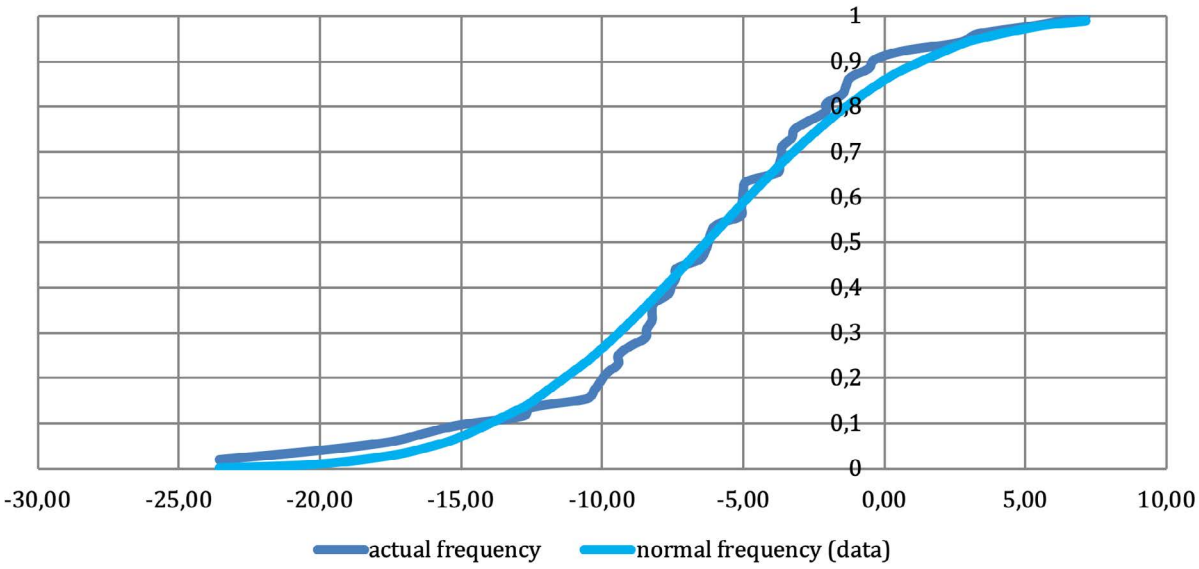
1	•	No separate legal tender
1	•	Pre announced peg or currency board arrangement
1	•	Pre announced horizontal band that is narrower than or equal to+/-2%
1	•	De facto peg
2	•	Pre announced crawling peg
2	•	Pre announced crawling band that is narrower than or equal to+/-2%
2	•	De factor crawling peg
2	•	De facto crawling band that is narrower than or equal to+/-2%
3	•	Pre announced crawling band that is wider than or equal to+/-2%
3	•	De facto crawling band that is narrower than or equal to+/-5%
3	•	Moving band that is narrower than or equal to +/-2% (i.e., allows for both appreciation and depreciation overtime)
3	•	Managed floating
4	•	Freely floating
5	•	Freely falling
6	•	Dual market in which parallel market datails missing.

3.3. Descriptive Statistics and Sample classification

African countries present typical characteristics of low-income and lower middle-income economies – namely, dependent and driven by weather conditions and balance of payment crises. Therefore, African countries' external balances are dependent on commodities price movement. Thus, most of African countries' GDP growth and current accounts are volatile. In addition, trade liberalization led African countries to focus on their comparative advantage –primary resources based goods production – which has had a negative impact on their overall macroeconomic environment and poses several challenges for policy makers. As a consequence, African economies are very much vulnerable to external imbalances – whether debt, currency or exchange rate crises.

Almost all of African countries' current accounts have been negative since 1980, at the exception of some resource producer countries. In figure 2, we construct a cumulative frequency distribution for African countries' current account mean for the period 1980-2017, to analyze the frequency of current account deficits. The results show that only few observations have a positive current account mean.

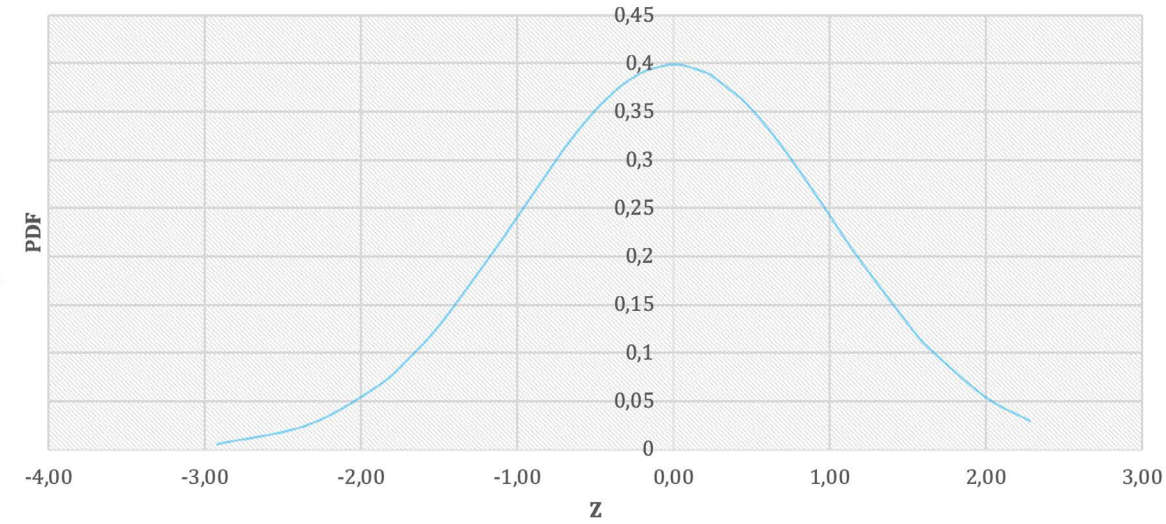
Figure 2: Current Account Cumulative Frequency Distribution 1980-2017



Source: Authors' calculation from World Economic Outlook, IMF, 2018.

Similarly, we draw in figure 3 a standard normal distribution for all African countries' current accounts mean for the same period, and observe that despite a standardization, the distribution keeps some features of the original data distribution – namely, the new normal distribution is asymmetric toward the negative values. Most of African countries have a negative current account mean except few resource producer countries, such as Namibia, Nigeria, Algeria, Botswana and Gabon.

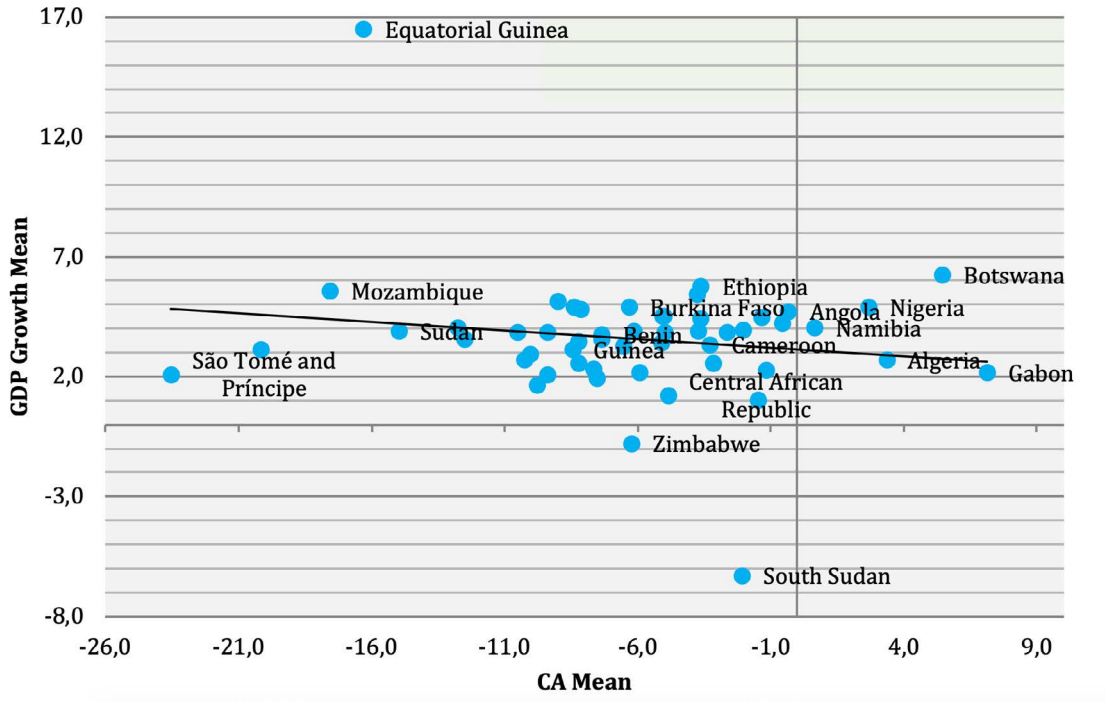
Figure 3: Current Account Standard Normal Distribution 1980-2017



Source: Authors' calculation from World Economic Outlook, IMF, 2018.

To endorse our intuition on the negative correlation between external imbalances, economic growth and macroeconomic fundamentals in African countries, we plot current accounts mean with GDP growth for the same period in figure 4. It shows that countries experiencing an average GDP growth higher than 2% tend to have a lower current account deficit. However, at the exception of the mentioned resource countries, even countries experiencing an average economic growth between 2% and 7% tend to have a chronic current account deficit since 1980. These descriptive statistics point to the vulnerability of African countries' external balances, and the need for institutional arrangements to limit exogenous shocks.

Figure 4: Current Account and GDP Growth Mean 1980-2017



Source: Authors' Calculation from World Economic Outlook, IMF, 2018.

In addition, we infer two important elements from these observations regarding our empirical analysis. First, our event-study analysis on current account reversals will only focus on current account deficit reversal episodes. And second, we will split our sample into resource and non-resource producer countries to control for the commodity price and terms of trade cycles impact. In the next section, we explain in detail our empirical methodology.

4. Empirical methodology

Our empirical analysis seeks to test two related hypotheses – commonly held in the literature (starting from Friedman, 1953). The first hypothesis states that real exchange rate flexibility promotes external stability – namely, smaller and less frequent current account imbalances. The second hypothesis states that flexible nominal exchange rate facilitates faster current account adjustments.

To examine the first hypothesis, we apply an event-study approach to determine current account reversal episodes. We then observe the behavior of the real exchange rate across exchange rate arrangements and analyze the magnitude of the shock on external balances across exchange rate regimes.

To test the second hypothesis, we apply an econometric model to examine the current account persistence of African countries. We then analyze the impact of exchange rate regimes on current account persistence by introducing a dummy variable to account for the institutional difference among African countries.

4.1. Event-Study Approach

We follow Freund and Warnock (2005), and Gervais, Schembri and Suchanek (2011) to apply the event-study analysis. This type of empirical analysis is not novel. However, it has not been applied specifically to the African context. In addition, the issue of exchange rate arrangements has not been addressed in similar literature at the exception of Gervais, Schembri and Suchanek (2011). The difference of our approach is first in the sample choice: we include all of African countries for which data were available for the period 1980-2016. Second, we use the de facto exchange rate regimes classification following Ilzetzki, Reinhart and Rogoff (2017). Additionally, we introduce a split in our sample between resource and non-resource producer countries. Once we determine current account reversal episodes, we observe output and real exchange rate behaviors during these episodes time frame. We focus on these variables because output and real exchange rate are the two main channels through which current account adjusts according to the existing literature.

The first question is how current account reversal episodes are determined. Adalet and Einchengreen (2004) define current account reversals as episodes in which the current account strengthens sharply, moving from deficit to surplus in three or few years. However, the recent literature (Freund and Warnock, 2005) does not emphasize the transition from deficit to surplus as a characteristic of current account reversal episodes. In contrast, current account reversals are divided between deficit reversal episodes and surplus reversal episodes.

As explained in the descriptive statistics section, we will focus on current account deficit reversal episodes due to the chronic deficit of African current accounts. To determine current account deficit reversal episodes, we follow Milesi-Ferretti and Razin (1998), Feund and Warnock (2005), and Gervais, Schembri, Suchanek (2011) criteria for a current account reversal.

According to this literature, there are four criteria determining a current account deficit reversal episode:

(1) The current account deficit-to-GDP ratio must be higher than 2% before the reversal.

(2) The average current account deficit-to-GDP ratio must have been reduced by at least 2% over three years (from the minimum to the centered three year average).

(3) The current account deficit is reduced by at least one third.

(4) The maximum deficit of the current account-to-GDP ratio in the five years after the reversal must not have been larger than the minimum deficit in the three years before the reversal.

The criteria (1), (2) and (3) allow the study to capture only major and large current account reversals, whereas the criterion (4) indicates that the reversal has been sustained.

We apply these criteria for 48 African countries for the period 1980-2017. For each country we first determine the reversal episode's date. Second, we establish a period of 12 years interval: 6 years prior to the reversal episode (t-6), and 6 years after the reversal episode(t+6), where T corresponds to the reversal year and the current account is the most negative. We choose this interval due to the criteria mentioned above and to better graphically observe the adjustment process over a long time period. Afterward, we apply the same process for real exchange rate and GDP data corresponding to the reversal episode period for each country.

We then split our sample in three ways: first, we distinguish between resource and non-resource countries, regardless of their exchange rate regime, to see if there is a difference in the magnitude of the current account deficit, and in the adjustment process. Second, we classify countries according to the exchange rate arrangements they had during the reversal episode's date, to observe if there is any difference across exchange rate regimes. Finally, we classify countries according to their exchange rate arrangements and whether they are resources or non-resources producer countries during the reversal episode. Due to the classification per exchange rate arrangement in our sample, some countries will appear in more than one regime, depending on the arrangement the country has during the reversal episode's date.

We found 53 reversal episodes for resource producer countries and 59 reversal episodes for non-resource producer countries. Table 2 documents the number of reversal episode per country. If Friedman's theory is accurate – namely, that flexible exchange rate regimes limit the magnitude of external imbalances and allow less costly adjustment processes via the real exchange rate channel – we should observe these differences across exchange rate regimes during the reversal episode period. The results of the event-approach will be presented in the results section.

4.2. The econometric model

The second hypothesis we test is whether nominal exchange rate flexibility has any impact on external imbalances adjustments. Specifically, the test hypothesis states that flexible exchange rate arrangements permit faster current account adjustments.

To examine this hypothesis, we follow Chin and Wei (2008), and Gosh, Terrones and Zettelmeyer (2008) and Debasish's (2016) econometric model by estimating the impact of nominal exchange rate arrangements on current account persistence. Following our test hypothesis, a flexible exchange rate regime should make current accounts less persistent. Besides, we augmented the initial version of the model, as Debasish (2016), to account for the trade openness, capital accounts control and commodity price index. Commodity prices fluctuations play a crucial role in the dynamics of the current account in African countries, especially resources intensive economies. Therefore, including this variable is necessary to extract the effective persistence of current accounts across different exchange rate regimes apart from commodity prices persistence.

The adopted methodology is not novel either. However, the exchange rate classification we apply following Ilzetzki, Reinhart and Rogoff (2017) has not been used for this type of econometric exercise. Furthermore, the African context constitutes the singularity of our analysis. Our sample comprises 48 countries and 37 observations (1980-2017).

The model is estimated, allowing both the intercept and the autoregressive coefficient (reflecting persistence)to vary across exchange rate regimes:

$$\begin{aligned} CA_{it} = {} & p_0 + p_1 CA_{it-1} + p_2 XRR2_{it} + p_3 XRR3_{it} + p_4 XRR4_{it} + p_5 XRR5_{it} \\ & + p_6 XRR6_{it} + p_7 (XRR2_{it} \times CA_{it-1}) + p_8 (XRR3_{it} \times CA_{it-1}) \\ & + p_9 (XRR4_{it} \times CA_{it-1}) + p_{10} (XRR5_{it} \times CA_{it-1}) \\ & + p_{11} (XRR6_{it} \times CA_{it-1}) + + p12\ trade\ openess \\ & + p13\ capital\ accounts\ controls + p14\ energy\ price\ index \\ & + p15\ non\ energy\ price\ index + p16\ precious\ metals\ price\ index \\ & + vit \end{aligned}$$

Where:

CA_{it} is the current account-to-GDP ratio for country i and year t,

CA_{it-1} is the lagged current account-to-GDP ratio, with the related coefficient () representing the persistence of the current account. The closer this value is to one, the slower the adjustment of the current account is in response to shocks. Thus, the more persistent is the current account.

We were able to find 6 types of exchange rate arrangements in African countries for the 1980-2017 period. These 6 regimes follow the coarse classification established in table 1, where regime 1 is the most fixed and regime 6 is the most floating. As noted, for n exchange regime, the model should include n-1 category, so that the interpretation of the coefficients is compared to the "reference" category, which is, in this case, regime1. Therefore, XRR2,XRR3,XRR4,XRR5 and XRR6 are dummy variables that correspond respectively to regime 2, regime 3, regime 4, regime 5, regime 6. These variables take the value of 0 when the exchange rate arrangement considered is not adopted by the country for year t, and the value of 1, when the regime is implemented.The coefficients related to

these dummy variables display the effect of the exchange arrangement on the intercept.

The effect of each exchange regime on the current account persistence is captured through the interaction term (XRR_{it} x CA_{it-1}). If our test hypothesis is correct – namely, a more flexible exchange rate regime helps countries adjust faster and make current accounts less persistent– **we would expect this coefficient to be negative and statistically significant**[10]. Besides, we expect this coefficient to be lower for floating exchange regimes than intermediate ones. Overall, the persistence of the current account per each exchange regime is the sum of two coefficients. For instance, the persistence of the current account in countries adopting a flexible exchange regime is $p_1 + p_9$.

Trade openness is the sum of exports and imported to GDP, while capital accounts controls refers to well-known Chinn-Ito index.

To estimate the equation, we used dynamic difference GMM technique and support it by two different estimation techniques, pooled OLS and Fixed effects for 48 African countries from 1980-2017. The results of this empirical analysis will be presented in the next section. The specification we adopted contains lags of the dependent variable and unobserved panel-levels effects. This unobserved panel-level effects are correlated with the lagged dependent variable (current account), making standard estimators inconsistent. Arellano and Bond (1991) have derived a consistent generalized method of moments (GMM) estimator for the parameters.

5. Results

This section presents the findings and results of our empirical analyses. Overall, the evidence are conclusive. The event-study analysis suggests that countries having a more flexible exchange rate arrangement (managed floating) experience smaller external imbalances and adjust at a lower cost via the real exchange rate channel by depreciating during reversal episodes. In addition, GDP growth gains tend to be higher after the shock in countries with a more flexible exchange rate regime. In that regard, our results concord with Gervais, Schembri and Suchanek (2011)'s findings. Thus, Friedman's theory seems to be empirically accurate according to this first empirical test.

Furthermore, our econometric analysis confirms the role of flexible exchange regime in absorbing shocks at faster pace than fixed exchange arrangements. From this perspective, our results contrast with Chinn and Wei's (2008) and Ghosh, Terrones and Zettelmeyer (2008) findings but corroborates the results of Martín (2015) – namely, current account balances are less persistent under flexible regimes than fixed regimes. The interaction term of our regression model is negative and statistically significant for regime 4 (floating regime). For the intermediate exchanges regimes, the coefficient signs seems to be in the opposite direction, suggesting that fixed exchange rate regimes make current accounts less persistent.

5.1. Event-Study Results

The results of the event-study approach are presented in figure 5, figure 6, figure 7 and figure 8. During current account reversal episodes, we were able to distinguish five types of exchange rate

10. Remember that the reference category is the fixed exchange regime.

arrangement, following Ilzetzki, Reinhart and Rogoff (2017) classification. It is important to note that there is no free-floating exchange rate regime per se during the episodes we identified, except for Malawi. The free-floating category is identified as regime 4, but we did not report it due its statistical non-significance - since it has only one country in its sample. In addition, regime 5 is the free falling category for countries experiencing very high inflation (over 40%). This regime is treated separately in the Ilzetzki, Reinhart and Rogoff (2017) classification due to its inflationary nature. We report it here but its significance and result inference should be taken with caution. Consequently, we are left with three types of regimes – namely, regime 1, regime 2 and regime 3. Regime 3 is the most flexible in this classification and represents an intermediate or managed float regime[11]. Regimes 1 and 2 are fixed regimes with a slight difference: regime 2 allows for a narrow flexibility.

Given these constraints, the question remains to know if a more flexible exchange rate regime reduces external imbalances and permits faster adjustments.

In figure 5, we observe that during reversal episodes, the lowest current account deficit for countries in the regime 1 exchange rate classification has a mean of -13.1 (GDP %) and a median of -9.3 (GDP %). In contrast, countries in regime 3 have an average current account deficit of - 8.2 (GDP %) and a median of -7.0 (GDP %). Thus, countries having a more flexible exchange rate regime tend to have smaller external imbalances on average than countries with fixed exchange rate regime. Surprisingly, the magnitude of the current account deficit is bigger in regime 2 than regime 1, with a 3 percentage points difference. In contrast, countries in regime 5 (free falling) experience the highest current account deficit with an average of -22 (GDP %) and a median of -14.6 (GDP %). Tanzania, Sudan and Sao Tome Principe bias these results due to their very high current account deficit. Thus, the evidence suggests that countries with managed floating regimes resist better to external imbalances.

In accordance with our test hypothesis, figure 6 countries in regime 3 experience the largest real exchange rate depreciation. In contrast, countries in regime 1 experience a slight appreciation. Countries in Regime 2 also depreciate from 133% to 117%, with a two times period longer than countries in Regime 3. Therefore, the results tend to confirm that countries with a more flexible exchange rate regime adjust through real exchange rate depreciation during reversal episodes.

To examine whether there could be a trade-off between adjustment through output contraction or real exchange rate depreciation, we observe in figure 7that countries in regime 3 and 5 experience stronger GDP growth than countries in regime 1 and 2. Countries in regime 1 and 2 experience a gain of 1.2 % GDP growth from period T to period T+1, whereas countries in Regime 3experience a gain of 2.3% for the same period. Countries in regime 5 take an additional time period to gain income growth, but grow at a higher pace than countries in regimes 1 and 2, and gain 2% GDP growth. Remarkably, GDP growth losses are greater for countries in Regime 1 from period T to period T+6, losing 1.2% of growth. Instead, countries in regimes 2 and 3 only loose 0.1% GDP growth between T and T+6, while countries in regime 5 gain 2.9% of GDP growth for the same period. This suggests that countries with more flexible exchange rate arrangements tend to have a less costly adjustment in terms of GDP growth than countries with fixed exchange rate regimes. Thus, the evidence suggest that with a flexible regime an adjustment via real exchange rate depreciation is less costly than an adjustment through output for African countries.

11.Refer to table 1 for further details.

The distinction between resource countries and non-resource countries in figure 8 suggest that resources countries experience greater shocks and greater real exchange rate depreciation. They also suffer greater output growth losses. These results are expected due to commodity prices and global demand volatility.

The results of the event-study analysis seem to confirm the first hypothesis we tested – namely, external imbalances are smaller and less costly in more flexible exchange rate arrangements. They also suggest that the adjustment of the current account is less costly in terms of GDP growth when the adjustment happens through the price mechanism in African countries. The presence of sticky prices makes external adjustment become more costly when a country has a fixed exchange rate arrangement. However, do flexible regimes permit faster current account adjustments?

5.2. Econometric results

The results of our regression model confirms the findings of the event-study approach. The purpose of the second empirical analysis is to test the second hypothesis mentioned above – namely, flexible exchange rate regimes permit faster adjustments. In this case, flexible exchange rate regimes should make current accounts less persistent. Unlike the event-study analysis, the regression model considers the six exchange rate regimes adopted by African countries since 1980. In addition, the regression analysis does not isolate current account reversal episodes. Instead, it considers the current account evolution since 1980 and evaluates its persistence for each country.

We estimate the econometric model and then run the regression following the three estimation approaches. The results we obtain suggest that exchange rate arrangements have an impact on current account persistence – namely, the flexible exchange regime allows faster adjustments[12]. Following the three estimation techniques, the coefficient related to the regime 4 is negative and statistically significant. In fact, the persistence of current account declines considerably for this exchange regime compared to the rest of exchange arrangements to around 0.1, while in average, it stands at 0.6 according to the DGMM estimation. In fact, except for the flexible exchange regime (regime 4), the rest of the regimes do not exert any effect on the persistence of current accounts. Persistence seems even to be higher while moving to intermediate exchange regimes, as coefficients are positive. This result could be interpreted as counterintuitive. However, a major strand of the economic literature (Fisher,(2001)) defends the bipolar view, suggesting that extreme regimes, such as fixed and floating, are disciplinary while intermediate regimes are vulnerable to speculative attacks and external chocks in general.

From a statistical point of view, the results of the three techniques are in line with the econometric findings (Baltagi2008). It is known that pooled estimation delivers generally an upward bias. Conversely, the fixed effects technique is downward biased, suggesting that GMM estimators are set within the upper bound of pooled OLS estimation and the lower bound of fixed effects. For instance, the GMM persistence coefficient fulfill this condition and lays between the pooled and fixed effects estimators.

12. Refer to the appendix for software and coding details. We use R to estimate our regression. The appendix presents a more detailed review of our regression analysis.

6. Concluding Remarks and Policy Recommendations

In this paper, we tried to empirically answer the following question: what exchange rate arrangement promotes external stability and provides faster adjustments for African countries. To address this issue, we followed Friedman 1953's theory of external imbalances given the existence of sticky prices. According to this theory, nominal prices are rigid and expose open economies to greater and more frequent external imbalances when they adopt a fixed exchange rate regime. In addition, once an economy is hit by an exogenous shock, adjustments happen at slower rate when the external institutional arrangement is a fixed exchange rate regime.

To empirically test this theory, we applied two complementary methodologies, namely an event-study analysis and an econometric model, estimated by the difference GMM technique , using a novel de facto exchange rate classification. The event-study analysis supports Friedman's original insights: countries with more flexible exchange rate arrangements experience smaller external imbalances and less costly shocks. Based on our econometric model, the results are conclusive regarding the role of flexible exchange regime in ensuring faster current account adjustments. In addition, the model confirms the risks surrounding the intermediate exchange regime for African economies, as many economists have argued (Fisher, S. 2001)), suggesting that external shocks affecting the current account tends to last and do not dissipate quickly in this case. Yet, the complex nature of this empirical exercise – related to data quality and availability– calls for caution when interpreting such results.

Thus, the results shed light on the role of exchange arrangements within the African context. Countries with managed floating regimes seem to resist better to external imbalances. Does it mean that African countries should follow the path of exchange rate flexibilisation ? Our results seem to confirm that proposition, in a context where commodity prices are expected to stay unchanged at relatively low levels. Having said that, the issue of external imbalances for African countries goes beyond choosing a certain exchange rate arrangement. Fiscal policy is an important issue when addressing external equilibriums and the behavior of current accounts. The idea of running contra cyclical fiscal policy, and the creation of sovereign funds to allow better absorption of external shocks and set fiscal targets for more transparent framework is considerably critical for a better macroeconomic management. These endeavors – although crucial - go beyond the purpose of this paper and suggest the need for further research, especially for African economists.

References

Adler Gustavo, Magud E. Nicolas, Werner Alejandro, 'Terms-of-Trade Cycles and External Adjustment', IMF Working Paper/17/29.

Algieri Bernardina, Bracke Thierry, 'Patterns of Current Account Adjustment: Insights from Past Experience', European Central Bank, Working Paper Series No 762/June 2007.

Ball M. Laurence, 'Policy Rules for Open Economies' in Taylor John B. ed., MonetaryPolicy Rules, University of Chicago Press, 1999.

Baltagi BH 2008."Forecasting with panel data. J Forecast" 27(2):153–173

Borda Christian, 'Terms of Trade and Exchange Rate Regimes in Developing Countries', Federal Reserve Bank of New York, January 2002.

Calvo, G. and C. Reinhart. 2001. "Fixing for Your Life." NBER Working Paper No. 8006.

Chinn, M. and S-J. Wei. 2008. "A Faith-Based Initiative: Does a Flexible Exchange Rate Regime Really Facilitate Current Account Adjustment?" NBER Working Paper No. 14420.

Corsetti, G. and P. Pesenti. 2001. "Welfare and Macroeconomic Interdependence." The Quarterly Journal of Economics 116 (2): 421–45.

Kumar Das, Debasish 2016 "Determinants of current account imbalance in the global economy: A dynamic panel analysis" Journal of Economic Structures.

Dornbusch, R. 1980. Open Economy Macroeconomics. New York, NY: Basic Books.

Eichengreen Barry, Adalet Muge, 'Current Account Reversals: Always a Problem?', National Bureau of Economic Research, Working Paper 11634, September 2005.

Eichengreen Barry, Globalizing Capital: A History of the international Monetary System, Princeton University Press, 2005.

Fisher, S., (2001) "Exchange Rate Regime: Is the Bipolar view correct" Journal of Economic Perspectives

Fleming, J.,M, & Mundell, A., R., 1964. «Official Intervention on the Forward Exchange Market: A Simplified Analysis", IMF Staff Papers, Palgrave Macmillan, vol. 11(1), pages 1-19, March.

Flood, R., Marion, N., 1982. "The Transmission of Disturbances Under Alternative Exchange Regimes with Optimal Indexing". Quarterly Journal of Economics 97(1), 43-66 (February).

Freund Caroline, 'Current Adjustment in Industrial Countries', Journal of InternationalMoney and Finance, 2005.

Freund, C. and F. Warnock. 2005. "Current Account Deficits in Industrial Countries: The Bigger They Are, the Harder They Fall?" NBER Working Paper No. 11823.

Friedman Milton, "The Case for Flexible Exchange Rates" in Essays in Positive Economics, University of Chicago Press, 1966.

Gervais Olivier, Schembri Lawrence, Suchanek Lena, 'External Stability, Real Exchange Rate Adjustment and the Exchange Rate Regime in Emerging-Market Economies', Bank of Canada, Discussion Paper, 2011-5.

Ghosh R. Atish, Terrones Marco, Zettelmeyer Jeromin, 'Exchange Rate Regimes and External Adjustment: New Answers to an Old Debate', IMF Research Department, 2008.

Ilzetzki Ethan, Reinhart M. Carmen, Rogoff S. Kenneth, 'Exhange Arrangements Entering the 21st Century: Which Anchor will Hold?', National Bureau of Economic Research, Working Paper 23134, February 2017.

Levy-Yeyati, Eduardo and Frederico Sturzennegger (2005). "Classifiying Echange Rate Regimes:

Deeds vs. Words." European Economic Review, 49(6): 1603-1635.

Martín Fernando Eguren (2015), "Exchange rate regimes and current accountadjustment: an empirical investigation" Bank of England.

Milesi Ferretti Gian Maria, Razin Assaf, 'Current Account Reversals and Currency Crises:
Empirical Regularities' in Krugman Paul ed., Currency Crises, University of Chicago Press, 2000.

Mundell, A., R., 1962. "The Appropriate Use of Monetary an Fiscal Policy for Internal and External Stability", IMF Staff Papers, Palgrave Macmillan, vol. 9(1), pages 70-79, March.

Obstfeld Maurice, Rogoff Kenneth, 'Exchange Rate Dynamics Redux', The Journal of PoliticalEconomy, Vol. 103, No.3. (Jun., 1995), pp. 624-660.

Obstfeld Maurice, Rogoff Kenneth, 'The Mirage of Fixed Exchange Rates', Journal of EconomicPerspectives, Vol.9, No.4. (Fall 1995), pp. 73-96.

Obstfeld Maurice, Rogoff Kenneth, 'Global Imbalances and the Financial Crisis: Product of Common Causes', Federal Reserve Bank of San Francisco, October 2009.

Reinhart M. Carmen, Rogoff S. Kenneth, 'The Modern History of Exchange Rate Arrangements: A Reinterpretation', The Quarterly Journal of Economics, Feb. 2004.

Rodrik Dani, 'Exchange Rate Regimes and Institutional Arrangements in the Shadow of Capital Flows', Harvard University, 2000.

_____, One Economics Many Recipes: Globalization, Institutions and Economic Growth, Princeton University Press, 2007.

_____, 'The Real Exchange Rate and Economic Growth', Harvard University John F.

Kennedy School of Government, Sept. 2008.

_____, "Globalization, Structural Change and Productivity Growth", World Development Vol. 63, pp. 11–32, 2011.

_____, "Premature Deindustrialization", Working Paper, 2015 .

Shambaugh, Jay C. (2004). "The Effect of Fixed Exchange Rates on Monetary Policy", Quarterly Journal of Economics, 119(1): 301-352.

Turnovsky, S., 1983. "Wage Indexation and Exchange Market Intervention in a Small Open Economy". Canadian Journal of Economics, 16. 574-592.

Table 2: Current Account Reversal Episodes Resource and Non-Resource Countries

Resources Countries:

Countries	Adjustment Dates	Countries	Adjustment Dates
Algeria	88	**Ghana**	97
	95		2013
	2015	**Guinea**	90
Angola	98		98
	2009	**Liberia**	2008
	2015	**Mali**	2008
Botswana	2009	**Namibia**	2015
Cameroon	97	**Niger**	1989
	2001		2009
Central African Republic	86	**Nigeria**	94
	2010		98
Chad	85		2015
	2002	**Republic of Congo**	86
	2015		94
Democratic Republic of the			
Congo	1998		2009
	2010		2015
Equatorial Guinea	96	**Sierra Leone**	2000
	2002		2011
	2010	**South Africa**	2013
	2010	**South Sudan**	2012
	2016	**Sudan**	91
Gabon	86		2005
	98	**Tanzania**	1993
	2016	**Zambia**	86
Zimbabwe	92		2001
	97		2008
	2009		2016

Non-Resources Countries:

Country	Adjustment dates	Country	Adjustment dates
Benin	88	**Lesotho**	91
Burundi	90		2014
	2007	**Madagascar**	94
	2015		2009
Cabo Verde	2011	**Malawi**	85
Comoros	84		92
	98		2006
	2008		2016
Côte d'Ivoire	0	**Mauritania**	2005
Djibouti	92		2014
	2000	**Mauritius**	94
	2008		99
	2015		2012
Egypt	84	**Morocco**	85
	90		95
	1998		2000
	2016		2012
Eritrea	98	**Mozambique**	93
Ethiopia	2005		2002
Guinea-Bissau	84	**Rwanda**	87
	89		93
	2012		2002
Kenya	90	**São Tomé and Príncipe**	96
	2014	**Senegal**	2008
Swaziland	98	**Seychelles**	2001
	2009	**Togo**	2013
	2016	**Tunisia**	84
The Gambia	96		2001
	2010	**Uganda**	91
Togo	2013		2000

Figure 5: Current Account Reversal Episodes across Exchange Rate Regimes (Coarse classification)

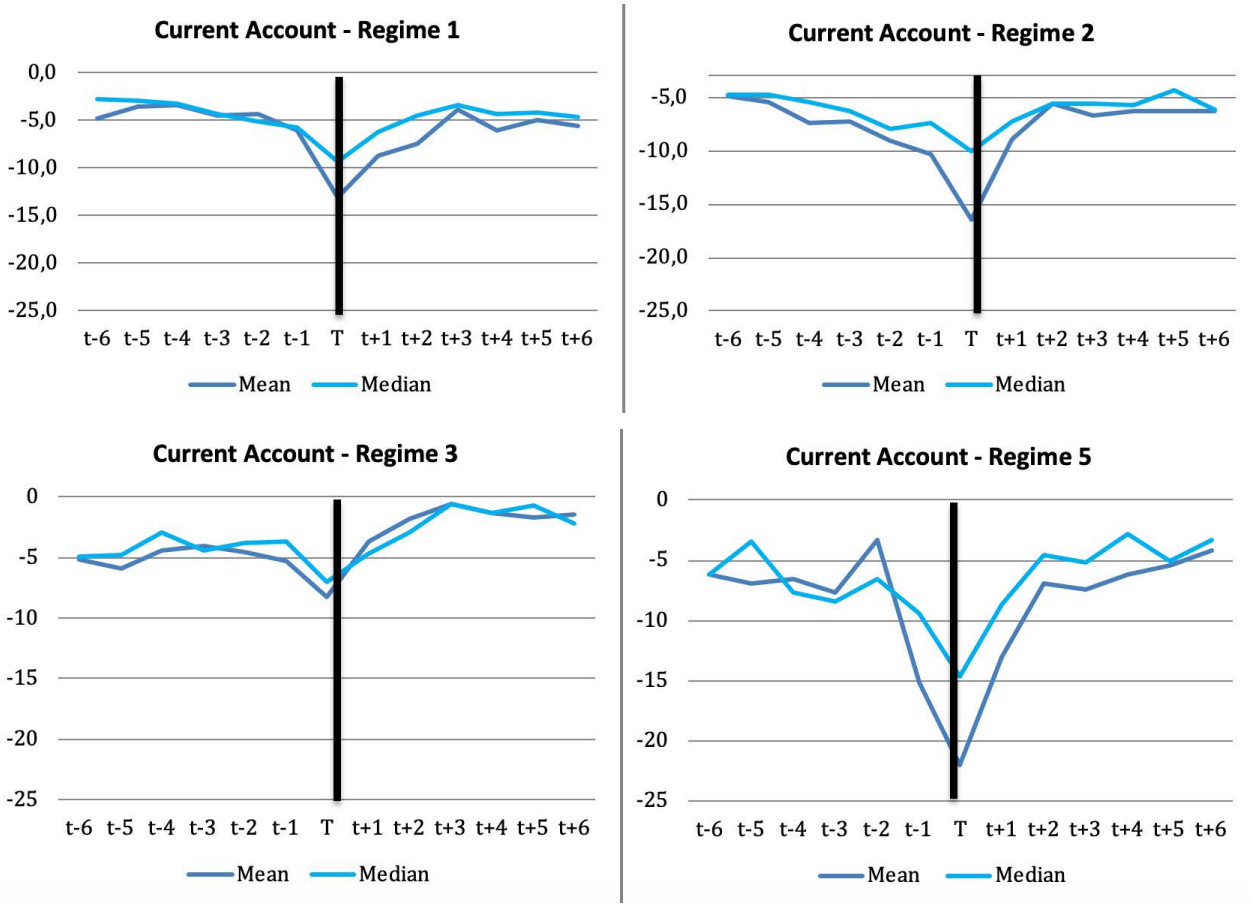
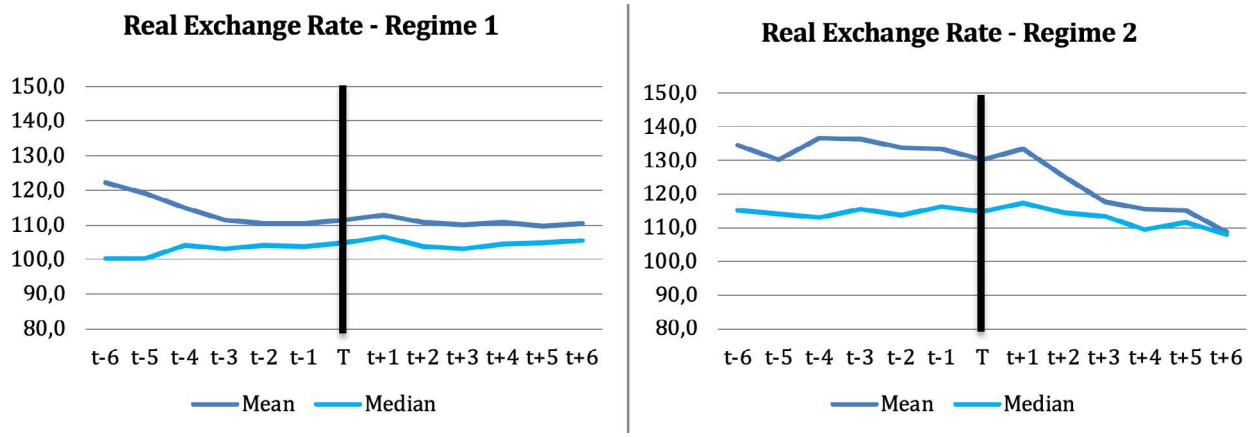


Figure 6: Real Exchange Rate during Reversal Episodes across Exchange Rate Regimes (Coarse Classification)



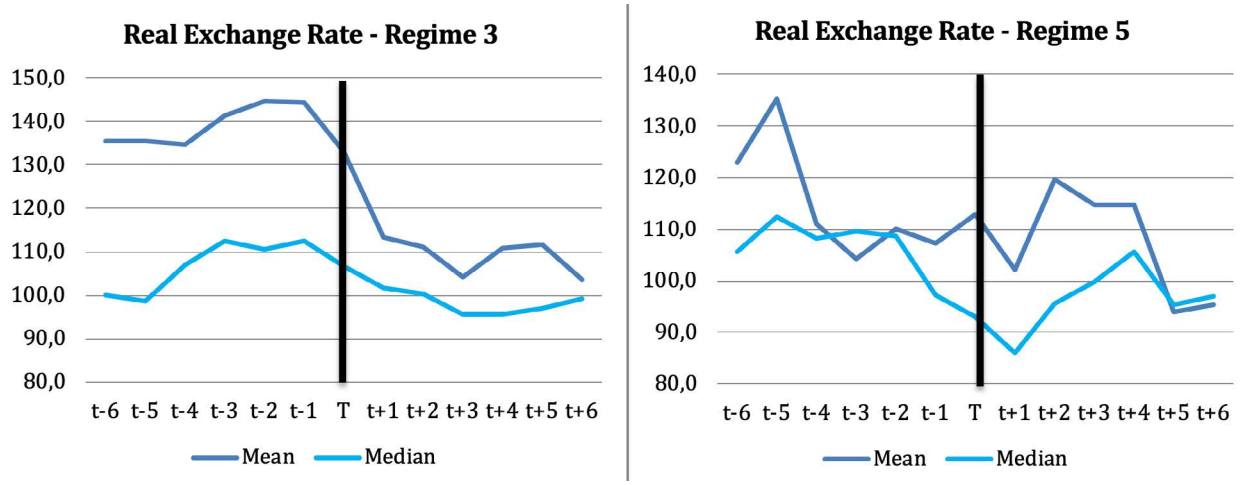


Figure 7: GDP Growth during Reversal Episodes across Exchange Rate Arrangements (Coarse Classification)

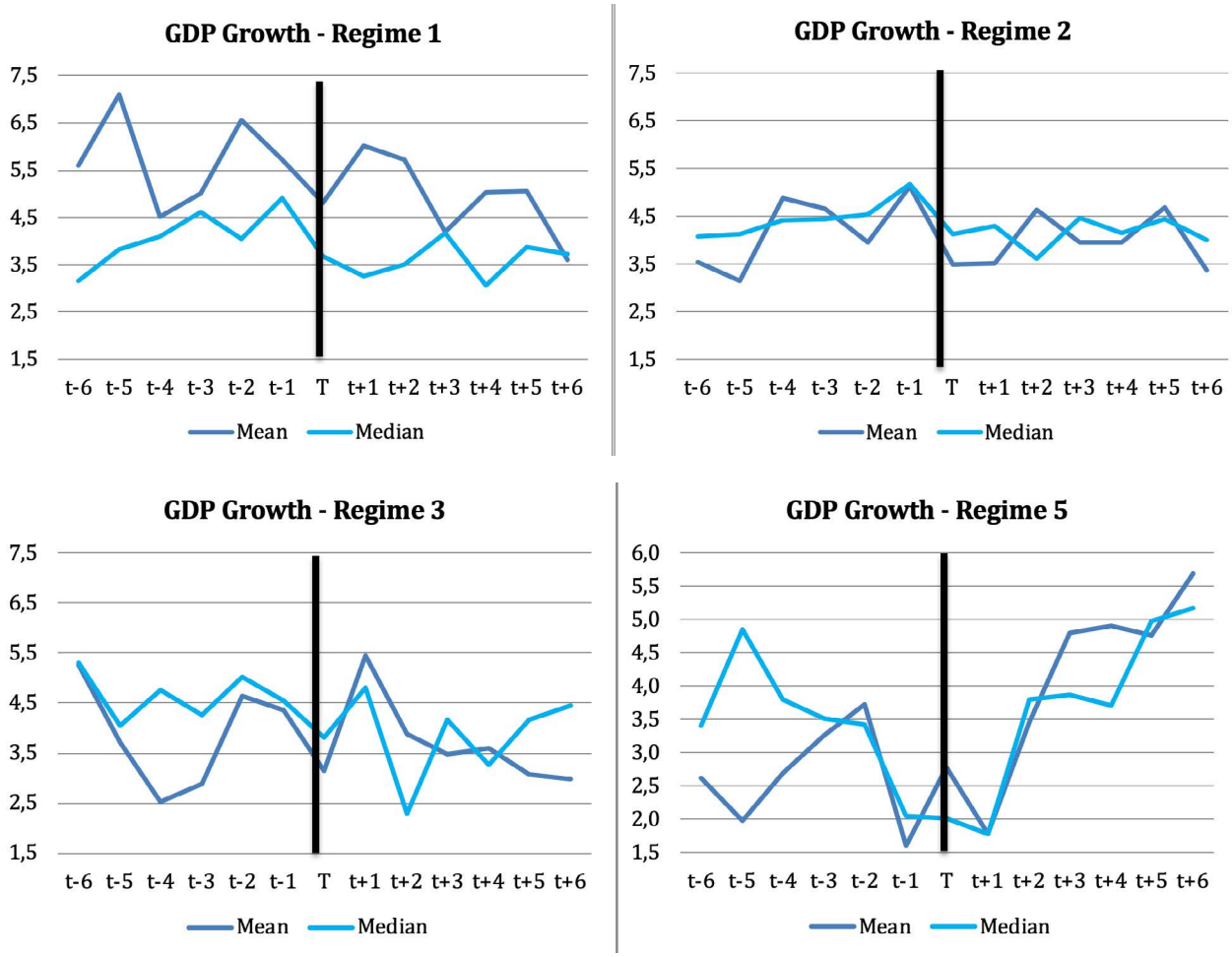


Figure 8: CA, RER and GDP Growth during Reversal Episodes Across Resource and Non-Resource Producer Countries

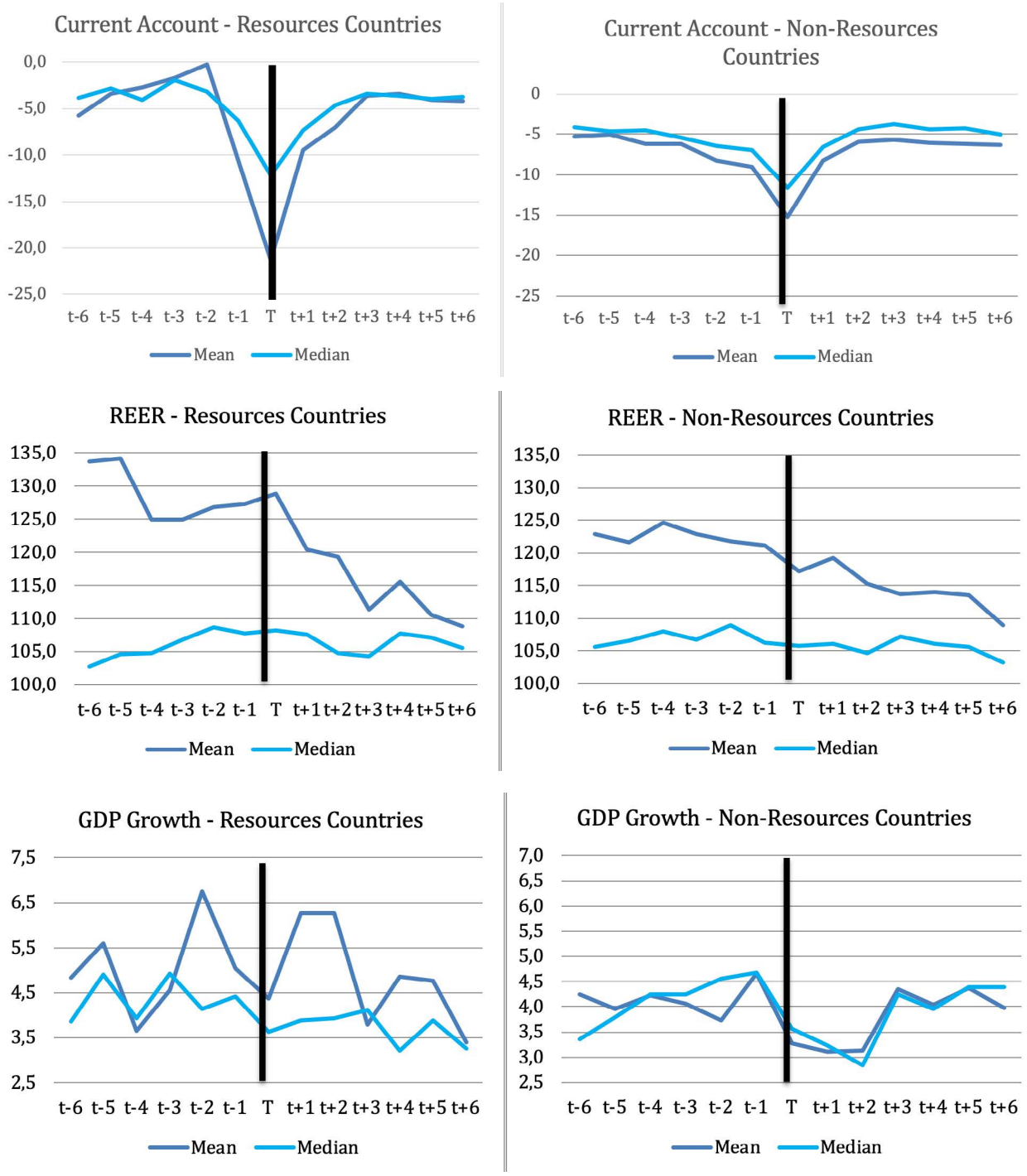


Table 4: Regression Output Table

Variables	DGMM	Pooled OLS	Fixed effects
$CA_{i(t-1)}$	0.6***	0.5***	0.6***
XRR_2	0.4	-0.5	0.3
XRR_3	0.3	-0.3	0.3
XRR_4	-1.2	-0.8	-1.1
XRR_5	-0.4	0.6	0.7
XRR_6	0.1	0.4**	0.1
Capital account openess	0.4	-0.8	0.4
Trade openess	-0.02*	-0.1**	-0.02**
energy price change	2.7*	3.2**	2.6***
non-energy price change	3.6*	3.2	3.5
Precious metal price change	-0.6	0.3	-0.7
XRR2t x $CA_{i(t-1)}$	0.1	0.1	0.1*
XRR3t x $CA_{i(t-1)}$	0.0	-0.1	0.1
XRR4t x $CA_{i(t-1)}$	-0.5**	-0.7***	-0.4*
XRR5t x $CA_{i(t-1)}$	0.0	0.1**	0.1
XRR6t x $CA_{i(t-1)}$	0.0	0.0	0.0
intercept	-0.8	1.8*	-0.7
Number of instruments	40		
Number of countries	48	48	48
Hansen test for p value	0.257	-	-
R2-adjusted	-	0.5	0.46
test AR(1) (p value)	0.002	-	-
test AR(2) (p value)	0.94	-	-

*** Significant at 1 %; ** significant at 5 %; * significant at 10 %
(1) DGMM : difference GMM (Arellano and Bond 1991)

Policy Center for the New South

Complexe Suncity, Immeuble C,
Angle Boulevard Addolb et rue Albortokal,
Hay Riad, Rabat - Maroc.

Email : contact@ocppc.ma
Phone : +212 5 37 27 08 08
Fax : +212 5 37 71 31 54
Website : www.policycenter.ma