

African Department

Dollarization in Sub-Saharan Africa

Experience and Lessons

*IMF staff team led by
Mauro Mecagni and
Rodolfo Maino*

African Department

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May 2015

INTERNATIONAL MONETARY FUND

Cataloging-in-Publication Data

Joint Bank-Fund Library

Dollarization in Sub-Saharan Africa : experience and lessons / Mauro Mecagni ... [et al.]. –
Washington, D.C. : International Monetary Fund, 2015.
pages ; cm.

At head of title: African Department.
ISBN: 978-1-49836-847-6 (print)

1. Dollarization – Africa, Sub-Saharan. 2. Foreign exchange – Africa, Sub-Saharan. 3. Africa,
Sub-Saharan – Economic policy. I. Mecagni, Mauro. II. International Monetary Fund. III.
International Monetary Fund. African Department.

HG1325.D64 2015

ISBN (paper): 978-1-49836-847-6
ISBN (PDF): 978-1-48431-980-2

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Recommended citation: Mecagni, Mauro, et al., *Dollarization in Sub-Saharan Africa: Experience and Lessons* (Washington: International Monetary Fund, April 2015)

Publication orders may be placed online, by fax, or through the mail:
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Contributors

The paper was prepared by a staff team led by Mauro Mecagni. The main contributors to Chapter 1 are Rodolfo Maino, Rodrigo Garcia-Verdu, Justin Matz, Futoshi Narita, Jemma Dridi, and Manuel Rosales. The main contributors to Chapter 2 are Juan Sebastian Corrales, Patrick Imam, Sebastian Weber, and Etienne Yehoue. The main contributors to Chapter 3 are Marco Pani, Carla Macario, Yibin Mu, and Ashwin Moheeput. The paper was prepared in the context of the activities of the African Department's Financial Systems Network. The team wishes to thank Anne-Marie Gulde-Wolf for her encouragement and guidance at various stages of the project.

Introduction

Dollarization—the use of foreign currencies as a medium of exchange, store of value, or unit of account—is a notable feature of financial development under macroeconomically fragile conditions. It has emerged as a key factor explaining vulnerabilities and currency crises, which have long been observed in Latin America, parts of Asia, and Eastern Europe. Dollarization is also present, prominently, in sub-Saharan Africa (SSA) where it remains significant and persistent at over 30 percent rates for both bank loans and deposits—although it has not increased significantly since 2001. However, progress in reducing dollarization has lagged behind other regions and, in this regard, it is legitimate to ask whether this phenomenon is an important concern in SSA. This study fills a gap in the literature by analyzing these issues with specific reference to the SSA region on the basis of the evidence for the past decade.

The context is one where the macroeconomic and financial landscape in SSA has improved significantly in the last decade. The chronic macroeconomic instability that has troubled the region in the past is receding. Conflicts and social turmoil, while not fully eradicated, are now more circumscribed. Institutions—notably the state—have been strengthened, governance is improving, and budgetary and monetary policies are becoming more sustainable. Macroeconomic stability has been regained—reflecting domestic policy reforms and the commodity prices and export boom driven by the emergence of China as a key commercial partner. While the financial system remains underdeveloped in many countries, signs of progress in financial deepening are emerging. Nonetheless, the financial landscape in SSA remains subject to important risks, and several SSA economies have experienced moderate increases in residents' holding of deposits denominated in foreign currency—mainly the U.S. dollar. The latter has been accompanied, in many cases, by the use of foreign currencies to pay a large share of purchases of goods and services and wages (*real sector dollarization*), for instance, in the Democratic Republic of the Congo and, until recently, in Angola, and by the use of foreign currency as a means of payment (*currency substitution*), as in Zimbabwe. SSA is, however, a highly heterogeneous region, with some countries, notably in Western Africa, seeing little or no dollarization.

Dollarization can pose important challenges to policymakers. It constrains the capacity of monetary authorities to act as a lender of last resort; hampers banks' liquidity management; and weakens the stability of the financial sector, as it may amplify the impact of exchange rate movements on banks' balance sheets, thereby increasing the risk of contractionary effects and bank failures (Box 1 outlines a literature review on dollarization). A better understanding of dollarization in SSA may thus help to assess potential vulnerabilities and the case for the implementation of policies in order to mitigate the risks that may result from it. Indeed, dollarization can complicate the implementation of economic policies through various channels, by:

- Exposing the balance sheets of the public sector, private enterprises, and households to exchange rate risks, when assets and liabilities in foreign currency are mismatched;

- Reducing the authorities' capacity to use monetary policy and making it harder to use the central bank's lender-of-last resort function to stabilize the domestic banking system¹;
- Weakening the structural fiscal balance and fiscal flexibility by reducing the scope for seigniorage; and, finally,
- Reducing the abilities of governments to issue medium- and long-term debt in domestic currency—known as the *original sin*—further exacerbating vulnerabilities to shocks and thereby amplifying macroeconomic and output fluctuations.²

On the other hand, dollarization may also have some merit in very specific circumstances. In economies with high and volatile inflation, allowing foreign currency deposits may encourage residents to transact through the banking system rather than deposit money abroad or hold their savings in nonmonetary assets. The use of a foreign currency can also bring credibility to a country's disinflation efforts, notably in situations of very high inflation. Countries that have experienced episodes of high inflation or hyperinflation have often used the exchange rate as a nominal anchor and have managed to bring inflation down through exchange rate-based stabilization programs. For these countries, dollarization is a way of benefiting from the long track record of the monetary and fiscal authorities of advanced economies and the credibility that is associated with their currencies. In highly dollarized economies, therefore, the debate about reforms frequently centers on whether these economies should fully dollarize, fully de-dollarize, or maintain the status quo.³

A. The Uniqueness of SSA

What sets SSA apart from other regions where dollarization is present? Historically, SSA has witnessed a rather tumultuous development since independence. Some critical characteristics stand out:

- **Political instability.** The incidence of conflict has been more severe and its impact longer-lasting than in other regions, owing to ethnic fragmentation and weak political institutions. As a result, private savers have not only been concerned about macroeconomic instability,

¹ Gulde-Wolf and others (2004) suggest that dollarization could undermine financial stability through risks associated with liability dollarization, that is, when the increase in local currency value of dollar liabilities exceeds the value of the borrower's income flow. Liability dollarization can often lead to sudden stops, and to corporate and banking crises, as witnessed during the East Asian crisis of 1997.

² Eichengreen, Hausmann, and Panizza (2002).

³ Most estimates of the extent of dollarization in a country do not include foreign currency in circulation since it is a difficult concept to measure. A narrow version looks at the ratio of foreign currency deposits to total deposits or to broad money. Reinhart, Rogoff, and Savastano (2003) construct a broader measure of dollarization through an index of economic and financial indicators. Baliño, Bennett, and Borensztein (1999) consider an economy to be dollarized if the ratio of foreign currency deposits to broad money exceeds 30 percent. A model to estimate dollars in circulation in Cambodia is presented in de Zamaróczy and Sa (2003).

which could be hedged through dollarization, but also by risks of expropriation, which encouraged capital flight.

- **Limited financial deepening.** Shallow financial systems provided limited investment opportunities in local currency. In some countries, the financial system is mainly constituted by banks, which tend to lend to the sovereign or to large resource-exporting companies—both of which may be, to some extent, naturally hedged, receiving aid inflows and earning foreign exchange from exports, respectively.
- **Limited private sector development.** The formal private sector in SSA tends to be smaller than in other regions. This, eventually, is reflected in limited bankable projects and inadequate demand for formal credit in local currency. The role of the state and state enterprises in economic activities has been pervasive in many countries.

As a result, economic take-offs tended, in many SSA countries, to be short, with frequent reversals, due either to external shocks such as adverse changes in the terms of trade, or to domestic turmoil such as civil unrest and other political upheavals that held back development. With tight foreign exchange restrictions, small private export sector, limited monetization, and large informal sectors, the use of foreign currencies manifested, mainly, in form of capital flight, with residents moving savings overseas.

Nonetheless, since the 1990s, political stability has improved, significant market-friendly structural reforms have been introduced, debt levels have been curbed, and inflation and budget deficits have been brought under control. In the last decade, SSA has also reversed the trend decline of its share in world trade. Foreign direct investment inflows have been substantial—particularly in energy and mining—and financial integration is starting to gain ground.⁴ Many countries in SSA are commodity exporters and price takers in international markets. Most commodities are priced and invoiced in dollars, so most transactions associated with their foreign trade is, in effect, dollar denominated. In this setting, countries endowed with natural resources have registered higher use of foreign currency. In a number of countries commercial banks have been allowed to collect foreign currency deposits from both residents and nonresidents, which contributed to an increase of the use of foreign currency, particularly the U.S. dollar.

B. Key Results and Policy Implications

This study shows that efforts to reduce dollarization in SSA countries during the last decade have had mixed results. First, dollarization has been more persistent in SSA than in the rest of the world. Second, there have been few successful episodes of de-dollarization—on the one hand, Angola has recorded a downward trend but, on the other hand, countries like the Democratic Republic of the Congo, Liberia, and São Tomé and Príncipe are still experiencing the same levels of dollarization as in 2000. Third, the study confirms that inflation and nominal exchange rate depreciation are key drivers of dollarization, supporting the currency substitution

⁴ IMF (2012).

argument that foreign currencies are used to hedge against inflation risk. Political instability, strong dependence on primary commodities exports, and limited financial market development also play a role to explain the SSA dollarization record.

The SSA experience confirms that successful de-dollarization requires time, persistent, and coordinated efforts to implement an appropriate mix of sound macroeconomic policies, market-based incentives, and microprudential measures. Mandatory measures and direct controls seem only to be effective when used as a complement to a market-based strategy. Countries around the world and in SSA that eventually managed to reduce significantly the use of foreign currencies were successful in implementing a sustained process of disinflation and stabilization, which, in the end, increases the attractiveness of using local currency.

C. A Reader's Map for the Study

Chapter 1 presents salient stylized facts on dollarization in the region and discusses its dynamics in the last decade from a balance sheet perspective. It also explores trends and similarities or differences between SSA and other regions.

Chapter 2 investigates the determinants of deposit and loan dollarization in SSA. Using a panel data set to benchmark dollarization in SSA with other regions, the chapter compares the level of dollarization across regions and macroeconomic performance by country groups, discusses currency mismatches and the dynamics of dollarization, and identifies specific macroeconomic features in SSA dollarized economies

Chapter 3 builds on the previous discussion to identify factors and policy measures promoting de-dollarization. By analyzing country cases of de-dollarization, this chapter derives some policy implications that can be relevant for countries in SSA.

The final chapter draws the main conclusions on how dollarized countries in SSA could de-dollarize or mitigate the consequences of dollarization.

Box 1. A Brief Literature Review

The literature on dollarization identifies several reasons behind this phenomenon:

- **Large macroeconomic imbalances and high inflation.** Several countries around the world (for example, Chile, Colombia, and Peru) became dollarized following periods of macroeconomic turbulence and high inflation that encouraged the substitution of domestic currency with the U.S. dollar. Dollarization may thus result from a legacy of severe economic disruption.
- **Financial repression and capital controls.** Many Latin American economies in the 1970s and 1980s as well as many SSA countries (for example, Democratic Republic of the Congo, Liberia, and Nigeria) have become dollarized following periods of financial repression and the imposition of capital controls.
- **Use of the dollar as anchor for macrostability.** Some countries (for example, Ecuador, El Salvador) adopted the dollar as legal tender in order to escape from a long history of monetary and financial disorder by “importing” the credibility of the U.S. monetary institutions.
- **Underdeveloped financial markets.** In several countries, domestic borrowers contract debt in foreign currencies in response to the lack of domestic currency alternatives in incomplete financial markets.

The early literature made a distinction between two types of dollarization: currency substitution and asset substitution. The former refers to the use of foreign currency as medium of exchange, the latter as store of value (Levy-Yeyati 2006). The early literature focused on currency substitution and was motivated by the history of high inflation in Latin America. The key message from this initial literature is that monetary policy will be ineffective in a country where foreign currencies are seen as substitutes for domestic currency. The implication is also that the elasticity of substitution between domestic and foreign currency is likely to increase when the perceived risk of sharp changes in the value of domestic currency are greater, most likely in situations of floating or adjustable predetermined exchange rates. To the extent that inflation is ultimately reflected in the nominal exchange rate, expected inflation should underpin currency substitution. In such circumstances, the effectiveness of monetary policy is limited (Miles 1978; Brillenbourg and Schadler 1980; Girton and Roper 1981; Ortiz 1983).

The currency substitution view was challenged by the persistence of dollarization in the 1990s, even after inflation rates in dollarized economies had declined significantly. The currency substitution view attributed this persistence to long-lasting memories of past inflation. However, more recent studies looked at dollarization as an asset substitution phenomenon. In this context, Ghosh and others (1998) showed that countries with high levels of dollarization or currency board arrangements enjoyed lower inflation, more stable exchange rates and faster economic growth than nondollarized economies, albeit losing the benefits of a more flexible monetary policy.

After the 1990s, the literature evolved into three categories inspired by macroeconomic developments in Latin America. The first refers to a portfolio view, which explains dollarization as optimal portfolio choice for a given distribution of real returns in each currency. The second emphasizes a market portfolio view, which looks at dollarization as a response to market imperfections. Finally, the last refers to an institutional view. Vetlov (2001) found that specific factors may lead to dollarization—high devaluation expectations, inflation rate differentials between domestic and foreign inflation, significant interest spread between domestic and foreign currency deposits, current account deficits, and inadequate levels of international reserves.

The empirical literature on dollarization has also mostly focused on Latin America and to some extent on transition economies. Giovanni and Turtelboom (1994) surveyed the theoretical literature on dollarization, suggesting a classification based on money demand in a multicurrency environment and distinguishing: (1) cash-in-advance and (2) transactions cost models. In the first group of models, the real return differential between domestic and foreign currencies determines the demand for domestic and foreign currencies.

(cont.)

Currencies can circulate together if there are no legal restrictions affecting their use. Bogetic (2000) found that the higher the domestic inflation rate vis-à-vis foreign inflation, the higher the level of foreign currency holdings will be. The second group—Marshall (1987) and Poloz (1986), among others—found that currency substitution may emerge when transaction costs are high (that is, agents maintain foreign exchange as medium of exchange and store of value).

Experience also shows that dollarization is often difficult to reverse. While the use of a foreign currency as a store of value or for domestic transactions has increased sharply in several countries over time, there are fewer cases in which this trend has been significantly reversed. Memories of macroeconomic instability and hyperinflation—the key factors that encourage dollarization—do not wither away easily, encouraging economic agents to maintain foreign currency denominated assets even when macroeconomic conditions have stabilized and policy credibility has been established. This hysteresis phenomenon has been explained in the literature. Baliño and others (1999) note that practices regarding the use of currencies for the settlement of transactions change slowly and only when there are significant benefits to be gained from switching currencies. Ize and Yeyati (1998) find that hysteresis can result from exchange-based stabilization measures, which are not well aligned with de-dollarization (for instance, reducing the volatility of the exchange rate below that of domestic prices). Kokenyne and others (2010) argue that maintaining trends in exchange rate can promote the persistence of dollarization, in some circumstances, by entrenching expectations of further depreciations.

Several studies argued that higher exchange rate volatility, by itself, encourages de-dollarization. Kokenyne and others (2010) and Garcia-Escribano (2010) show that this happens if two-way movements in the exchange rate (as opposed to one-way bets on an overvalued peg) are allowed. A move toward higher exchange rate flexibility has further contributed to de-dollarization efforts in Lao P.D.R. (1995), Poland (1995–2000), and Turkey (2001). The evidence also shows that a trend toward local currency appreciation has provided a significant contribution to deposit de-dollarization in Bolivia, Peru, Paraguay, and Uruguay (2001–10), and that an increase in exchange rate volatility also encourages de-dollarization. The rationale is that the possibility that the local currency may appreciate increases the risk of holding balances in foreign currencies, which may lose value in local currency terms. Other studies, however, purport that the causal relationship between exchange rate volatility and de-dollarization is generally not strong (for example, Berkmen and Cavallo 2010).

To our knowledge no study focuses on the issue of dollarization in the African context. However, a few exceptions are worth mentioning. Kessy (2011) argues that one of the most notable effects of the financial sector liberalization in Tanzania has been the increased use of the U.S. dollar as store of value and a mean of transactions by residents. As part of the liberalization process, commercial banks were allowed in 1992 to open foreign currency deposits accounts to both residents and nonresidents. The impact of this change was rapid. Within a year, foreign currency deposits accounted for about 15 percent of broad money and increased to a peak of 33.5 percent in 2003. This makes Tanzania one of the most dollarized countries within the East African Community (EAC), although the country's dollarization pattern has been declining in recent years. Olalekan (2009) examines the effect of macroeconomic fluctuations on deposit dollarization in 18 SSA countries between 1980 and 2004, highlighting the role of expectations about exchange rate changes and capital account restrictions in explaining deposit dollarization.

1. Stylized Facts

With data for the period 2001–12, this chapter presents some stylized facts about the process of dollarization in SSA, and across regions and countries.⁵ The chapter finds that while deposit and loan dollarization in SSA did not increase significantly from 2001–12, it has persisted, indeed, lagging behind other regions in regard to deposit de-dollarization. Currency mismatches are also more prevalent in SSA dollarized economies than in the rest of the world.

A. The Dollarization Picture in SSA: 2001–12

A study of dollarization in the SSA has to consider the existence of specific legal restrictions on the holding and use of foreign exchange. These restrictions are country-specific (see Table A.1.2). On the one hand, there are the country members of the two Communauté Financière Africaine (CFA) currency unions (CFA zone) in which, by law, foreign currency deposits and credits are not permitted (without previous authorization).⁶ The same applies to Lesotho and Swaziland, which have restrictions on holdings of foreign exchange deposits and credits. In these countries, banks are not allowed to take foreign exchange deposits or lend in foreign exchange, and capital controls ensure that foreign exchange does not find its way into the financial system. This explains the absence of dollarization in the banking system. At the other extreme is Zimbabwe, which became fully dollarized, by law, in 2009 following a period of hyperinflation. The rest of the SSA region does not have these tight restrictions. As a result, the analysis here will exclude the countries that are not dollarized and focus on the remainder. Two measures of dollarization are used: bank deposit dollarization and bank loan dollarization, defined as the ratio of bank deposits (loans) denominated in foreign currency to total bank deposits (loans).⁷

⁵ To supplement these analyses, Annex 1.1 describes dollarization levels for households and firms in the SSA region, focusing on balance sheet analysis of dollarization by sectors and depicting restrictions on the use of foreign currency in SSA.

⁶ CFA countries comprise WAEMU (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, Togo) and CEMAC (Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea, Gabon).

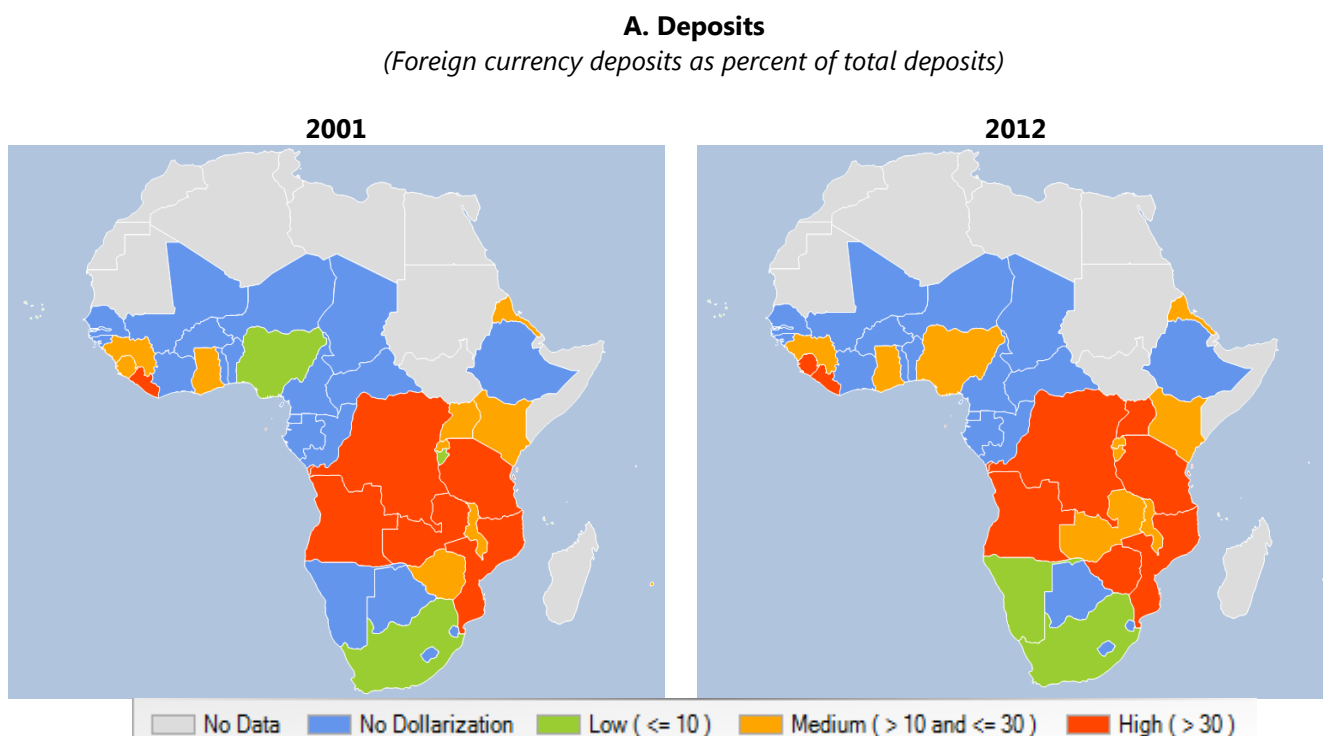
⁷ The main source of these data to estimate dollarization levels is the IMF International Financial Statistics (IFS) database, which provides information on foreign currency denominated deposits or loans for an average of 100 countries during the period 2001–11. For the SSA region, the number of countries with available data in IFS is 30 for deposits and 29 for loans. In order to expand the coverage of countries in SSA, we used data from the African Department database. However, while IFS decomposes the information by sectors of the economy, the AFR database does not. Therefore, in the broad definition of dollarization used in this document, all sectors of the economy are included except for central bank and central government.

On average, deposits and loans dollarization in SSA increased, albeit not dramatically, during the course of the last decade. The average level of deposit dollarization—excluding countries with zero values—was 29 percent in 2001 and 31.6 percent in 2012. Loan dollarization was on average 26.1 percent in 2001 and went up to 34.8 percent in 2012.⁸

Figure 1.1 maps dollarization in SSA in 2001 and 2012. It is noteworthy that the most dollarized countries in the region include some important natural resource-dependent economies (Democratic Republic of the Congo, Liberia, São Tomé and Príncipe, Angola, Mozambique, and Zambia). The number of countries with high deposit dollarization (above 30 percent) remained the same but the composition of this group changed. While Tanzania and Mozambique managed to reduce their respective dollarization level to below 30 percent, Sierra Leone did the opposite and, as noted, Zimbabwe became fully dollarized. On the other hand, the number of countries with a high level of loans dollarization increased from four—Angola, Mozambique, São Tomé and Príncipe, and Tanzania—to six—Angola, the Democratic Republic of the Congo, Liberia, São Tomé and Príncipe, Tanzania, and Uganda.

Figure 1.2 correlates the degree of loan dollarization and of deposit dollarization, and shows that for most SSA countries, higher deposit dollarization moves *pari passu* with higher loan dollarization.

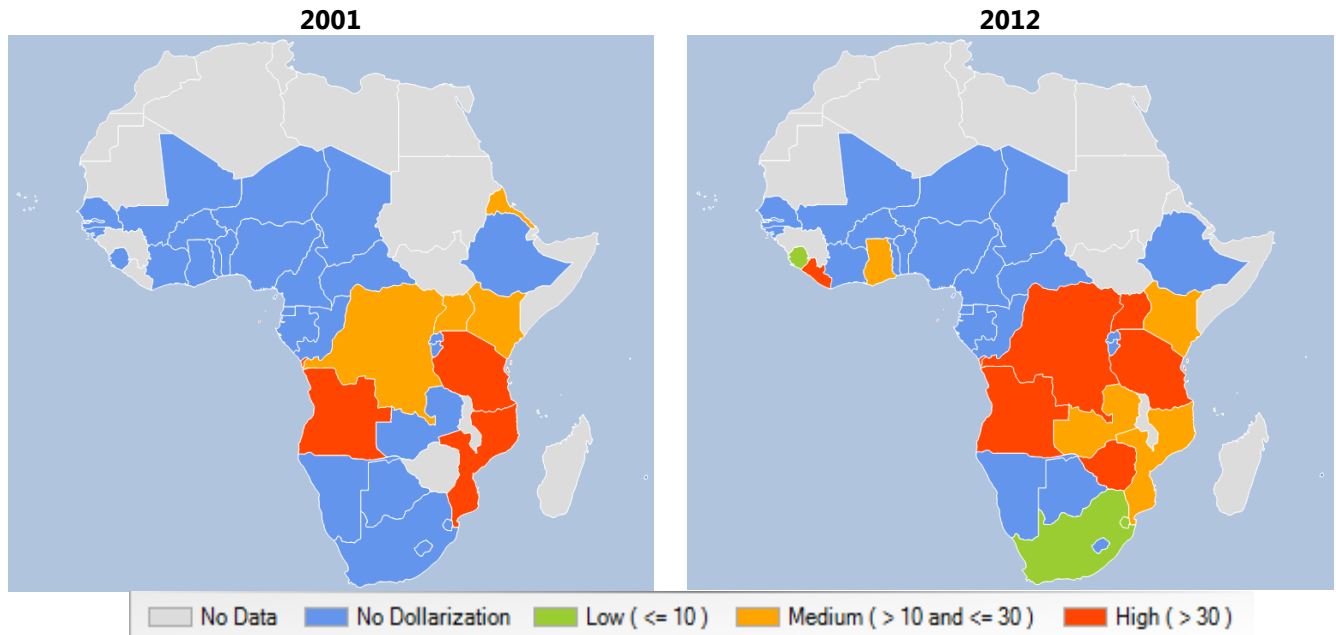
Figure 1.1. SSA: Dollarization Picture, 2001 and 2012



⁸ Including all countries but Zimbabwe, the average of deposits dollarization was 14 percent in 2001 and 16 percent in 2012, while the average for loans was 7 percent in 2001 and 12 percent in 2012.

B. Loans

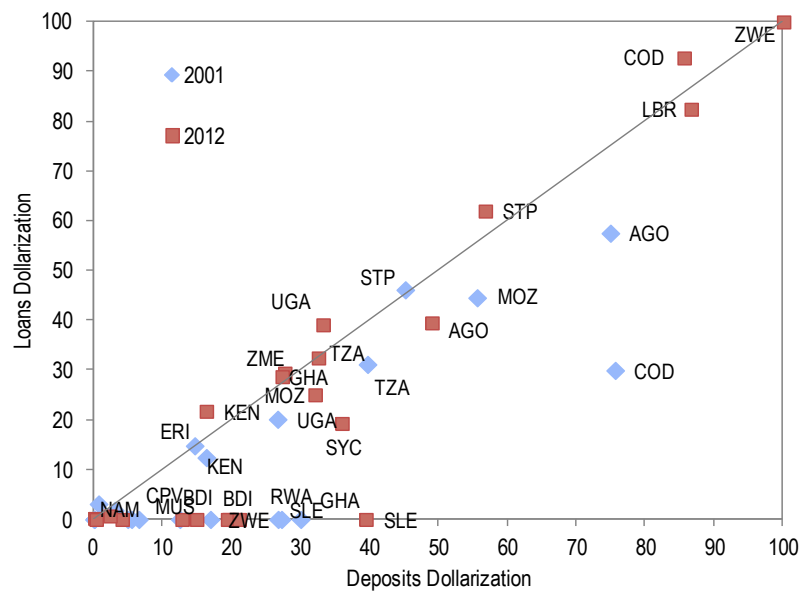
(Foreign currency loans as percent of total loans)



Sources: International Financial Statistics (IFS) database; and African Department database, IMF.

Figure 1.2. SSA: Correlation of Deposits and Loans Dollarization, 2001 and 2012

(Foreign currency deposits/loans as percent of total deposits/loans)



Sources: International Financial Statistics (IFS) database; and African Department database, IMF.

B. Trends in Dollarization Over the Last Decade

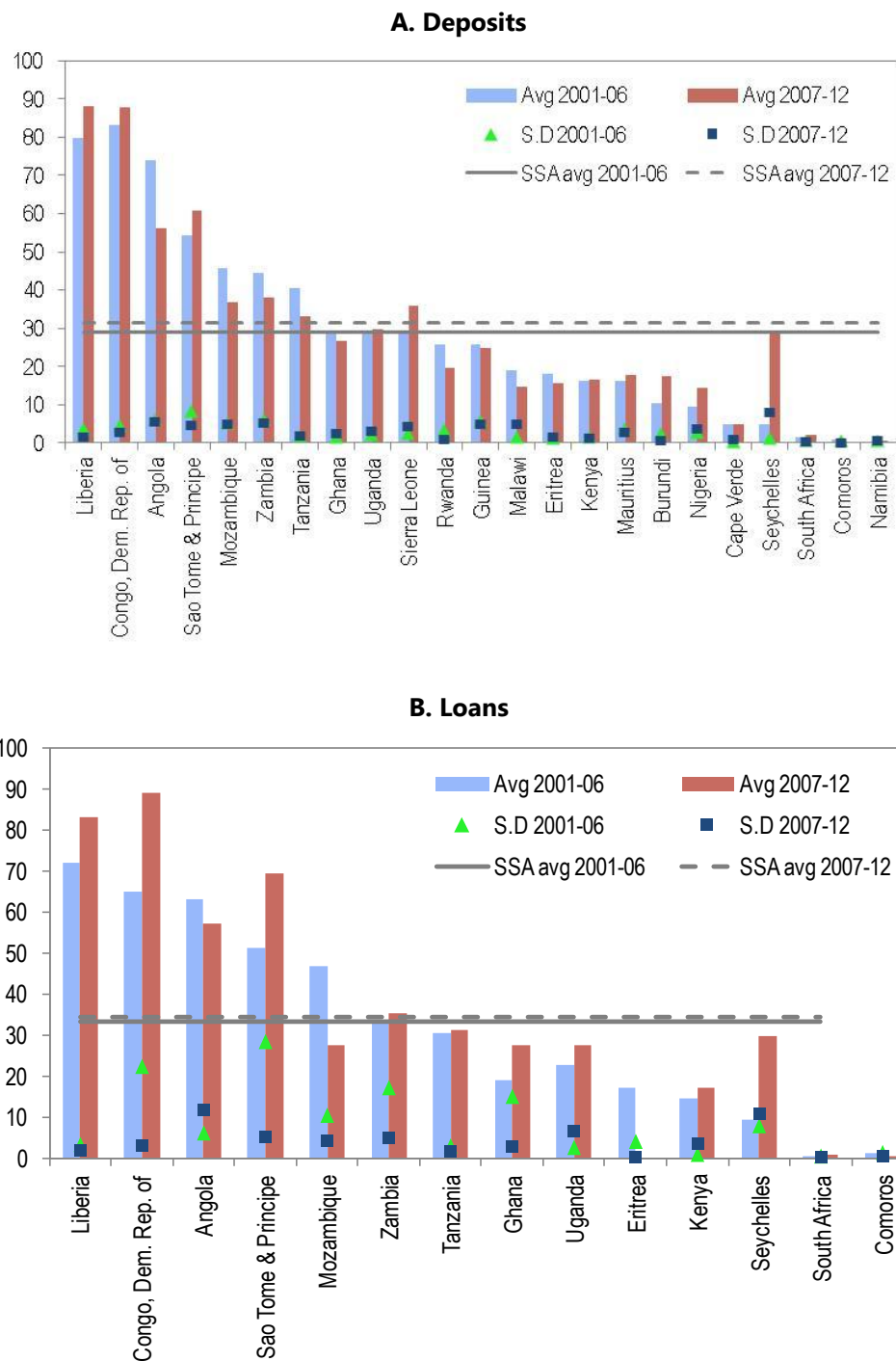
Deposit and loan dollarization did not increase significantly in the decade or so from 2001–12. The evolution of trends during 2001–12—as depicted in Figure 1.3 by the small distance between the averages for the first and second half of the decade—shows that the situation has not changed much, in terms of mean values.

In terms of individual countries, apart from Zimbabwe, Seychelles is the country that experienced the largest, and statistically significant, increase in deposits dollarization. This occurred on the backdrop of the lack of credibility of the peg, the near-depletion of international reserves, and the emergence of significant parallel market. The Democratic Republic of the Congo experienced a similar dynamic concerning loans dollarization. Angola and Mozambique, on the other hand, recorded significant reductions in deposits and loans dollarization, respectively, during the second half of the decade vis-à-vis the first six years.

Looking now at the different experience across countries observed during the decade, it is possible to classify SSA countries in three groups, depending on whether the deposits and loans dollarization trend is upward, downward, or relatively stable. Figure 1.4 shows the average level of bank deposits dollarization for each country in these groups, while Figure 1.5 shows average level for bank loans. The sample of 23 SSA countries with positive deposit dollarization values—excluding Zimbabwe, Lesotho, Swaziland, and CFA zone countries—is divided almost equally between the three groups. The sample of 15 countries with positive loan dollarization values—excluding Zimbabwe—is instead concentrated in the upward trend group.

Of the five most dollarized economies (Angola, Democratic Republic of the Congo, Liberia, São Tomé and Príncipe, and Zambia) only Angola recorded a downward trend in both deposits and loans, while Democratic Republic of the Congo, Liberia, and São Tomé and Príncipe recorded an upward trend during the decade. Contrasting with the previous cases, Zambia presents a peculiar characteristic: a downward trend in deposits dollarization but an upward trend in loans. Furthermore, trends in the ratio of foreign exchange debt to total debt in SSA show, unequivocally, that countries have been able to tame, somewhat, the so-called “original sin problem.” The average ratio of foreign exchange debt to total debt in SSA started at around 78 percent in 2001 and decreased rather steadily to around 60 percent at end-2012. This pattern confirms the increasing ability of governments to issue debt in domestic currency, which enhances the economy’s resilience to external shocks. In addition to this growing role of domestic debt markets, it is also noteworthy that, after a long absence from international capital markets, several SSA economies have recently been able to tap also into these markets. To finance their infrastructure development projects, some debut issuers have started to issue their second-time bonds—Ghana, Gabon, Nigeria—while others (like Kenya, Senegal, and Tanzania) consider issuing in international capital markets in the near future. The overall reduction of the “original sin” is, therefore, also associated with a contemporaneous differentiation of external financing sources for some frontier SSA economies.

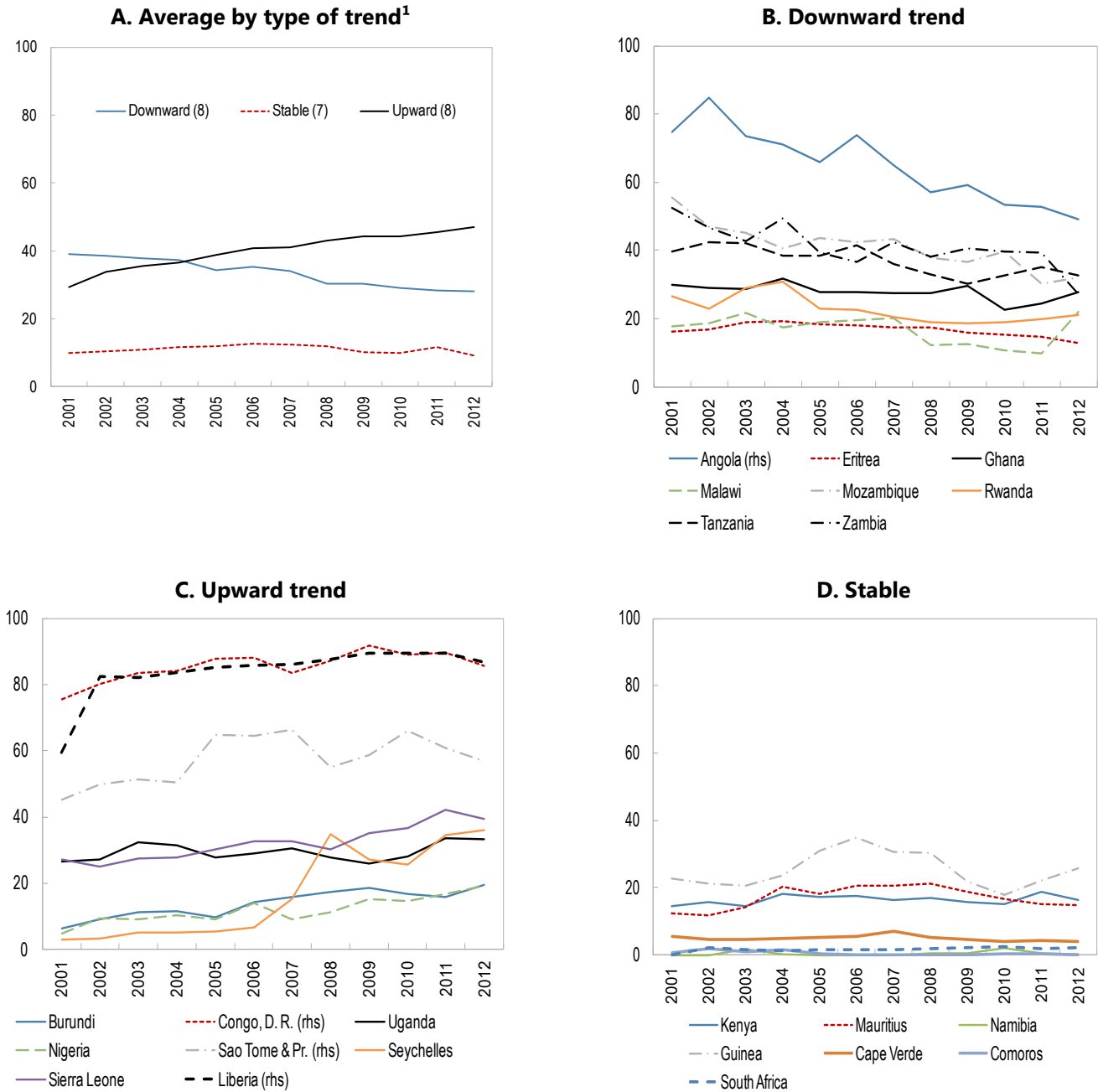
Figure 1.3. SSA: Deposits and Loans Dollarization by Country, 2001–12
(Foreign currency deposits/loans as percent of total deposits/loans)



Sources: International Financial Statistics (IFS) database; and African Department database, IMF.

Figure 1.4. SSA: Trend of Deposits Dollarization, 2001–12

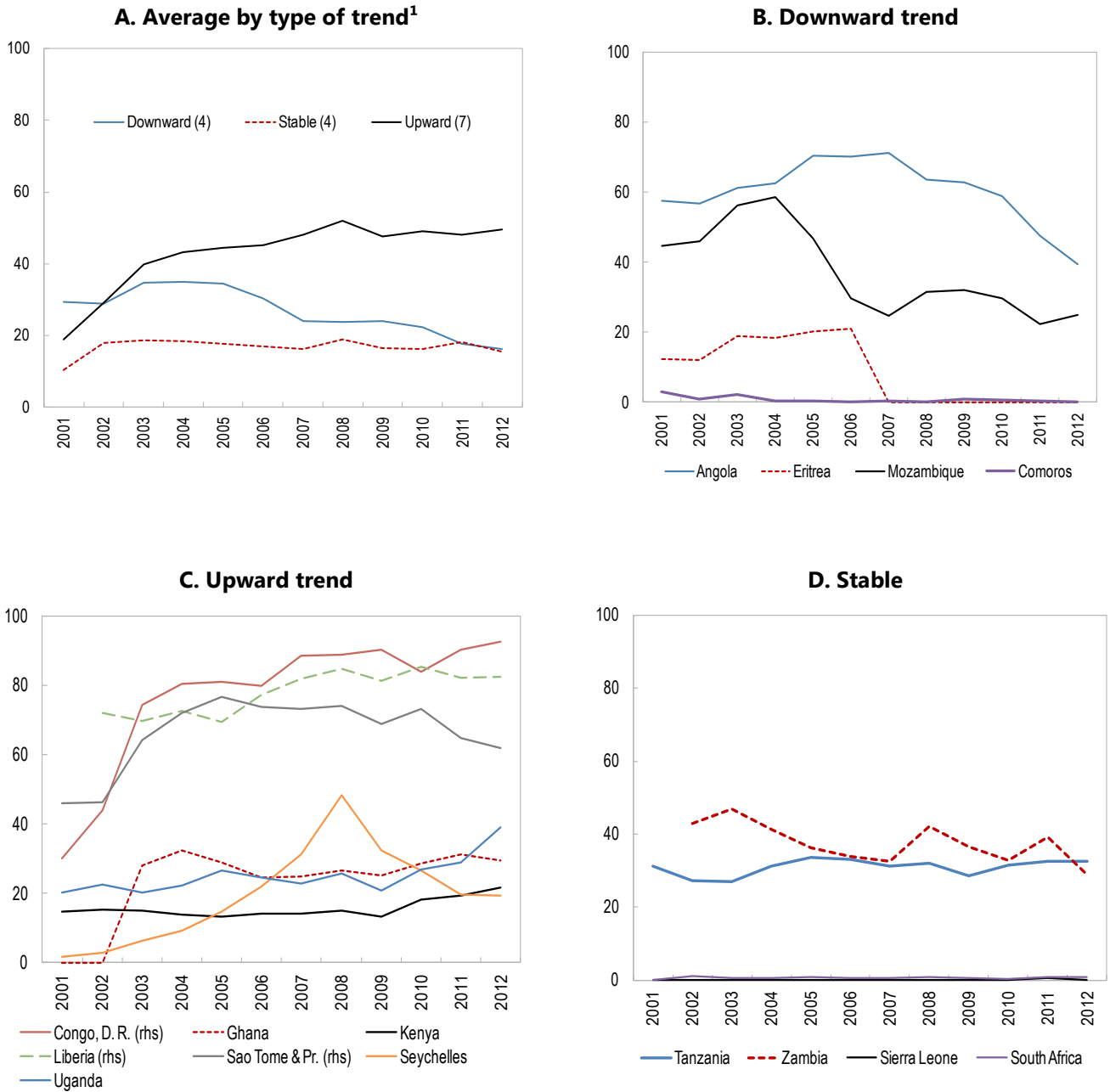
(Foreign currency deposits as percent total deposits)



Sources: International Financial Statistics (IFS) database; and African Department database, IMF.

¹In parentheses the number of countries in each group.

Figure 1.5. SSA: Trend of Loans Dollarization, 2001–12
(Foreign currency loans as percent of total loans)



Sources: International Financial Statistics (IFS) database; and African Department database, IMF.

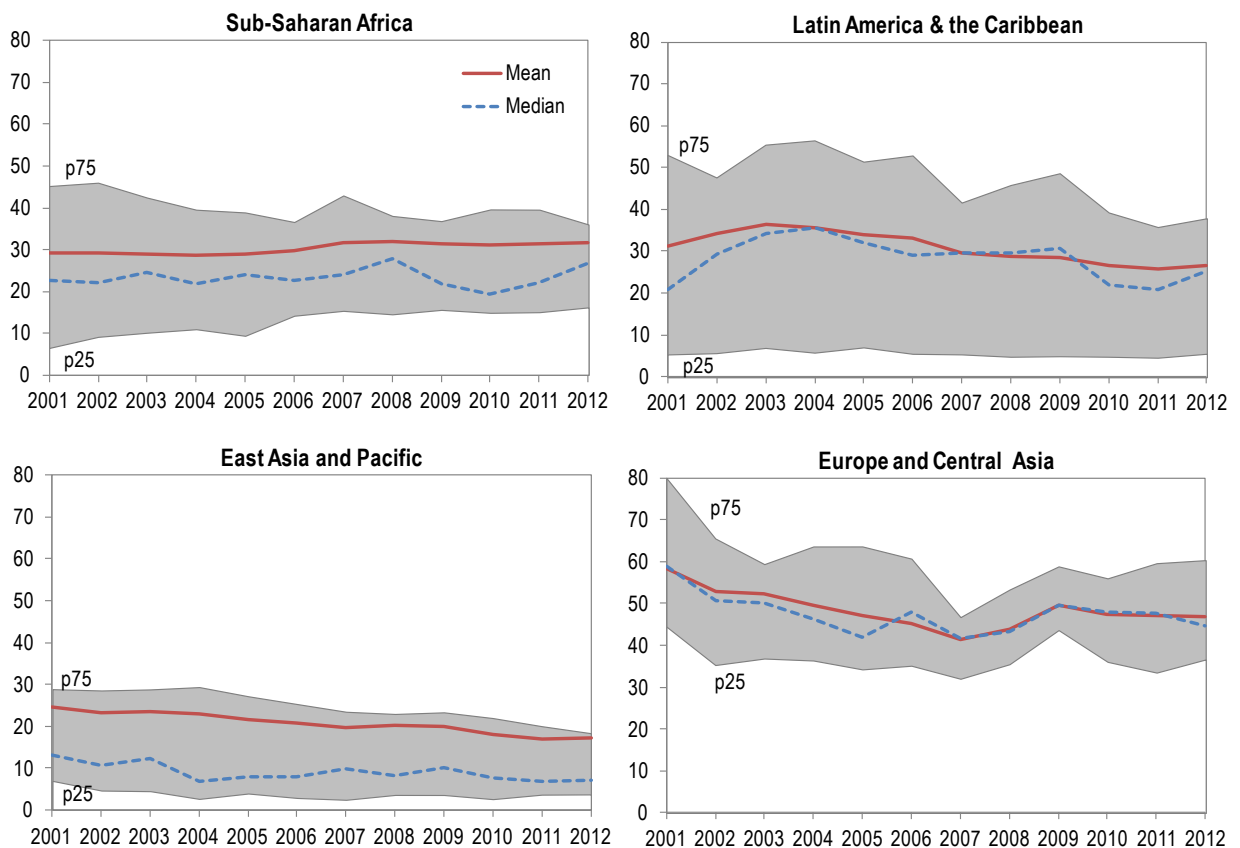
¹In parentheses the number of countries in each group.

C. Benchmarking Sub-Saharan Africa versus the Rest of the World

Deposit dollarization in SSA has been more stable than in other regions, and the de-dollarization of deposits has lagged behind. As mentioned in section A, deposit and credit dollarization hover around 30 percent, similar to Latin America, higher than East Asia but much lower than some economies of Eastern Europe. Figure 1.6 also shows that the Latin America and Caribbean region has experienced a process of gradual de-dollarization in the last decade.⁹ Likewise, deposits dollarization in East Asia and Pacific has dropped from 25 to 17 percent. Europe and Central Asia have also managed to reduce deposits dollarization (by 10 percentage points from 2001–12), but prevailing levels remain high.

Figure 1.6. Evolution of Deposits Dollarization by Region, 2001–12

(Deposits in foreign currency as percent of total deposits)¹



Sources: International Financial Statistics (IFS) database; and African Department database, IMF.

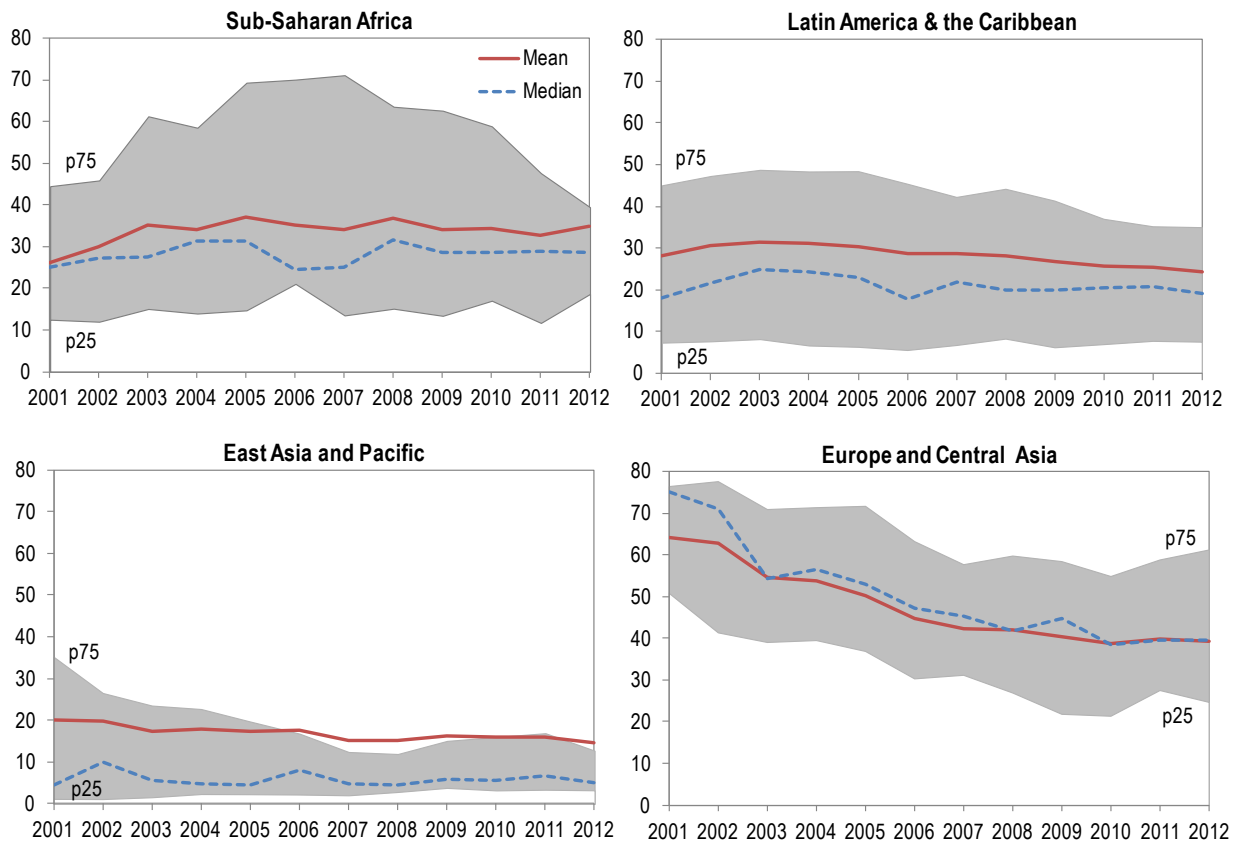
¹p25 and p75 show, respectively, the first and third quartile.

⁹ Starting in 2003, deposits in FX in the Latin America and Caribbean region reached 36.3 percent and went down to 25.6 percent in 2012.

In terms of loan dollarization, the average level has modestly increased in SSA while remaining stable or falling in other regions. In 2001, 26 percent of total bank credit in SSA was denominated in foreign currencies. This ratio increased to 34 percent in 2012. By contrast, in East Asia and Pacific, Latin America and the Caribbean, and Europe and Central Asia the share of credit issued in foreign currencies remained constant or declined over the same time span (Figure 1.7). As a result, SSA is today the second most dollarized region after Europe and Central Asia.

Figure 1.7. Evolution of Loans Dollarization by Region, 2001–12

(Loans in foreign currency as percent of total deposits)¹



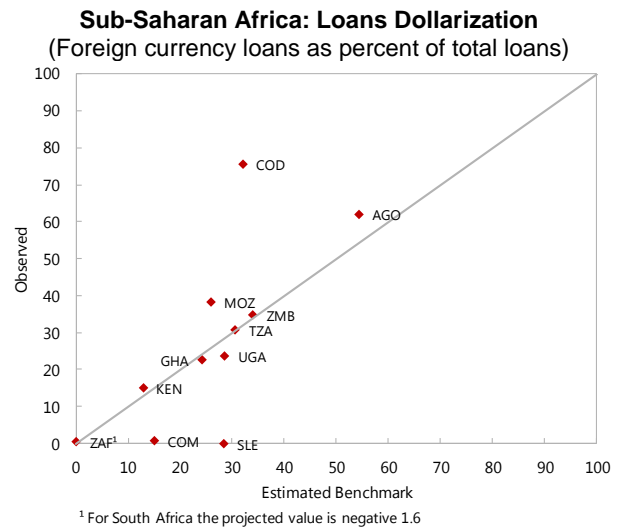
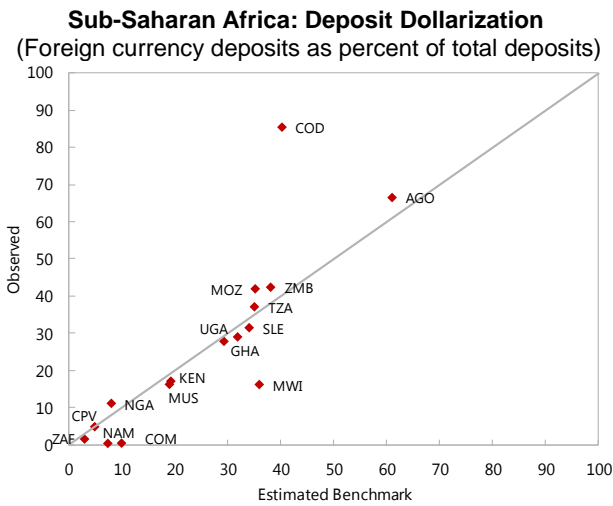
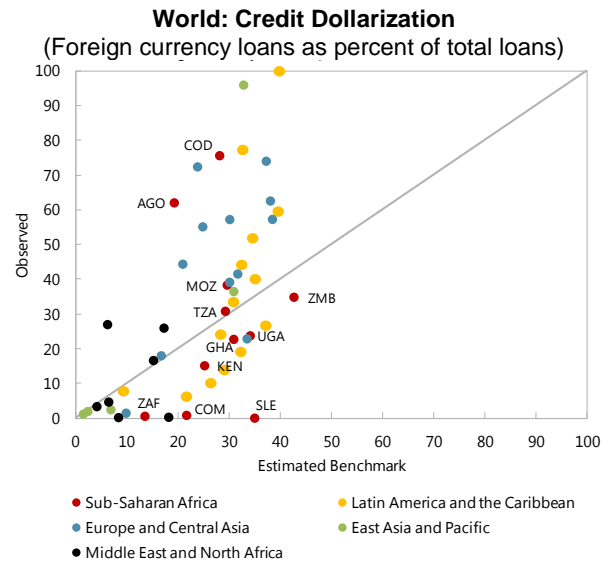
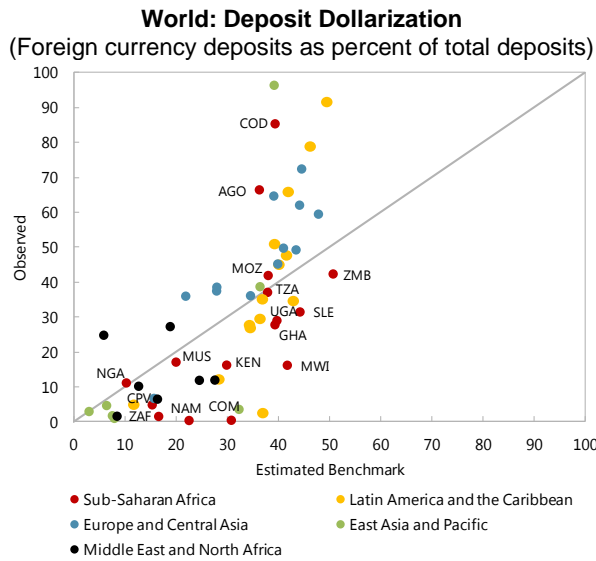
Sources: International Financial Statistics (IFS) database; African Department database; and IMF staff calculations.

Note: Excludes all countries with zero values.

¹p25 and p75 show, respectively, the first and third quartile.

While dollarization in SSA is showing signs of hysteresis or persistence, its level is consistent with the economic and structural characteristics of the region (Figure 1.8). For most SSA countries, observed dollarization tracks the benchmark levels estimated on the basis of key countries' characteristics (per capita gross domestic product [GDP], financial depth, inflation, and openness). This is illustrated by the constellation around the 45 degree line in Figure 1.8 (upper charts). Nevertheless, when only SSA countries are considered (lower part of Figure 1.8), the gap between observed dollarization and the benchmarks narrows significantly.

Figure 1.8. Evolution of Dollarization in the World, Average 2001–12



Sources: International Financial Statistics (IFS) database; and IMF staff calculations and estimates.

Comparing Dollarization

Comparing dollarization in SSA versus the rest of the world, Table 1.1 and Figures 1.9 and 1.10 provide further insights into the relation between the use of foreign currency and key macroeconomic variables. What emerges is that macroeconomic volatility typical of dollarized economies is more pronounced in SSA than in other regions. Currency mismatches are significant, and persistence is higher in SSA when compared to other regions as well.

Table 1.1. Average Dollarization Across Regions, 2001–12

| | Deposit | | Loans | |
|---------------------------------|--|-------------|------------------------------------|-------------|
| | (FX deposits over total deposits) | | (FX loans over total loans) | |
| | 2001 | 2012 | 2001 | 2012 |
| East and South Asia and Pacific | 20.9 | 18.1 | 20.1 | 17.8 |
| Europe and Central Asia | 59.7 | 45.8 | 58.7 | 37.3 |
| Latin America & the Caribbean | 29.9 | 26.5 | 26.7 | 24.0 |
| Middle East and North Africa | 19.5* | 11.7 | 11.4* | 13.1 |
| Sub-Saharan Africa | 27.6 | 31.6 | 26.2 | 34.8 |

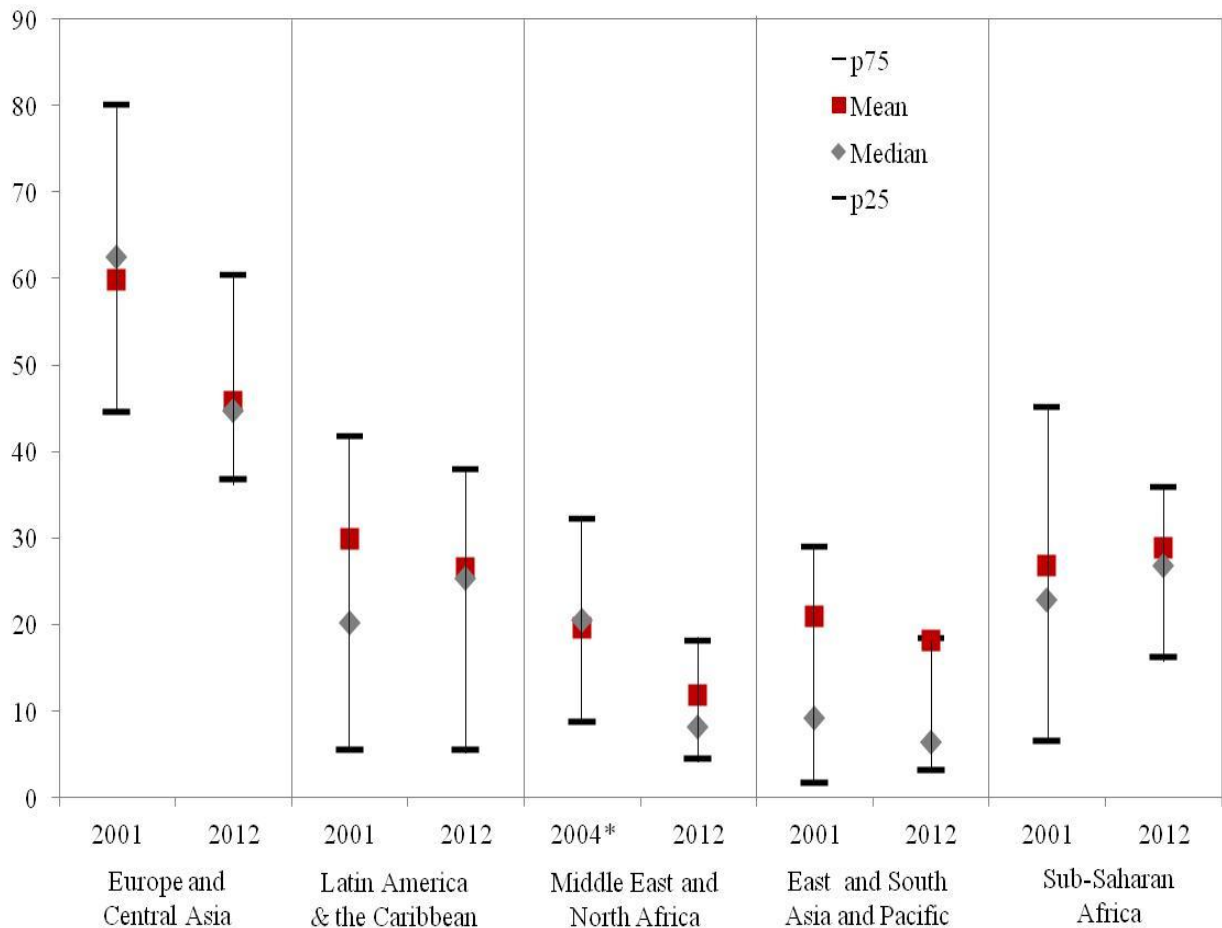
Source: IFS, AFR database

* 2004 is used for this region to compare the two years with a similar number of countries

For the purpose of this exercise, the sample of countries is divided into two categories—dollarized or nondollarized. In this analysis, a country is classified as dollarized if more than 30 percent of its deposits are denominated in foreign currencies on average over the period 2001–12. Based on this definition, a third of sample countries are classified as dollarized.¹⁰ The level of bank deposit dollarization is higher in SSA than in other regions (the median is higher in SSA when compared with the rest of the world), and there is a higher dispersion around the median for bank deposit and loan dollarization (Figure 1.9).

¹⁰ The use of a common currency within a currency union including CEMAC and WAEMU (CFA francs) and Common Monetary Area (South African Rand) is not considered dollarization.

Figure 1.9. Deposit and Loan Dollarization: SSA and the Rest of the World

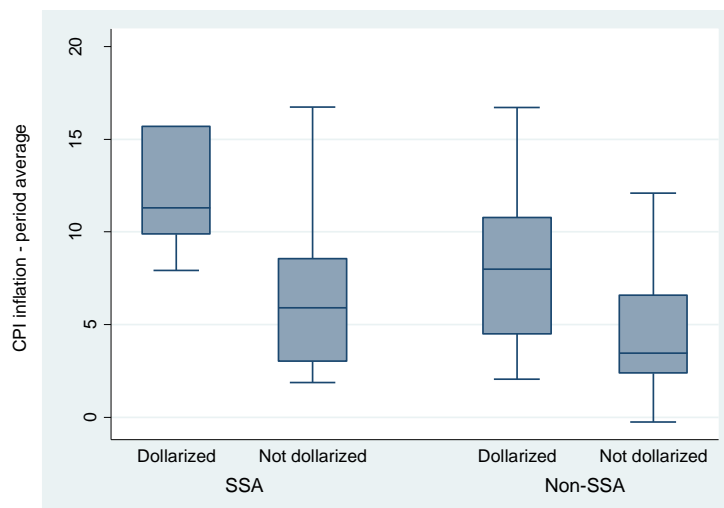


Sources: International Financial Statistics database; and IMF staff calculations and estimates.

Dollarized economies tend to have higher and more volatile inflation and exchange rate depreciation, and this tendency is more pronounced in SSA (Figure 1.10). Another reason could be that national currencies in SSA countries may be less resilient to shocks owing to weak policies and management capacity.

Currency mismatches represent a major financial risk for dollarized economies. Significant use of foreign currencies can create risks from unmatched foreign currency assets and liabilities and from foreign currency debt obligations unmatched by similarly denominated earnings. These risks are most pronounced when the banking system holds a large amount of foreign currency deposits or other liabilities while its assets are mostly denominated in the national currency. In such a case, banks may face solvency problems when the national currency depreciates sharply. Public fear of such a scenario could trigger capital flight, resulting in self-fulfilling expectations.

Figure 1.10. CPI Inflation: SSA versus the Rest of the World



Sources: International Financial Statistics database; and IMF staff calculations and estimates.

The Persistence of Dollarization in SSA

Dollarization has been more persistent in SSA than in the rest of the world since 2001. Most SSA countries show a similar level of deposit dollarization in the first half of 2000s and in early 2010s, while countries in other regions show more diverse experiences (Figure 1.9). A simple regression shows that while dollarization rates in the second half 2010s are on average equal to 79 percent of the rates in the early 2000s, in SSA this proportion increases to 103 percent, implying that SSA countries experienced more persistent dollarization while the rest of the world saw a declining trend in dollarization on average. The difference is statistically significant at 5 percent level. As indicated by the size of these regression coefficients, a panel unit root test accepts the null hypothesis that foreign exchange deposit shares have unit roots for all SSA countries whereas it rejects the same null for the rest of the world at 1 percent significant level (Table 1.2).

Table 1.2. Panel Unit Root Test on the Foreign Exchange Deposit Shares: SSA versus the Rest of the World

| | SSA | | The Rest of the World | |
|----------------------------------|------------|---------|-----------------------|---------|
| | Statistics | p-value | Statistics | p-value |
| Inverse chi-squared: P | 41.2 | 1.0000 | 324.7 | 0.0000 |
| Inverse normal: Z | 3.9 | 1.0000 | -2.4 | 0.0090 |
| Inverse logit t: L* | 3.7 | 0.9998 | -4.8 | 0.0000 |
| Modified inverse chi-squared: Pm | -3.4 | 0.9997 | 9.4 | 0.0000 |
| Sample size | 516 | | 891 | |
| Number of countries | 43 | | 79 | |
| Average periods per country | 12 | | 11.3 | |

Sources: International Financial Statistics (IFS) database; African Department database; and IMF staff estimates.

Note: We use a Fisher-type panel unit root test. The test properly aggregates the results of the augmented Dickey-Fuller test (with one lag without a drift or trend term) for each individual country, and in this way, the test fully takes into account country-specific heterogeneity. We subtract cross-sectional averages from the series to mitigate the impact of cross-sectional dependence. We chose the Fisher-type test because our panel data for the rest of the world are unbalanced.

Annex 1.1. SSA: Households and Firms under Dollarization

Dollarization trends have not been uniform across SSA countries and, in fact, they are highly country specific. Using a more limited sample of data from the IMF's IFS database, it is possible to analyze dollarization levels by households, firms, other financial corporations, and other resident sectors in the SSA region (Table A.1.1). For those countries with available data, Figures A.1.1 and A.1.2 depict the situation for households and firms respectively. Households' and firms' deposits and loans dollarization in the Democratic Republic of the Congo were high during the decade, in line with other sectors. Mozambique reduced dollarization in both deposits and loans in the two sectors. In Uganda, firms increased both their deposits and loans dollarization. In Tanzania, firms reduced their level of deposits dollarization, but increased the share of loans in foreign currency from 2001–12.

Firms tend to have more loans denominated in foreign currency than households, partly reflecting the fact that, unlike most households, some firms earn foreign currencies through exports.¹¹ With limited capital available in domestic currency and in the absence of domestic markets for equity and local currency debt, firms are also induced to accept greater currency risk in order to acquire capital for investment purposes. Firms in natural resource-based economies may also have the incentive to match their liabilities to their hard currency-generating assets.

However, these dollar-based liabilities leave the firms potentially vulnerable to terms-of-trade and exchange rate shocks. Households, on the other hand, typically borrow for either consumption or home mortgages. Both firms and households have high rates of foreign currency borrowing in countries with historically high inflation (Angola, Democratic Republic of the Congo, and São Tomé and Príncipe). Domestic inflation appears to be generally a factor in the decision of firms and households to hold financial assets denominated in foreign currencies.

Trends in foreign exchange deposit and loan in the private sector over time are shown in more detail in Table A.1.1.¹² Some salient points emerge from these data:

- Overall, for SSA countries in the east in 2012, firms were more likely to borrow in foreign currency than households in the countries sampled. The percent of foreign currency loans to total loans greatly increased for firms and households in the Democratic Republic of the Congo over the period.
- In east SSA economies (particularly in 2012), firms are more likely to have foreign currency denominated deposits than households, with notable increases in their foreign currency

¹¹ It should be underscored that, firms in SSA are often owned by single individual families.

¹² Data in this table are sourced from the Standardized Report Forms (SRFs) provided by the country authorities to the Statistics Department (STA) of the IMF, which provide enough detail to distinguish between households from firms. This approach can be limited as countries have adopted the SRFs over time. For some countries data in the SRF format are compiled from pre-SRF data not based on the 2000 Monetary and Financial Statistics Manual (MFSM) methodology, leading to series breaks.

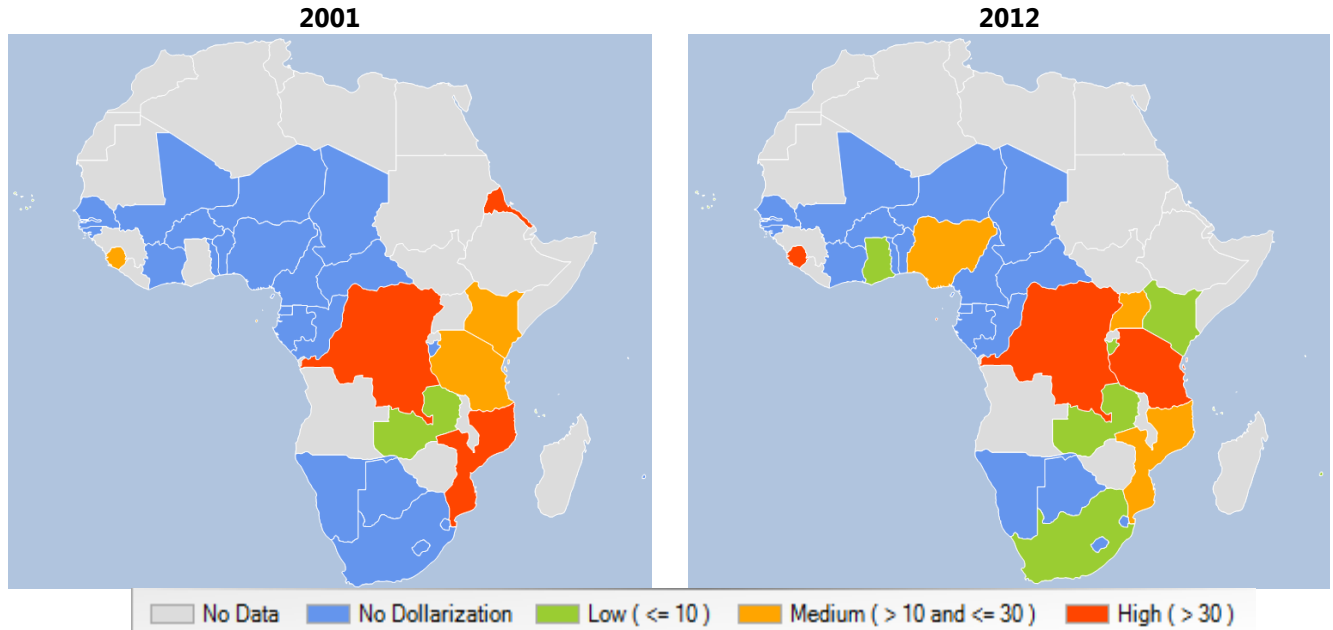
assets over the past five years in Nigeria. In 2001, firms seemed to be more dollarized than households in Serra Leone but less than households in Eritrea.

- Households in São Tomé and Príncipe, Seychelles, Sierra Leone, and Tanzania have increased their foreign currency deposits over the past few years while households in Mauritius and Mozambique have been gradually switching to the use of local currency deposits.
- Net open currency positions—defined here as foreign currency–denominated loans minus foreign currency–denominated deposits, divided by total deposits—show that currency mismatches remain a key risk from dollarization. Every country for which the data are available shows a negative net open position with other resident sectors in 2012 (Table A.1.1).

Figure A.1.1. SSA: Households' Dollarization

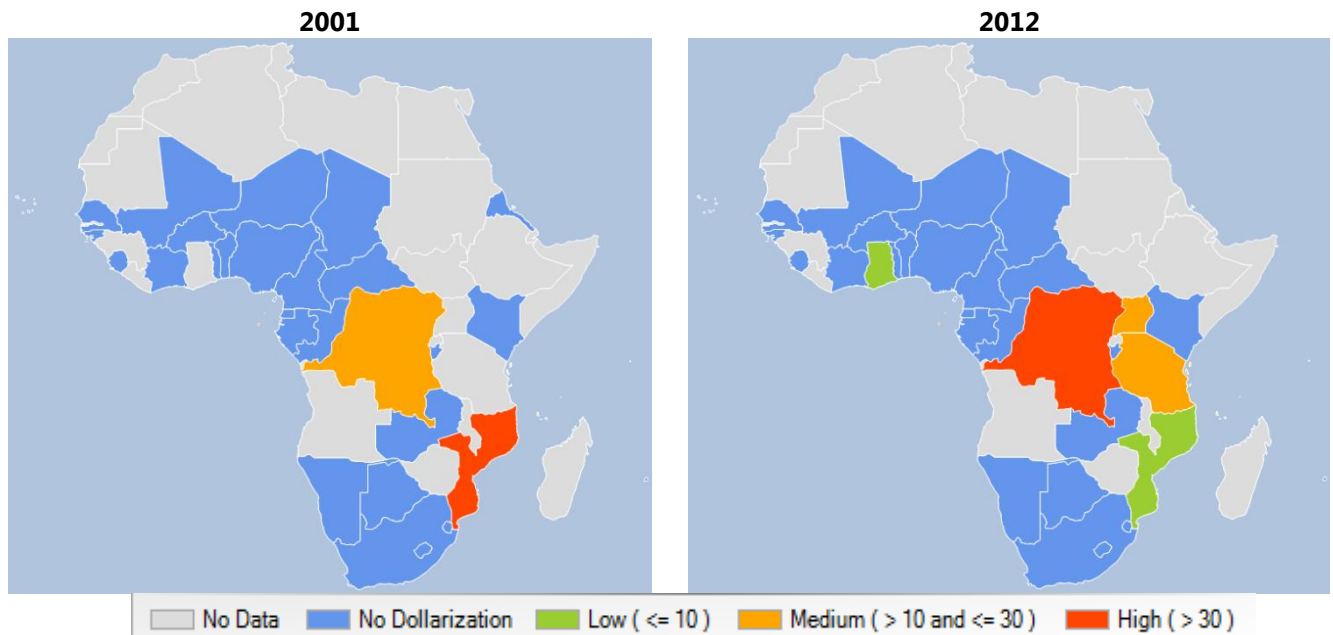
A. Deposits

(Foreign currency deposits as percent of total deposits)



B. Loans

(Foreign currency loans as percent of total loans)

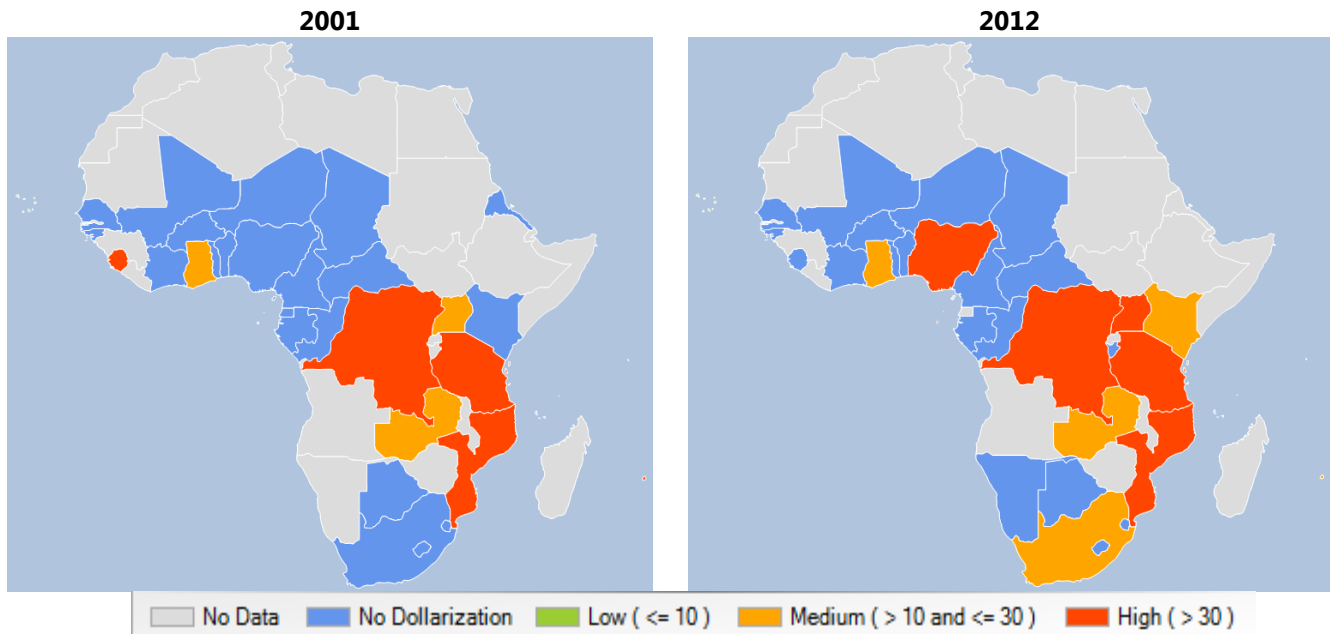


Source: International Financial Statistics (IFS) database, IMF.

Figure A.1.2. SSA: Firms' Dollarization

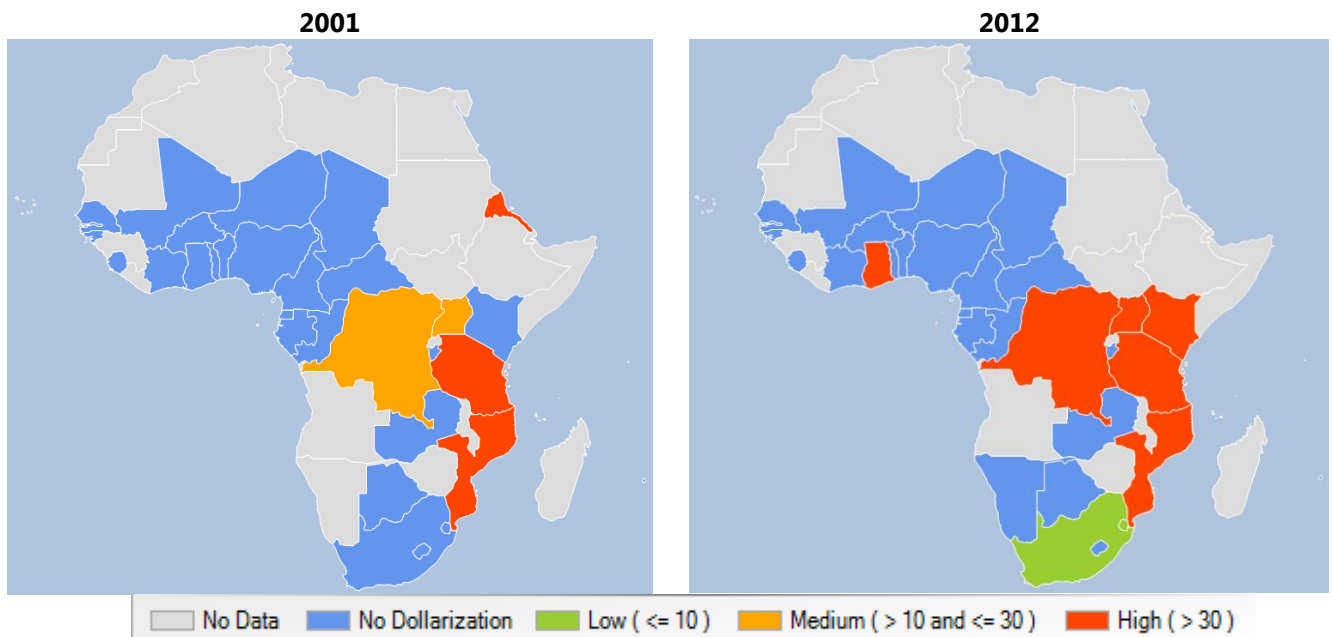
A. Deposits

(Foreign currency deposits as percent of total deposits)



B. Loans

(Foreign currency loans as percent of total loans)



Source: International Financial Statistics (IFS) database, IMF.

Table A.1.1. SSA: The Dynamics of Dollarization, 2001–12

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|--|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| FX Loans to total Loans - Other Nonfinancial Corporations | | | | | | | | | | | | |
| Angola | 56.96 | 57.11 | 57.87 | 62.23 | 71.34 | 71.11 | 71.09 | 60.59 | 64.73 | 64.10 | 52.38 | 43.81 |
| Democratic Republic of Congo | 29.89 | 46.29 | 74.91 | 80.84 | 81.77 | 79.20 | 88.03 | 90.33 | 90.16 | 77.38 | 86.92 | 91.46 |
| Ghana | ... | ... | 34.60 | 42.06 | 37.80 | 31.17 | 29.03 | 31.67 | 30.99 | 35.27 | 36.21 | 34.57 |
| Kenya | ... | ... | ... | ... | ... | ... | ... | 25.11 | 23.38 | 29.76 | 29.45 | 32.79 |
| Mozambique | 42.26 | 43.85 | 54.63 | 59.45 | 49.52 | 31.34 | 28.61 | 37.41 | 34.92 | 33.76 | 27.31 | 30.35 |
| São Tomé and Príncipe | ... | ... | ... | ... | ... | 79.79 | 78.64 | 80.81 | 69.25 | 75.36 | 70.55 | 65.67 |
| Seychelles | 3.44 | 5.05 | 7.66 | 10.54 | 16.96 | 19.78 | 38.64 | 59.72 | 48.33 | 32.86 | 29.00 | 29.16 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 27.74 | 26.01 |
| Tanzania | ... | ... | ... | ... | ... | ... | ... | 45.65 | 41.09 | 44.09 | 45.00 | 47.37 |
| Uganda | 20.50 | 22.89 | 20.35 | 22.45 | 26.65 | 24.81 | 23.11 | 25.74 | 20.98 | 38.93 | 41.21 | 52.71 |
| FX Loans to total Loans - Other Resident Sectors | | | | | | | | | | | | |
| Angola | 55.48 | 43.12 | 66.76 | 26.44 | 24.39 | 43.83 | 53.41 | 59.82 | 41.65 | 69.38 | 20.13 | 55.00 |
| Democratic Republic of Congo | 10.96 | 21.35 | 36.58 | 53.94 | 72.65 | 78.55 | 80.35 | 69.58 | 91.86 | 95.06 | 95.03 | 94.93 |
| Ghana | ... | ... | 2.94 | 4.52 | 5.35 | 7.60 | 7.89 | 8.03 | 9.24 | 7.19 | 8.11 | 6.62 |
| Mozambique | 57.07 | 57.94 | 61.47 | 52.38 | 36.95 | 23.75 | 16.31 | 12.13 | 10.17 | 9.03 | 6.04 | 4.78 |
| São Tomé and Príncipe | 53.49 | 50.84 | 63.99 | ... | 74.86 | 69.52 | 70.16 | 70.09 | 69.64 | 69.75 | 58.55 | 56.58 |
| Seychelles | 0.20 | 0.22 | 0.00 | 0.69 | 1.40 | 3.08 | 1.89 | 0.02 | 0.26 | 0.29 | 0.10 | 0.70 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 8.54 | 7.11 |
| Tanzania | ... | ... | ... | ... | ... | ... | ... | 12.97 | 9.26 | 10.95 | 9.61 | 17.30 |
| Uganda | ... | ... | ... | ... | ... | ... | ... | ... | ... | 6.42 | 7.84 | 10.92 |
| FX Deposits to total deposits - Other Nonfinancial Corporations | | | | | | | | | | | | |
| Burundi | ... | ... | ... | ... | ... | ... | 13.27 | 15.76 | 17.50 | 16.66 | 20.36 | 17.26 |
| Cape Verde | 5.89 | 7.17 | 8.81 | 8.02 | 4.91 | 7.69 | 15.57 | 11.73 | 9.37 | 6.70 | 4.73 | 5.78 |
| Democratic Republic of Congo | 73.61 | 76.97 | 81.65 | 81.79 | 85.70 | 83.38 | 76.28 | 81.82 | 90.07 | 87.13 | 88.68 | 83.82 |
| Kenya | ... | ... | ... | ... | ... | ... | ... | 26.40 | 25.20 | 21.74 | 27.43 | 22.85 |
| Ghana | 27.74 | 23.19 | 37.94 | 38.31 | 38.80 | 37.77 | 37.05 | 36.58 | 40.79 | 31.62 | 32.39 | 37.18 |
| Mauritius | ... | ... | 49.97 | 50.95 | 40.91 | 45.66 | 40.06 | 34.57 | 31.10 | 27.09 | 26.74 | 26.65 |
| Mozambique | 57.64 | 47.20 | 47.08 | 43.27 | 48.22 | 47.46 | 53.56 | 43.49 | 41.60 | 50.78 | 38.66 | 41.27 |
| Nigeria | ... | ... | ... | ... | ... | ... | 11.74 | 16.78 | 20.04 | 19.17 | 23.83 | 24.89 |
| São Tomé and Príncipe | ... | ... | ... | ... | ... | 73.65 | 73.95 | 61.99 | 71.00 | 63.50 | 54.27 | 50.77 |
| Seychelles | 7.55 | 8.42 | 7.30 | 14.07 | 13.45 | 16.15 | 32.31 | 55.58 | 43.18 | 39.48 | 52.27 | 55.32 |
| Sierra Leone | 37.89 | 25.26 | 32.34 | 36.37 | 45.93 | 44.00 | 45.66 | 38.23 | 46.64 | 50.34 | 52.02 | 47.29 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 34.32 | 36.39 |
| Tanzania | 48.91 | 51.32 | 50.49 | 46.39 | 46.27 | 49.50 | 43.79 | 52.99 | 48.53 | 70.62 | 60.30 | 66.27 |
| Uganda | ... | ... | ... | ... | ... | ... | ... | ... | ... | 42.12 | 45.99 | 41.15 |
| Zambia | 71.26 | 56.85 | 54.04 | 59.06 | 47.84 | 48.01 | 49.82 | 52.94 | 51.91 | 54.03 | 52.62 | 37.81 |
| FX Deposits to total deposits - Other Resident Sectors | | | | | | | | | | | | |
| Burundi | 6.59 | 9.09 | 11.43 | 11.83 | 9.84 | 14.52 | 17.44 | 18.89 | 20.31 | 17.94 | 15.07 | 20.39 |
| Cape Verde | 5.22 | 4.08 | 3.61 | 4.35 | 5.21 | 4.76 | 3.82 | 2.90 | 3.13 | 3.00 | 3.80 | 2.86 |
| Democratic Republic of Congo | 81.90 | 89.73 | 88.65 | 90.19 | 91.64 | 95.06 | 93.89 | 94.26 | 93.82 | 90.91 | 91.11 | 87.64 |
| Ghana | 33.82 | 33.81 | 26.20 | 26.26 | 25.60 | 25.55 | 25.47 | 25.26 | 25.51 | 19.79 | 20.53 | 18.85 |
| Kenya | 22.88 | 24.19 | 22.18 | 27.19 | 27.28 | 27.79 | 25.07 | 10.98 | 10.71 | 9.73 | 10.47 | 10.84 |
| Mauritius | ... | ... | 5.67 | 7.36 | 7.83 | 9.28 | 9.89 | 13.51 | 11.39 | 9.78 | 8.13 | 8.08 |
| Mozambique | 53.11 | 45.50 | 41.35 | 34.41 | 36.52 | 35.52 | 32.86 | 29.94 | 29.16 | 28.69 | 21.44 | 20.88 |
| Nigeria | ... | ... | ... | ... | ... | ... | 5.56 | 7.25 | 8.37 | 7.36 | 8.20 | 9.77 |
| São Tomé and Príncipe | ... | ... | ... | ... | ... | 40.59 | 50.33 | 41.36 | 38.13 | 68.47 | 65.30 | 61.58 |
| Seychelles | 0.02 | 0.02 | 3.91 | 0.27 | 0.37 | 0.38 | 1.46 | 11.31 | 9.39 | 12.95 | 16.50 | 19.32 |
| Sierra Leone | 12.91 | 17.38 | 14.46 | 16.15 | 14.82 | 15.63 | 19.18 | 22.18 | 22.92 | 19.17 | 31.61 | 30.33 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 15.98 | 15.21 |
| Tanzania | 30.41 | 33.41 | 33.63 | 30.48 | 30.65 | 33.17 | 28.70 | 26.76 | 24.03 | 34.37 | 38.00 | 35.19 |
| Uganda | ... | ... | ... | ... | ... | ... | ... | ... | ... | 28.02 | 28.11 | 30.61 |
| Zambia | 34.21 | 36.45 | 32.09 | 37.15 | 31.11 | 27.95 | 38.99 | 28.69 | 26.81 | 22.73 | 22.11 | 18.31 |

(cont.)

| | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|---|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|
| Net open FX position - private sector | | | | | | | | | | | | |
| Angola | -50.40 | -52.97 | -27.50 | 7.70 | 55.16 | 57.05 | 172.35 | 189.07 | 63.62 | 54.63 | 22.88 | 19.84 |
| Burundi | -6.59 | -9.09 | -11.43 | -11.83 | -9.84 | -14.52 | -16.67 | -18.31 | -19.78 | -17.66 | -16.27 | -19.71 |
| Cape Verde | -5.31 | -4.54 | -4.35 | -4.85 | -5.16 | -5.36 | -6.81 | -5.20 | -4.78 | -4.03 | -4.03 | -3.65 |
| Democratic Republic of Congo | -63.92 | -61.57 | -42.75 | -49.24 | -45.85 | -36.84 | -29.79 | -10.36 | -25.08 | -42.79 | -36.89 | -28.04 |
| Ghana | -30.86 | -29.74 | -8.88 | -9.44 | -5.22 | -9.78 | -7.99 | -5.98 | -10.05 | -3.08 | -5.01 | -8.18 |
| Kenya | -16.68 | -17.89 | -16.68 | -20.54 | -19.59 | -20.14 | -18.32 | -4.00 | -4.22 | 0.47 | -0.91 | 3.16 |
| Mauritius | -12.42 | -11.80 | -13.64 | -16.10 | -14.89 | -16.13 | -15.76 | -17.43 | -15.09 | -13.36 | -12.24 | -12.32 |
| Mozambique | -20.26 | -16.27 | -12.25 | -7.86 | -12.75 | -20.85 | -25.77 | -16.33 | -14.24 | -16.89 | -13.18 | -14.93 |
| Nigeria | ... | ... | ... | ... | ... | ... | -9.24 | -13.40 | -15.34 | -14.15 | -17.83 | -18.79 |
| São Tomé and Príncipe | -30.47 | -35.10 | -25.81 | -50.90 | 6.46 | 13.19 | 5.17 | 7.83 | 17.74 | 17.79 | 16.28 | 9.90 |
| Seychelles | -3.07 | -3.35 | -3.95 | -3.67 | -2.31 | -2.69 | -3.66 | -13.04 | -12.75 | -15.28 | -24.93 | -25.46 |
| Sierra Leone | -23.49 | -20.07 | -20.60 | -23.56 | -28.25 | -28.37 | -34.24 | -31.64 | -35.96 | -37.45 | -42.79 | -39.82 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | -20.59 | -22.70 |
| Tanzania | -28.48 | -31.36 | -28.82 | -19.84 | -19.55 | -20.17 | -13.66 | -8.97 | -12.69 | -14.11 | -15.47 | -11.86 |
| Uganda | -14.95 | -15.03 | -20.21 | -16.91 | -10.59 | -11.10 | -14.89 | -6.45 | -9.98 | -8.75 | -8.52 | 1.29 |
| Zambia | -54.43 | -48.24 | -43.66 | -49.22 | -39.96 | -37.81 | -44.68 | -39.77 | -41.99 | -42.53 | -42.04 | -29.82 |
| Net open FX position - other nonfinancial corporations | | | | | | | | | | | | |
| Burundi | ... | ... | ... | ... | ... | ... | -13.27 | -15.76 | -17.50 | -16.66 | -20.36 | -17.26 |
| Cape Verde | -5.89 | -7.17 | -8.81 | -8.02 | -4.91 | -7.69 | -15.57 | -11.73 | -9.37 | -6.70 | -4.73 | -5.78 |
| Democratic Republic of Congo | -62.27 | -58.12 | -34.59 | -41.16 | -32.93 | -6.88 | 8.15 | 49.73 | 23.94 | -12.03 | -5.84 | 1.78 |
| Ghana | -27.74 | -23.19 | 28.11 | 18.28 | 40.86 | 21.05 | 19.27 | 17.26 | 5.00 | 13.54 | 8.54 | -0.64 |
| Kenya | ... | ... | ... | ... | ... | ... | ... | 3.86 | 4.54 | 10.20 | 8.31 | 18.13 |
| Mauritius | ... | ... | -49.97 | -50.95 | -40.91 | -45.66 | -40.06 | -34.57 | -31.10 | -27.09 | -26.74 | -26.65 |
| Mozambique | 6.40 | 13.99 | 14.21 | 14.24 | 4.71 | -11.95 | -24.63 | -8.05 | -5.05 | -8.49 | -7.47 | -11.20 |
| Nigeria | ... | ... | ... | ... | ... | ... | -11.74 | -16.78 | -20.04 | -19.17 | -23.83 | -24.89 |
| São Tomé and Príncipe | ... | ... | ... | ... | ... | -19.30 | -23.00 | -19.32 | -11.19 | 2.45 | 27.41 | 28.64 |
| Seychelles | -6.67 | -7.04 | -4.01 | -8.52 | -4.87 | -5.88 | -6.40 | -14.31 | -15.44 | -17.52 | -33.33 | -32.96 |
| Sierra Leone | -37.89 | -25.26 | -32.34 | -36.37 | -45.93 | -44.00 | -45.66 | -38.23 | -46.64 | -50.34 | -52.02 | -47.29 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | -31.19 | -33.17 |
| Tanzania | -26.56 | -29.36 | -24.08 | -9.10 | -8.27 | -7.07 | 1.82 | 14.14 | -0.84 | 648.22 | 1015.33 | 697.79 |
| Uganda | ... | ... | ... | ... | ... | ... | ... | ... | ... | 44.38 | 6.30 | 32.06 |
| Zambia | -71.26 | -56.85 | -54.04 | -59.05 | -47.84 | -48.01 | -49.82 | -52.94 | -51.91 | -54.03 | -52.62 | -37.81 |
| Net open FX position - other resident sectors | | | | | | | | | | | | |
| Burundi | -6.59 | -9.09 | -11.43 | -11.83 | -9.84 | -14.52 | -17.44 | -18.89 | -20.31 | -17.94 | -15.07 | -20.39 |
| Cape Verde | -5.22 | -4.08 | -3.61 | -4.35 | -5.21 | -4.76 | -3.82 | -2.90 | -3.13 | -3.00 | -3.80 | -2.86 |
| Democratic Republic of Congo | -76.28 | -80.37 | -75.07 | -77.77 | -77.66 | -80.82 | -82.99 | -81.71 | -76.61 | -65.52 | -62.07 | -54.65 |
| Ghana | -33.82 | -33.81 | -25.77 | -25.06 | -24.55 | -24.09 | -23.92 | -23.35 | -23.22 | -17.51 | -18.07 | -16.43 |
| Kenya | -22.88 | -24.19 | -22.18 | -27.19 | -27.28 | -27.79 | -25.07 | -10.98 | -10.70 | -9.72 | -10.43 | -10.80 |
| Mauritius | ... | ... | -5.67 | -7.36 | -7.83 | -9.28 | -9.89 | -13.51 | -11.39 | -9.78 | -8.13 | -8.08 |
| Mozambique | -41.06 | -36.39 | -30.58 | -23.29 | -25.39 | -26.85 | -26.48 | -25.75 | -25.10 | -24.85 | -18.62 | -18.75 |
| Nigeria | ... | ... | ... | ... | ... | ... | -5.56 | -7.25 | -8.37 | -7.36 | -8.20 | -9.77 |
| São Tomé and Príncipe | 18.29 | 21.96 | 48.69 | -11.14 | 87.83 | 81.55 | 64.76 | 80.39 | 64.00 | 30.63 | 9.21 | -1.29 |
| Seychelles | 0.03 | 0.03 | -3.91 | -0.14 | -0.09 | 0.18 | -0.95 | -11.30 | -9.33 | -12.87 | -16.48 | -19.13 |
| Sierra Leone | -12.91 | -17.38 | -14.46 | -16.15 | -14.82 | -15.63 | -19.17 | -22.17 | -22.92 | -19.17 | -31.61 | -30.33 |
| South Sudan | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | -15.23 | -14.45 |
| Tanzania | -30.41 | -33.41 | -33.63 | -30.48 | -30.65 | -33.17 | -28.70 | -20.55 | -19.68 | -31.19 | -35.13 | -27.33 |
| Uganda | ... | ... | ... | ... | ... | ... | ... | ... | ... | -25.41 | -22.43 | -24.34 |
| Zambia | -34.21 | -36.45 | -32.09 | -37.15 | -31.11 | -27.95 | -38.99 | -28.69 | -26.81 | -22.73 | -22.11 | -18.31 |

Table A.1.2. SSA: Legal Restrictions on FX Deposits/Loans

| | Use of foreign exchange among residents | Foreign exchange accounts permitted | | | |
|--------------------------|---|-------------------------------------|----------------------|----------------------|----------------------|
| | | Resident Accounts | | Nonresident Accounts | |
| | | | Approval Required | | Approval Required |
| Angola | yes | yes | no | yes | yes |
| Benin | yes | yes | yes | yes | yes |
| Botswana | no | yes | no | yes | no |
| Burkina Faso | yes | yes | yes | yes | yes |
| Burundi | yes | yes | no | yes | yes |
| Cameroon | yes | yes | yes | no | n.r. |
| Cape Verde | yes | yes | no | yes | yes |
| Central African Republic | yes | yes | yes | no | n.r. |
| Chad | yes | yes | yes | no | n.r. |
| Comoros | yes | yes | yes | yes | yes |
| Congo, DR | yes | yes | no | yes | yes |
| Congo, Republic | yes | yes | yes | no | n.r. |
| Cote d'Ivoire | yes | yes | yes | yes | yes |
| Equatorial Guinea | yes | yes | yes | no | n.r. |
| Eritrea | yes | yes | yes | yes | no |
| Ethiopia | yes | yes | no | yes | yes |
| Gabon | yes | yes | yes | no | n.r. |
| Gambia | n.a. | yes | no | no | no |
| Ghana | yes | yes | no | yes | yes |
| Guinea | yes | yes | no | yes | yes |
| Guinea-Bissau | yes | yes | yes | yes | yes |
| Kenya | no | yes | no | yes | no |
| Lesotho | no | yes | no | yes | yes |
| Liberia | no | yes | no | yes | no |
| Madagascar | yes | yes | no | yes | yes |
| Malawi | n.a. | yes | no | yes | yes |
| Mali | yes | yes | yes | yes | yes |
| Mauritius | yes | yes | no | yes | no |
| Mozambique | yes | yes | yes | yes | yes |
| Namibia | yes | yes | yes | yes | yes |
| Niger | yes | yes | yes | yes | yes |
| Nigeria | yes | yes | no | no | no |
| Rwanda | no | yes | no | yes | no |
| Sao Tome and Principe | no | yes | no | yes | no |
| Senegal | yes | yes | yes | yes | yes |
| Seychelles | no | yes | no | yes | no |
| Sierra Leone | yes | yes | no | no | no |
| South Africa | no | yes | yes | yes | no |
| South Sudan | no | yes | yes | n.a. | n.a. |
| Swaziland | yes | yes | no | yes | no |
| Tanzania | no | yes | no | no | no |
| Togo | yes | yes | yes | yes | yes |
| Uganda | no | yes | no | yes | no |
| Zambia | no | yes | no | yes | no |
| Zimbabwe | yes | yes | no | yes | yes |

Source: IMF's Annual Report on Exchange Arrangements and Exchange Restrictions.

2. Modeling the Determinants of Dollarization in SSA

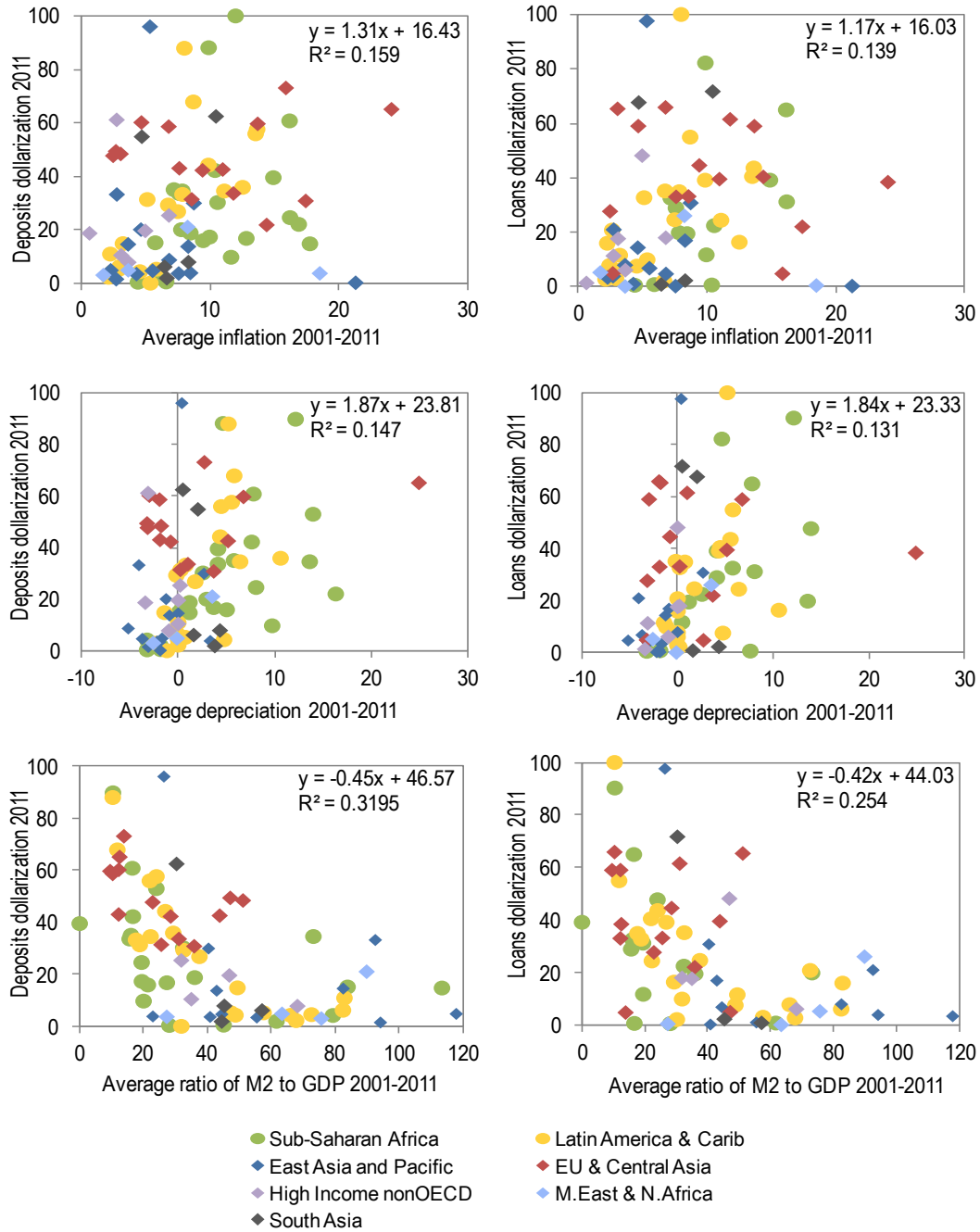
High dollarization values are often correlated with a history of high rates of inflation and currency depreciation. This chapter assesses the correlation between a country's degree of deposit dollarization and the average inflation and average exchange rate depreciation over the past few years, using a panel of data covering all SSA countries over the period 2001–12, contrasting the region with the rest of the world. The positive correlation found suggests that agents substitute into foreign currency–denominated assets in order to protect the purchasing power of their savings. In addition, dollarization is inversely related to the development of the financial sector.

A. Determinants of Dollarization

As illustrated in the previous section, a unique feature of dollarization in SSA, in contrast to other emerging and frontier regions, has been its persistence over the last decade. Despite improving macroeconomic performance and political stability, both deposit and loan dollarization has failed to break inertia. There are unique features in SSA that could explain the dollarization pattern observed.

From a methodological standpoint, estimations of determinants of dollarization are generally affected by three considerations: (1) endogeneity of some explanatory variables, (2) high serial correlation, and (3) the fact that most dollarization measures are ratios, bound between zero and 100. The literature has addressed these considerations differently. Earlier contributions by De Nicolò and others (2003) and Levy-Yeyati (2006) rely on cross-sectional ordinary least squares (OLS) regression using either average values over a given sample period or a specific year (and lagged values as regressors). These approaches are meant to reflect the longer-term determinants rather than describing short-term variations and circumvent the question of persistence and endogeneity of some regressors to the level of dollarization (when using lags). More recently, others have run fixed-effects panel regressions on annual data, used first differences in dollarization rather than levels, used instrumental variables, and modeled the standard errors to account for the potential autocorrelation in the error terms or explicitly modeling them by running feasible generalized least squares (GLS) estimates (Neanidis and Savva 2009). The analysis focuses on results using feasible GLS estimates for both household and firm dollarization to exploit both the time variation and cross-country variation in the data. The respective stage of (financial) development, historic experience with crises that caused balance sheet effects and subsequent moves to different monetary framework likely explain some of the divergence between dollarization developments of these regions and SSA countries, which to date have mostly been spared balance sheet crisis. While deposit and loan dollarization appear correlated with high inflation, domestic currency depreciation, and less developed financial markets regardless the region, the correlation is stronger for SSA (Figure 2.1).

Figure 2.1. Deposits and Loans Dollarization Correlated with Inflation, Exchange Rate Depreciation, and M2



Sources: IFS, AFR database, IMF staff calculations

¹ Countries excluded from a). inflation charts: Angola (46 percent average inflation) and Dem. Rep. of Congo (50 percent), b). depreciation charts and equations: Zimbabwe and Iraq with average depreciations greater than 1,000 percent), c). M2 to GDP charts and equations: Liberia with an average ratio greater than 1,000 percent.

The basic regression set up is given by¹³:

$$\begin{aligned} DD_{i,t} = & \beta_1 \cdot CurrSubs_{i,t} + \beta_2 \cdot Portfolio_{i,t} + \beta_3 \cdot MktFailure_{i,t} \dots \\ & \dots + \beta_4 \cdot Access_{i,t} + \beta_5 \cdot Inst_{i,t} + \beta_6 \cdot Contr_{i,t} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where $DD_{i,t}$ stands for the measure of dollarization; $CurrSubs_{i,t}$ for the variables capturing the currency substitution dimension; $Portfolio_{i,t}$ for variables reflecting portfolio optimization considerations; $MktFailure_{i,t}$ for proxies for potential market failures; $Access_{i,t}$ for variables reflecting ease of access to foreign exchange; $Inst_{i,t}$ for institutional characteristics that influence dollarization; $Contr_{i,t}$ are relevant control variables; and $\varepsilon_{i,t}$ is an *iid* error term. $DD_{i,t}$ is measured by deposit (loan) dollarization of the overall economy, firms, and households, respectively.¹⁴

B. Econometric Results

What are the key findings of the above econometric model?¹⁵ The econometric assessments first focus on deposit dollarization (Table 2.1) and then on loan dollarization (Table 2.2); lastly, the differences between household and firm dollarization determinants are analyzed.¹⁶

¹³ As illustrated earlier, dollarization of credit and deposits appears not to change significantly in most countries during the period analyzed in SSA. To confirm this, the data is tested for stationarity, using the Levin-Lin-Chu test, which applies to balanced panels. The results confirm that over the period tested, 2000–11, that both deposit dollarization and credit dollarization are stationary, suggesting that we do not need to use panel-co-integration techniques (see Annex 2.2). Annex 2.1 presents further details of the estimation of cross-sectional averages in the spirit of Levy-Yeyati (2006), contrasting these results with a panel regression with robust standard errors, and accounting for the endogeneity and the bounded nature of the dependent variable. While the key findings remain robust throughout these regressions, significance levels vary, often due to the reduction in sample size implied by the various methods.

¹⁴ We make use of two main measures of dollarization that are most widely available: deposit dollarization and loan dollarization. Deposit dollarization is the most frequently used concept since it is also the most widely available statistic. The main source for this data is the International Financial Statistics database. The extent of dollarization is the sum of “transferable deposits” and “other deposits” included in M2 of all sectors excluding the central bank and the central government. However, several countries do not fully report to IFS the level of dollarization. For these countries, and for countries where additional information is available, IMF country desk data is used to complement the data. The other measure we employ is the extent of loan dollarization. Again, not all countries full report the level of loan dollarization, where we again resort to IMF country desk data to complete this time series. Loan dollarization is measure as the ratio of loans in foreign currency to total loans across all sectors except for central bank and central government.

¹⁵ One issue this chapter was not able to test is how prudential regulations have impacted dollarization in SSA, for lack of data. Evidence from Latin America and transition economies (for example, Kokenyne and others 2010) suggests that these measures—currency blind financial safety nets, implicit debtor guarantees—are crucial to provide incentives to de-dollarize.

Deposit Dollarization

The results confirm the currency substitution argument for both the rest of the world and the SSA region: inflation and/or the nominal depreciation by and large enter significantly in the regressions with the expected positive sign except for one case where the sign is negative but not significant. It is worth noting that the depreciation of the nominal exchange rate appears to be the most relevant variable, significant and positive in nearly all cases. Thus, there is evidence that currency substitution—due to loss of confidence in local currency arising from uncertainty associated with inflation or high nominal exchange rate volatility leading to purchasing power losses—is a primary factor for higher dollarization, similar to other regions. This suggests—bearing in mind hysteresis effects—that as SSA continues to pursue macroeconomic stability by keeping inflation low and stable, and by reducing nominal exchange rate volatility, dollarization in the region could gradually diminish.

The portfolio approach is effective at explaining deposit dollarization.¹⁷ If domestic currency deposits yield higher returns than dollar-denominated deposits, one should expect lower deposit dollarization.¹⁸ The econometric findings confirm (Table 2.1) in all cases that a positive interest differential reduces significantly deposit dollarization.¹⁹ Firms appear to be more sensitive to this spread. The portfolio view is further supported by the finding that a higher real deposit rate is associated (in most cases significantly) with lower levels of dollarization. Again, SSA is not different from other regions in this respect.

Four different measures to proxy for various aspects of policy outcomes are employed: capital account openness, external debt to GDP, M2 to GDP, and GDP per capita. Lower capital account openness should go along with restrictions on the use of foreign exchange that provides legal disincentives to hold foreign exchange. Higher external debt is likely to be linked to higher balances in foreign exchange by the entity that owes this debt.²⁰

A higher level of financial development is likely to go along with better management and investment opportunities in domestic currency. Economic agents will prefer to hold currency in

¹⁶ The sample excludes from the baseline specification countries that have zero deposit dollarization due to legal restrictions—WAEMU, CEMAC, Lesotho, and Swaziland—as their inclusion could bias the results. Furthermore, the analysis restricts some specifications to exclude all zero observations and other countries which potentially have legislation/practices in place that restrict the use of FX which we are not accounting for.

¹⁷ Based on the work of Ize and Levy-Yeyati (1998), the minimum variation portfolio (MVP) model postulates that the choice of holding deposits in local currency or FX is determined by the relative volatility of the real exchange rate and inflation. If the real exchange rate depreciation is less volatile than inflation, then consumers would prefer to hold dollar deposit as it would be less risky. Here we focus on the expected return difference rather than the variance. Including the MVP would be a relevant extension.

¹⁸ No full dataset on the actual remuneration of domestic foreign currency deposits is available. Thus, the return on dollar deposits is measured by the deposit rate in the United States adjusted by the expected exchange rate change.

¹⁹ The results on Table 2.1 show countries that present some degree of dollarization and exclude zeros.

²⁰ For loan dollarization, the relationship may be of a different nature, as banks may use foreign debt to lend in foreign exchange (passing on the exchange rate risk). This nevertheless also implies an expected positive sign.

FX if the domestic financial sector is shallow and does not provide useful investment options. GDP per capita, in turn, is used as a proxy for several other potential market failures not captured by the other measures, such as economic and institutional factors that influence the development of local currency markets (Levy-Yeyati 2006).

Results

- *Capital Account Openness.* The results do not support the hypothesis that capital account openness has a significant impact on deposit dollarization. For the SSA sample, the capital account index has no significant impact on the level of dollarization. This could stem from the fact that the variation of capital account openness in SSA economies is very limited both across time and across countries. Porous borders and weak enforcement of capital controls in many countries could also explain this finding.
- *External Debt to GDP.* Higher external debt tends to be associated with a higher share of foreign currency deposits. The lack of significance of this variable, nonetheless, could be explained by the debt relief initiatives of the last decade—Heavily Indebted Poor Countries and Multilateral Debt Relieve Initiative—and debt restructurings under IMF programs (such as Seychelles) that may have distorted this relationship over this time period.
- *Financial Sector Development.* The econometric results for this variable are unambiguous: countries more financially developed—identified by higher M2/GDP ratios—have ceteris paribus lower levels of deposit dollarization. As the financial sector develops, and more financial products are offered in which domestic currency savings can be invested, dollarization naturally declines. Financial sector development presumably captures not only the diversity of investment products available but also a more stable macroeconomic environment.
- *Income per capita.* Higher income per capita is associated with a marked decline in deposit dollarization, in particular in SSA countries. This is in line with expectations that income per capita proxies for economic and institutional factors that influence the development of local currency markets. Interestingly, results for the rest of the world are insignificant. This and the results on M2/GDP could suggest that for the rest of the world, money supply in percent of GDP is a sufficient indicator of financial sector development, while in SSA other factors are also important.
- *Access to foreign exchange Finance.* A priori, de facto access to foreign exchange has an ambiguous impact on deposit dollarization. The ability to keep money overseas is expected to reduce domestic deposit dollarization. However, at the same time, banks can mobilize resources in foreign exchange, thus increasing their appetite for passing on the exchange rate risk while making use of (potentially cheaper) foreign funding. In fact, no robust relationship is found between the respective indicators and deposit dollarization.

Table 2.1. Determinants of Deposit Dollarization, Sub-Saharan Africa versus Rest of the World, 2001–12

| | Overall economy | | Overall excl. zeros | | Firms excl. zeros | | Households excl. zeros | |
|--|----------------------|---------------------|---------------------|----------------------|----------------------|----------------------|------------------------|---------------------|
| | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA |
| Currency Substitution | | | | | | | | |
| Inflation | 0.03 (0.039) | 0.11*** (0.028) | 0.03 (0.039) | 0.05* (0.031) | 0.07 (0.059) | 0.19 (0.225) | 0.07 (0.053) | -0.09 (0.118) |
| Nom. Depr. to USD | 0.05*** (0.015) | -0.00 (0.012) | 0.07*** (0.016) | 0.03* (0.017) | 0.09*** (0.021) | 0.18** (0.084) | 0.08*** (0.020) | 0.09** (0.039) |
| Portfolio Model | | | | | | | | |
| Deposit rate spread to US | -0.06*** (0.015) | -0.03* (0.015) | -0.08*** (0.017) | -0.06*** (0.021) | -0.11*** (0.025) | -0.30*** (0.090) | -0.07*** (0.021) | -0.14*** (0.042) |
| Real deposit rate: $i(t) - \text{infl}(t+1)$ | -0.08** (0.037) | -0.12*** (0.037) | -0.07** (0.037) | -0.09* (0.044) | -0.11** (0.045) | -0.30 (0.196) | -0.05 (0.053) | 0.04 (0.113) |
| Market Failure | | | | | | | | |
| CA index | 0.31 (0.375) | -0.16 (0.521) | 0.06 (0.393) | 0.28 (0.489) | 2.29*** (0.606) | -1.90 (1.289) | -0.36 (0.486) | -3.01*** (0.982) |
| External debt to GDP ratio | 0.09*** (0.020) | 0.03** (0.015) | 0.08*** (0.020) | 0.08*** (0.016) | -0.00 (0.032) | 0.02 (0.041) | 0.11*** (0.029) | 0.04 (0.025) |
| M2 to GDP ratio | -0.36*** (0.022) | -0.09** (0.038) | -0.40*** (0.024) | -0.15*** (0.041) | -0.35*** (0.042) | 0.17 (0.131) | -0.46*** (0.035) | -0.02 (0.076) |
| GDP p.c. | -0.00 (0.079) | -0.78* (0.407) | -0.01 (0.080) | -1.80*** (0.359) | -0.14 (0.092) | -3.64*** (1.141) | -0.24** (0.110) | -3.77*** (0.744) |
| Access to FX Finance | | | | | | | | |
| BIS deposits+loans to GDP ratio | -0.02 (0.028) | 0.01 (0.011) | 0.00 (0.028) | 0.02** (0.010) | 0.08** (0.038) | -0.03 (0.044) | -0.00 (0.042) | 0.06*** (0.021) |
| Export to GDP ratio | -0.04 (0.035) | -0.03 (0.040) | -0.05 (0.036) | 0.23*** (0.064) | -0.05 (0.047) | 1.44*** (0.134) | -0.08* (0.044) | 0.33*** (0.110) |
| Oil exports to GDP ratio | -0.20*** (0.069) | 0.49*** (0.058) | -0.22*** (0.070) | 0.27*** (0.069) | -0.19*** (0.043) | -0.57 (0.404) | -0.17* (0.091) | -0.70*** (0.218) |
| Institutions | | | | | | | | |
| Dejure Peg | -12.78*** (2.490) | 0.57 (1.757) | -7.92*** (2.425) | -20.05*** (2.041) | -12.50*** (4.314) | -18.85*** (4.980) | -12.22*** (3.680) | -7.98*** (2.132) |
| Dejure Float | -1.51 (1.743) | 21.11*** (2.816) | -0.41 (1.684) | | -0.07 (3.744) | | -5.11* (2.904) | |
| Polity | -0.30*** (0.102) | 0.06 (0.131) | -0.21** (0.096) | -0.77*** (0.187) | 0.15 (0.141) | -2.86*** (0.613) | -0.29** (0.133) | -0.34 (0.269) |
| Controls | | | | | | | | |
| Population | -0.21*** (0.013) | -0.22*** (0.033) | -0.20*** (0.014) | -0.23*** (0.036) | -0.20*** (0.035) | 0.09 (0.122) | -0.19*** (0.017) | 0.17*** (0.059) |
| Constant | 56.13*** (2.417) | 9.80** (3.953) | 56.61*** (2.381) | 31.78*** (2.766) | 63.03*** (4.395) | -8.51 (7.066) | 67.69*** (3.649) | 5.29 (4.241) |
| Observations | 447 | 214 | 428 | 164 | 370 | 106 | 391 | 112 |
| Number of countries | 44 | 21 | 43 | 16 | 39 | 12 | 41 | 13 |
| Time dummies | X | X | X | X | X | X | X | X |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

- *Bank for International Settlements (BIS) Deposits and Loans to GDP.* Results for this variable are not conclusive for either SSA or the rest of the world, suggesting that this is not a major determinant of domestic deposit dollarization, contrary to what has been suggested in the literature (for example, Levy-Yeyati 2006).
- *Exports to GDP.* Also for exports to GDP ratios, for SSA, most results point to a significant positive impact of export earnings on deposits in foreign exchange. Results are relatively inconclusive for the rest of the world. This suggests that economic agents that receive earnings in foreign currency in SSA have a tendency to keep part of their proceeds in foreign currency rather than converting into domestic currency, while this is not the case in the rest of the world.
- *Oil Exports to GDP.* There is a noticeable difference on the results for the oil exports to GDP for SSA economies versus the rest of the world. In SSA countries, for the overall economy, higher oil exports to GDP are associated with higher deposit dollarization whereas in the rest of the world higher oil exports are associated with lower foreign currency deposits. This pattern is similar to the findings on exports to GDP but emphasizes the role of natural resource dependence.

Institutions (Exchange Rate Regime)

Fixed exchange rates—if credible—could lead to indifference between holding deposits in domestic or foreign currency. A floating exchange rate, by making more explicit the risks of holding the domestic currency, may encourage dollarization if a loss of value in the domestic currency is expected. Although not significant in all regressions, floating exchange rate regimes in SSA tend to be associated with higher dollarization ratios, while fixed regimes are generally associated with lower dollarization ratios (the base category are intermediate regimes).²¹ This finding likely reflects the fact that floating regimes in SSA are often associated with higher and more volatile inflation. In this context agents tend to favor foreign currency holdings. In the rest of the world, more flexible regimes tend to go along with inflation targeting and lower and less volatile inflation, which minimizes dollarization incentives (Levy Yeyati 2006).

A characteristic of SSA countries has been the high level of political instability until recently, with democratic institutions having only emerged in the 1990s/2000s. Even some of the most sophisticated economies and stable democracies—such as Kenya—have, in recent years, seen turbulences following elections, which reminds us that political stability cannot be taken for granted. In the past, political instability has often led to large fiscal outlays financed by an inflationary borrowing from the central bank. In an unstable political environment there is always a bias (confirmed by the data) toward keeping deposits in foreign exchange, which appears particularly acute in SSA, compared to other regions. As democracies mature and political stability is established, the impact of this problem is expected to diminish over time.

²¹ SSA countries with de facto floats in selected years include South Africa, the DRC, Liberia, Madagascar, Malawi, Mauretania, Nigeria, Sierra Leone, and Zambia. Excluding South Africa would strengthen the finding. Note that the base category is intermediate regimes, which are associated often with the highest degree of dollarization. In some instances, the dummy for floating regimes drop since there are no sufficient observations.

Table 2.2. Determinants of Loan Dollarization, Sub-Saharan Africa versus Rest of the World, 2001–12

| | Overall economy | | Overall excl. zeros | | Firms excl. zeros | | Households excl. zeros | |
|--|---------------------|---------------------|---------------------|---------------------|---------------------|----------------------|------------------------|------------------------|
| | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA |
| Currency Substitution | | | | | | | | |
| Inflation | 0.30*** (0.049) | -0.02 (0.052) | 0.31*** (0.051) | -0.19*** (0.064) | 0.39*** (0.062) | -0.09 (0.167) | -0.01 (0.065) | 1.09*** (0.141) |
| Nom. Depr. to USD | 0.04** (0.017) | 0.02* (0.014) | 0.06*** (0.017) | 0.05* (0.032) | -0.03 (0.022) | 0.08* (0.045) | 0.00 (0.020) | 0.20*** (0.071) |
| Portfolio Model | | | | | | | | |
| Lending rate spread to US | -0.05*** (0.016) | 0.00 (0.019) | -0.06*** (0.016) | -0.06 (0.041) | -0.02 (0.022) | -0.07 (0.074) | -0.01 (0.019) | -0.12 (0.087) |
| Real lending rate: $i(t) - \text{infl}(t+1)$ | -0.14*** (0.034) | 0.08* (0.050) | -0.12*** (0.034) | 0.04 (0.071) | -0.11** (0.048) | 0.31** (0.120) | -0.01 (0.039) | -0.36*** (0.089) |
| Market Failure | | | | | | | | |
| CA index | 1.14** (0.484) | 3.70*** (0.581) | 1.04** (0.511) | 0.48 (0.573) | 2.59*** (0.543) | 1.10 (1.127) | 1.99*** (0.593) | 4.01*** (0.640) |
| External debt to GDP ratio | 0.15*** (0.024) | 0.06*** (0.016) | 0.20*** (0.025) | 0.19*** (0.028) | 0.19*** (0.026) | 0.08 (0.067) | 0.12*** (0.031) | 0.20*** (0.049) |
| M2 to GDP ratio | -0.34*** (0.032) | -0.18*** (0.043) | -0.30*** (0.026) | -0.58*** (0.117) | -0.24*** (0.030) | -0.05 (0.270) | -0.35*** (0.034) | -0.63*** (0.185) |
| GDP p.c. | -0.02 (0.111) | -1.24*** (0.429) | 0.04 (0.105) | -3.20*** (1.112) | -0.24** (0.107) | -2.49 (2.002) | -0.24*** (0.082) | 10.10*** (1.671) |
| Access to FX Finance | | | | | | | | |
| BIS deposits+loans to GDP ratio | -0.02 (0.034) | -0.00 (0.009) | -0.03 (0.032) | 0.14 (0.095) | -0.07* (0.043) | 0.45 (0.290) | -0.03 (0.041) | 0.23* (0.125) |
| Export to GDP ratio | -0.21*** (0.042) | 0.10** (0.046) | -0.23*** (0.039) | 0.21 (0.134) | -0.28*** (0.042) | 0.10 (0.143) | -0.16*** (0.052) | -0.18* (0.101) |
| Oil exports to GDP ratio | -0.26*** (0.076) | 0.63*** (0.105) | -0.33*** (0.075) | 0.74*** (0.137) | 0.05 (0.080) | 7.38*** (2.282) | -0.14** (0.070) | 12.61*** (2.049) |
| Institutions | | | | | | | | |
| Dejure Peg | -0.75 (1.234) | -2.52* (1.528) | 0.15 (1.289) | 0.29 (2.997) | -1.24 (1.720) | 4.98 (3.331) | 1.58 (1.705) | -2.75 (1.861) |
| Dejure Float | 1.84 (1.150) | 10.37*** (1.996) | 0.93 (1.142) | 10.43** (4.361) | 3.15** (1.408) | -41.16** (16.559) | 0.17 (1.233) | -112.29*** (11.338) |
| Polity | 0.01 (0.090) | -0.07 (0.157) | 0.09 (0.098) | -0.46* (0.237) | 0.26** (0.127) | 0.65 (0.818) | 0.05 (0.100) | 6.55*** (0.555) |
| Controls | | | | | | | | |
| Population | -0.17*** (0.020) | -0.00 (0.053) | -0.19*** (0.016) | 0.72*** (0.072) | -0.15*** (0.026) | 1.19*** (0.170) | -0.14*** (0.014) | 1.78*** (0.118) |
| Constant | 53.06*** (2.467) | 12.51*** (2.612) | 52.43*** (2.287) | 6.67* (3.573) | 60.44*** (2.307) | -15.35* (7.869) | 43.32*** (2.919) | -63.02*** (4.678) |
| Observations | 376 | 183 | 346 | 87 | 299 | 58 | 313 | 39 |
| Number of countries | 41 | 20 | 38 | 10 | 35 | 8 | 37 | 7 |
| Time dummies | X | X | X | X | X | X | X | X |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Loan versus Deposit Dollarization

The results for loan dollarization have several elements in common with those for deposit dollarization. This is to be expected, for various reasons: (1) the drivers are often identical (for example, institutional weaknesses); (2) there may be supervisory restriction on the banking sector limiting the net foreign position; and (3) banks' own prudential procedures limit a strong deviation between foreign credit and deposit exposure.²² However, differences are also expected because loan dollarization typically develops over a longer time horizon, and requires a stronger institutional set up in case of default, for instance, than is typically the case with deposit dollarization. This is also reflected in the econometric results, which highlight some differences in the relative importance of certain factors (Table 2.2).

Currency Substitution. There is a significant positive relation between both nominal depreciation and inflation and high loan dollarization in the rest of the world, whereas inflation appeared insignificant in the deposit dollarization regressions. Results for SSA are less conclusive on the currency substitution for loan dollarization. Hysteresis effects are likely to be stronger for deposit dollarization.

Portfolio Effects. For SSA countries, higher real lending rates in domestic currency are associated with significantly higher loan dollarization, though the results are often not statistically significant. For the rest of the world, the sign is surprisingly negative. Taken together with the findings on currency substitution (and financial deepening), the results seem to suggest that in SSA dollarization is largely driven by demand factors, with higher deposit dollarization being sensitive to lower remuneration rates on domestic currency deposits and with higher loan dollarization being sensitive to higher interest rates on domestic currency loans.

Market Features. A striking difference between the results on loan dollarization and deposit dollarization relates to current account openness. While higher current account openness has no impact on deposit dollarization, it has a significant positive impact on loan dollarization in all regression. This suggests that current account openness largely affects banks capacity to obtain foreign funds to lend on domestically, while it has no impact on firms' and households' capacity/willingness to obtain foreign funds.²³ Similarly, as expected, a higher degree of external debt goes along with higher loan dollarization. Results for M2 to GDP and GDP per capita are comparable to those obtained for deposit dollarization.

Access to Foreign Exchange Finance. Results on BIS exposure are also inconclusive for loan dollarization. However, for exports to GDP, a negative relation is found in the case of the rest of the world with loan dollarization while no impact was found for deposit dollarization,

²² One may argue that FX deposits are a determinant of foreign loan extension. An extension could consider modeling the two variables in a system of equations.

²³ Note that we control for GDP per capita and financial development, so this effect does not just capture some degree of development.

though the sign is the same. This suggests that at least in the rest of the world funds from export earnings substitute for needed foreign exchange funding (for example, to finance imports of firms). This pattern is not found in SSA, where only a positive and significant relation between oil exports to GDP and loan and deposit dollarization is observed.

Exchange Rate Regime. The exchange rate regime does not appear to be a major determinant of loan dollarization, which may reflect a tendency of banks to lend only to prime borrowers—such as multinationals—where legal disputes are unlikely to be decided under domestic law.

Household versus Corporate Dollarization

Though a more limited sample—as fewer countries have granular data—the IFS data permit to look into the determinants of household and enterprise deposit dollarization. Given that this granular data is not available for each country in SSA, the number of countries in the regression falls significantly, making the findings less robust and caution is needed in interpreting the results. Nonetheless, the results do provide a flavor of what drives dollarization at the micro level.

Results at the micro level are consistent with findings for the overall economy. A notable finding from the comparison is that firms appear to be substantially more sensitive than households to portfolio considerations (for deposit dollarization), probably reflecting a higher ability of firms to adjust their holdings through a wider access to alternative investment and treasury options compared to households.

Annex 2.1. Econometric Output

Table A.1: Determinants of Deposit Dollarization, Sub-Saharan Africa versus Rest of the World, 2001-2012

| | 2011 on avg. 2001-10 | | Avg. 2001-11 | | Pooled | | FGLS - AR(1) | | FGLS - AR(1) | | Panel Tobit | | Blundell-Bond Panel | |
|--|-----------------------|-----------------------|-----------------------|--------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|--------------------|
| | (1) RoW | (2) SSA | (3) RoW | (4) SSA | (5) RoW | (6) SSA | (7) RoW | (8) SSA | (9) RoW | (10) SSA | (11) RoW | (14) SSA | (17) RoW | (18) SSA |
| Currency Substitution | | | | | | | | | | | | | | |
| Inflation | 0.30 (0.828) | -2.87** (0.699) | -0.08 (0.724) | 1.61 (0.828) | -0.01 (0.162) | 0.13 (0.140) | 0.04 (0.038) | 0.10*** (0.035) | 0.02 (0.045) | 0.10*** (0.032) | 0.06 (0.061) | 0.07** (0.035) | 0.00 (0.047) | -0.06 (0.039) |
| Nom. Depr. to USD | -0.00 (0.001) | 6.50** (1.637) | -0.00 (0.001) | -3.16 (2.522) | 0.10* (0.059) | 0.03 (0.063) | 0.05*** (0.013) | 0.01 (0.012) | 0.05*** (0.015) | -0.00 (0.016) | 0.12*** (0.024) | 0.04* (0.024) | 0.08*** (0.019) | 0.04 (0.025) |
| Portfolio Model | | | | | | | | | | | | | | |
| Deposit rate spread to US | -0.05 (0.122) | 0.44* (0.203) | 0.15 (1.432) | -1.72 (2.640) | -0.18*** (0.053) | -0.04 (0.060) | -0.06*** (0.015) | -0.02* (0.012) | -0.06*** (0.017) | -0.03** (0.015) | -0.13*** (0.027) | -0.04* (0.021) | 0.02 (0.024) | 0.03*** (0.011) |
| Real deposit rate: $i(t) - \text{inff}(t+1)$ | 0.37 (0.450) | -6.93*** (1.159) | 0.67 (1.658) | 1.00 (1.348) | 0.23 (0.157) | -0.37 (0.246) | -0.04 (0.033) | -0.08* (0.042) | -0.03 (0.039) | -0.14*** (0.042) | 0.04 (0.056) | -0.02 (0.055) | 0.09 (0.075) | -0.19** (0.081) |
| Market Failure | | | | | | | | | | | | | | |
| CA index | 2.84 (2.404) | 6.66* (2.543) | 3.33 (2.329) | -3.23 (2.956) | 2.40*** (0.757) | -1.65** (0.725) | 0.83* (0.444) | 1.30*** (0.496) | 0.76* (0.441) | 0.59 (0.547) | 1.95*** (0.678) | 2.43** (1.012) | 0.64 (0.843) | -0.59 (0.535) |
| External debt to GDP ratio | 0.15 (0.309) | 0.43** (0.115) | 0.19 (0.267) | 0.20 (0.196) | 0.19*** (0.062) | 0.10** (0.041) | 0.11*** (0.019) | 0.02 (0.015) | 0.12*** (0.021) | 0.03 (0.017) | 0.09*** (0.022) | 0.02 (0.011) | 0.01 (0.039) | 0.00 (0.007) |
| M2 to GDP ratio | -0.40** (0.182) | -0.12 (0.218) | -0.46** (0.176) | -0.63* (0.296) | -0.44*** (0.039) | -0.46*** (0.066) | -0.30*** (0.025) | -0.18*** (0.044) | -0.33*** (0.024) | -0.07* (0.038) | -0.36*** (0.043) | 0.04 (0.061) | -0.18** (0.074) | -0.01 (0.043) |
| GDP p.c. | 0.30 (0.522) | 15.53** (4.444) | 0.20 (0.510) | 0.48 (3.231) | 0.08 (0.100) | 0.07 (0.658) | 0.05 (0.074) | -0.83** (0.387) | 0.03 (0.080) | -1.06*** (0.399) | -0.06 (0.091) | -1.46*** (0.511) | 0.11 (0.078) | -0.45 (0.309) |
| Access to FX Finance | | | | | | | | | | | | | | |
| BIS deposits+loans to GDP ratio | -0.23 (0.380) | -0.21 (0.104) | -0.28 (0.417) | 0.16 (0.101) | -0.16* (0.084) | 0.08** (0.032) | -0.03 (0.027) | 0.01 (0.011) | -0.02 (0.029) | 0.00 (0.010) | 0.11*** (0.037) | 0.02 (0.011) | -0.02 (0.037) | 0.00 (0.008) |
| Export to GDP ratio | 0.19 (0.298) | 0.45 (0.224) | 0.20 (0.264) | -0.03 (0.498) | 0.14** (0.065) | 0.32*** (0.117) | -0.06* (0.034) | -0.02 (0.033) | -0.06 (0.038) | -0.00 (0.037) | -0.10** (0.047) | -0.16** (0.072) | 0.03 (0.051) | 0.04 (0.041) |
| Oil export to GDP ratio | -0.63 (0.503) | -0.95** (0.229) | -0.49 (0.455) | 0.21 (0.299) | -0.36*** (0.107) | 0.17 (0.104) | -0.21*** (0.068) | 0.53*** (0.051) | -0.21*** (0.068) | 0.46*** (0.049) | -0.27** (0.108) | 0.56*** (0.129) | -0.22* (0.117) | 0.00 (0.074) |
| Institutions (Monetary) | | | | | | | | | | | | | | |
| Defacto Peg | -38.19*** (12.560) | 157.57** (46.584) | -45.13*** (11.470) | -30.15 (42.187) | -34.48*** (3.731) | -4.66 (4.554) | -17.93*** (2.597) | 1.44 (2.877) | -17.94*** (2.569) | 0.74 (1.770) | -1.24 (2.823) | 11.54 (569.154) | -0.03 (2.981) | 0.17 (1.987) |
| Defacto Float | -9.27 (13.601) | 134.01** (34.987) | -18.40* (10.757) | 2.09 (28.502) | -10.31*** (3.010) | 20.55*** (4.150) | -3.32* (1.721) | 25.57*** (3.068) | -2.91* (1.660) | 25.78*** (2.686) | 5.68** (2.255) | 11.81 (569.153) | 3.52** (1.658) | -2.24 (2.092) |
| Institutions (Political) | | | | | | | | | | | | | | |
| Polity Score | -2.07** (0.930) | 0.38 (0.473) | -2.03** (0.876) | -0.14 (0.695) | -1.36*** (0.232) | 0.69*** (0.202) | -0.35*** (0.114) | 0.16 (0.128) | -0.37*** (0.116) | 0.16 (0.138) | 0.27* (0.153) | 0.07 (0.278) | -0.02 (0.113) | 0.31 (0.325) |
| Controls | | | | | | | | | | | | | | |
| Population | -0.16*** (0.058) | 0.45*** (0.083) | -0.16*** (0.052) | -0.12 (0.077) | -0.15*** (0.014) | -0.06 (0.051) | -0.21*** (0.013) | -0.29*** (0.040) | -0.22*** (0.013) | -0.20*** (0.039) | -0.19*** (0.056) | 0.17*** (0.043) | -0.06*** (0.023) | 0.03 (0.024) |
| Lag dependent | | | | | | | | | | | | | | |
| Constant | 62.65*** (22.423) | -165.07** (44.787) | 76.85*** (19.297) | 33.30 (42.135) | 65.58*** (4.749) | -1.76 (6.349) | 54.58*** (2.472) | 8.70** (3.763) | 56.81*** (2.440) | 7.58** (3.677) | 44.49*** (4.781) | -1.93 (569.162) | 17.81*** (5.038) | 1.12 (2.708) |
| Observations | 43 | 20 | 44 | 21 | 411 | 194 | 411 | 194 | 411 | 194 | 411 | 194 | 403 | 194 |
| R-squared | 0.689 | 0.986 | 0.725 | 0.933 | 0.642 | 0.690 | | | | | | | | |
| Number of countries | | | | | | | 44 | 21 | 44 | 21 | 44 | 21 | 44 | 21 |
| Time dummies | | | | | | | | | X | X | | | | |

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A.2: Determinants of Deposit Dollarization Excl. Zeros, Sub-Saharan Africa versus Rest of the World, 2001-2012

| | 2011 on avg. 2001-10 | | Avg. 2001-11 | | Pooled | | FGLS - AR(1) | | FGLS - AR(1) | | Panel Tobit | | Blundell-Bond Panel | |
|--|-----------------------|-----|-----------------------|-----|----------------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|---------------------|---------------------|--------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (14) | (17) | (18) |
| | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA |
| Currency Substitution | | | | | | | | | | | | | | |
| Inflation | 0.26 (0.838) | | -0.11 (0.721) | | -0.06 (0.162) | 0.02 (0.106) | 0.07* (0.037) | 0.02 (0.042) | 0.05 (0.042) | 0.02 (0.034) | 0.06 (0.061) | 0.07** (0.036) | 0.00 (0.047) | -0.05 (0.055) |
| Nom. Depr. to USD | -0.00 (0.001) | | -0.00 (0.001) | | 0.12** (0.058) | 0.04 (0.068) | 0.07*** (0.014) | 0.08*** (0.025) | 0.07*** (0.015) | 0.04 (0.022) | 0.13*** (0.024) | 0.04* (0.025) | 0.09*** (0.021) | 0.06 (0.036) |
| Portfolio Model | | | | | | | | | | | | | | |
| Deposit rate spread to US | -0.05 (0.121) | | 0.06 (1.448) | | -0.15*** (0.056) | -0.04 (0.066) | -0.07*** (0.015) | -0.10*** (0.023) | -0.08*** (0.016) | -0.08*** (0.020) | -0.13*** (0.027) | -0.04* (0.021) | 0.03 (0.027) | 0.04** (0.019) |
| Real deposit rate: $i(t) - \text{infl}(t+1)$ | 0.44 (0.509) | | 0.89 (1.692) | | 0.22 (0.154) | -0.27 (0.194) | -0.05 (0.031) | 0.07 (0.062) | -0.04 (0.037) | -0.03 (0.047) | 0.03 (0.055) | -0.03 (0.056) | 0.07 (0.074) | -0.18** (0.075) |
| Market Failure | | | | | | | | | | | | | | |
| CA index | 2.85 (2.403) | | 3.36 (2.335) | | 1.90** (0.739) | -1.58** (0.659) | 0.17 (0.424) | -1.09*** (0.415) | 0.19 (0.424) | -0.30 (0.493) | 1.93*** (0.670) | 2.52** (1.178) | 0.51 (0.873) | -0.74 (0.720) |
| External debt to GDP ratio | 0.14 (0.323) | | 0.16 (0.280) | | 0.17*** (0.063) | 0.11*** (0.033) | 0.11*** (0.018) | 0.07*** (0.016) | 0.11*** (0.020) | 0.09*** (0.017) | 0.10*** (0.022) | 0.02 (0.012) | 0.02 (0.041) | 0.01 (0.011) |
| M2 to GDP ratio | -0.41** (0.195) | | -0.49** (0.187) | | -0.46*** (0.041) | -0.24*** (0.059) | -0.37*** (0.025) | -0.20*** (0.039) | -0.39*** (0.024) | -0.13*** (0.041) | -0.38*** (0.042) | 0.02 (0.064) | -0.24*** (0.080) | -0.06 (0.074) |
| GDP p.c. | 0.33 (0.544) | | 0.25 (0.530) | | 0.11 (0.104) | -2.13*** (0.641) | 0.01 (0.075) | -1.98*** (0.390) | -0.01 (0.079) | -2.11*** (0.376) | -0.05 (0.090) | -1.38** (0.545) | 0.10 (0.081) | -0.63 (0.512) |
| Access to FX Finance | | | | | | | | | | | | | | |
| BIS deposits+loans to GDP ratio | -0.22 (0.381) | | -0.29 (0.418) | | -0.14* (0.083) | 0.03** (0.012) | -0.00 (0.026) | 0.03*** (0.010) | 0.00 (0.027) | 0.02** (0.010) | 0.11*** (0.037) | 0.01 (0.011) | 0.01 (0.039) | 0.01 (0.009) |
| Export to GDP ratio | 0.20 (0.301) | | 0.22 (0.267) | | 0.11* (0.064) | 0.92*** (0.135) | -0.08** (0.034) | 0.35*** (0.071) | -0.06* (0.038) | 0.30*** (0.064) | -0.12** (0.047) | -0.13* (0.079) | 0.04 (0.052) | 0.20** (0.102) |
| Oil export to GDP ratio | -0.65 (0.514) | | -0.53 (0.461) | | -0.36*** (0.109) | -0.34*** (0.117) | -0.26*** (0.066) | 0.11 (0.072) | -0.26*** (0.067) | 0.19*** (0.066) | -0.26** (0.107) | 0.52*** (0.140) | -0.25** (0.123) | -0.08 (0.098) |
| Institutions (Monetary) | | | | | | | | | | | | | | |
| Defacto Peg | -38.02*** (12.740) | | -44.31*** (11.960) | | -33.55*** (3.702) | -18.83*** (2.673) | -8.24*** (2.357) | -19.16*** (2.057) | -8.34*** (2.366) | -20.86*** (2.038) | -1.47 (2.793) | 0.63 (3.328) | 0.80 (2.999) | 3.88* (2.194) |
| Defacto Float | -9.28 (13.850) | | -18.29 (10.972) | | -9.70*** (3.024) | -1.67 (1.514) | | | -1.74 (1.459) | | 5.46** (2.230) | | 3.23** (1.550) | |
| Institutions (Political) | | | | | | | | | | | | | | |
| Polity Score | -2.07** (0.933) | | -2.01** (0.876) | | -1.29*** (0.233) | -1.62*** (0.231) | -0.19** (0.094) | -1.23*** (0.211) | -0.22** (0.099) | -1.13*** (0.210) | 0.16 (0.155) | -0.10 (0.346) | -0.04 (0.113) | -0.07 (0.387) |
| Controls | | | | | | | | | | | | | | |
| Population | -0.15** (0.061) | | -0.14*** (0.048) | | -0.15*** (0.015) | -0.05 (0.042) | -0.22*** (0.015) | -0.22*** (0.040) | -0.22*** (0.015) | -0.21*** (0.037) | -0.15*** (0.055) | 0.17** (0.079) | -0.06** (0.024) | 0.03 (0.028) |
| Lag dependent | | | | | | | | | | | | | | |
| Constant | 63.54** (23.008) | | 78.49*** (19.656) | | 67.77*** (4.761) | 13.90*** (4.005) | 56.53*** (2.235) | 33.93*** (2.889) | 57.48*** (2.234) | 31.46*** (2.813) | 46.24*** (4.660) | 23.54*** (6.838) | 20.52*** (5.595) | 0.17 (3.175) |
| Observations | 42 | 16 | 43 | 16 | 395 | 149 | 395 | 149 | 395 | 149 | 395 | 149 | 384 | 149 |
| R-squared | 0.680 | | 0.720 | | 0.642 | 0.821 | | | | | | | | |
| Number of countries | | | | | | | 43 | 16 | 43 | 16 | 43 | 16 | 43 | 16 |
| Time dummies | | | | | | | | | X | X | | | | |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A.3: Determinants of Loan Dollarization, Sub-Saharan Africa versus Rest of the World, 2001-2012

| | 2011 on avg. 2001-10 | | Avg. 2001-11 | | Pooled | | FGLS - AR(1) | | FGLS - AR(1) | | Panel Tobit | | Blundell-Bond Panel | |
|--|----------------------|------------|-----------------------|------------|----------------------|---------------------|----------------------|---------------------|----------------------|---------------------|---------------------|-----------------------|---------------------|--------------------|
| | (1) RoW | (2) SSA | (3) RoW | (4) SSA | (5) RoW | (6) SSA | (7) RoW | (8) SSA | (9) RoW | (10) SSA | (11) RoW | (14) SSA | (17) RoW | (18) SSA |
| Currency Substitution | | | | | | | | | | | | | | |
| Inflation | 0.67 (1.203) | | 0.94 (0.900) | | 0.32** (0.160) | 0.07 (0.133) | 0.15*** (0.046) | 0.03 (0.054) | 0.21*** (0.051) | -0.01 (0.051) | 0.09 (0.080) | 0.03 (0.073) | -0.04 (0.077) | -0.07 (0.056) |
| Nom. Depr. to USD | -0.00** (0.001) | | -0.00*** (0.001) | | -0.04 (0.053) | 0.12 (0.077) | 0.03* (0.013) | -0.00 (0.015) | 0.04** (0.015) | 0.02 (0.018) | 0.01 (0.026) | -0.03 (0.054) | 0.08*** (0.024) | 0.04* (0.022) |
| Portfolio Model | | | | | | | | | | | | | | |
| Lending rate spread to US | 0.00 (0.107) | | 1.47 (1.091) | | -0.05 (0.059) | -0.04 (0.083) | -0.05*** (0.014) | -0.01 (0.015) | -0.04*** (0.016) | -0.01 (0.018) | -0.02 (0.030) | 0.02 (0.054) | 0.02 (0.031) | -0.02 (0.017) |
| Real lending rate: $i(t) - \text{infl}(t+1)$ | 0.26 (0.344) | | -0.00 (0.430) | | 0.08 (0.080) | 0.45** (0.206) | -0.06** (0.027) | -0.01 (0.052) | -0.05* (0.030) | 0.08 (0.050) | -0.05 (0.048) | -0.02 (0.079) | -0.01 (0.049) | 0.11*** (0.034) |
| Market Failure | | | | | | | | | | | | | | |
| CA index | 3.85 (2.965) | | 4.31 (2.760) | | 2.50*** (0.905) | -1.14 (1.014) | 0.88** (0.370) | 1.18* (0.600) | 1.41*** (0.385) | 0.90 (0.570) | 2.69*** (0.791) | 0.74 (2.734) | 0.85 (0.702) | 1.61* (0.887) |
| External debt to GDP ratio | -0.55* (0.304) | | -0.43 (0.329) | | -0.29*** (0.070) | -0.01 (0.022) | -0.03 (0.008) | -0.00 (0.032) | -0.06* (0.007) | -0.01 (0.007) | 0.08 (0.052) | 0.01 (0.067) | -0.05 (0.036) | -0.01 (0.009) |
| M2 to GDP ratio | -0.09 (0.147) | | -0.15 (0.126) | | -0.25*** (0.035) | -0.39*** (0.074) | -0.30*** (0.020) | -0.28*** (0.041) | -0.29*** (0.022) | -0.16*** (0.039) | -0.43*** (0.054) | -0.46** (0.185) | -0.10* (0.054) | 0.09 (0.062) |
| GDP p.c. | 0.55 (0.469) | | 0.14 (0.446) | | 0.25** (0.114) | -0.09 (0.663) | 0.20*** (0.069) | -0.47 (0.390) | 0.21*** (0.078) | -1.24*** (0.424) | 0.40*** (0.102) | -0.05 (1.171) | 0.28** (0.125) | -0.36 (0.518) |
| Access to FX Finance | | | | | | | | | | | | | | |
| BIS deposits+loans to GDP ratio | 0.50* (0.281) | | 0.34 (0.275) | | 0.30*** (0.058) | 0.08 (0.050) | 0.16*** (0.023) | 0.03* (0.017) | 0.16*** (0.025) | 0.04** (0.018) | 0.15*** (0.031) | 0.03 (0.027) | 0.05* (0.024) | 0.05** (0.023) |
| Export to GDP ratio | -0.20 (0.254) | | -0.17 (0.207) | | -0.13** (0.060) | 0.50*** (0.123) | -0.12*** (0.026) | 0.02 (0.045) | -0.10*** (0.029) | 0.07 (0.051) | -0.14** (0.057) | -0.08 (0.113) | -0.00 (0.097) | 0.12 (0.082) |
| Oil export to GDP ratio | 0.02 (0.430) | | -0.05 (0.384) | | -0.12 (0.104) | 0.08 (0.133) | -0.22*** (0.065) | 0.51*** (0.099) | -0.20*** (0.066) | 0.57*** (0.093) | -0.28** (0.124) | 0.41 (0.257) | -0.21 (0.169) | 0.04 (0.095) |
| Institutions (Monetary) | | | | | | | | | | | | | | |
| Defacto Peg | -30.78** (12.625) | | -50.16*** (13.166) | | -41.82*** (4.050) | -3.05 (4.912) | -13.50*** (3.037) | 2.73 (3.012) | -13.96*** (2.905) | 0.25 (1.974) | -9.45*** (3.345) | 19.09 (2,252.827) | -0.36 (3.287) | 1.50 (1.893) |
| Defacto Float | -17.85 (12.470) | | -33.78*** (11.534) | | -21.62*** (3.391) | 16.97*** (4.558) | -1.84 (2.470) | 15.32*** (3.167) | -2.80 (2.389) | 8.14*** (2.734) | 2.21 (2.610) | 37.37 (2,252.909) | 5.36*** (2.007) | 1.68 (3.046) |
| Institutions (Political) | | | | | | | | | | | | | | |
| Polity Score | -0.79 (0.889) | | -1.17 (0.696) | | -0.74*** (0.213) | 0.69*** (0.232) | -0.21* (0.121) | 0.38** (0.162) | -0.11 (0.114) | 0.27 (0.211) | 0.44** (0.197) | 0.68 (0.580) | 0.00 (0.133) | -0.74** (0.355) |
| Controls | | | | | | | | | | | | | | |
| Population | -0.17** (0.078) | | -0.16** (0.068) | | -0.16*** (0.020) | -0.02 (0.059) | -0.17*** (0.011) | -0.16*** (0.047) | -0.17*** (0.013) | 0.02 (0.061) | -0.17** (0.065) | 0.36*** (0.122) | -0.04* (0.021) | 0.02 (0.030) |
| Lag dependent | | | | | | | | | | | | | | |
| Constant | 47.19* (26.144) | | 67.70*** (22.628) | | 66.09*** (5.448) | -12.67* (6.725) | 48.61*** (2.894) | 8.65** (3.978) | 46.13*** (2.882) | 9.52** (4.009) | 43.66*** (5.818) | -36.58 (2,252.917) | 6.64 (4.933) | -6.89 (4.968) |
| Observations | 40 | 19 | 42 | 19 | 384 | 187 | 384 | 187 | 384 | 187 | 384 | 187 | 375 | 187 |
| R-squared | 0.653 | | 0.721 | | 0.582 | 0.571 | | | | | | | | |
| Number of countries | | | | | | | 42 | 20 | 42 | 20 | 42 | 20 | 42 | 20 |
| Time dummies | | | | | | | | | X | X | | | | |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A.4: Determinants of Loan Dollarization Excl. Zeros, Sub-Saharan Africa versus Rest of the World, 2001-2012

| | 2011 on avg. 2001-10 | | Avg. 2001-11 | | Pooled | | FGLS - AR(1) | | FGLS - AR(1) | | Panel Tobit | | Blundell-Bond Panel | |
|---|----------------------|-----|-----------------------|-----|----------------------|----------------------|----------------------|---------------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (14) | (17) | (18) |
| | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA | RoW | SSA |
| Currency Substitution | | | | | | | | | | | | | | |
| Inflation | 0.63 (1.157) | | 1.04 (0.926) | | 0.31* (0.162) | -0.07 (0.118) | 0.19*** (0.046) | -0.02 (0.080) | 0.23*** (0.050) | -0.09 (0.075) | 0.10 (0.083) | 0.02 (0.073) | -0.06 (0.074) | -0.09 (0.058) |
| Nom. Depr. to USD | -0.00* (0.001) | | -0.00*** (0.001) | | -0.05 (0.053) | 0.08 (0.083) | 0.02 (0.014) | -0.00 (0.031) | 0.02 (0.016) | 0.05 (0.033) | 0.00 (0.028) | -0.04 (0.057) | 0.08*** (0.024) | 0.03 (0.032) |
| Portfolio Model | | | | | | | | | | | | | | |
| Lending rate spread to US | -0.03 (0.098) | | 1.14 (0.983) | | -0.02 (0.067) | -0.06 (0.089) | -0.06*** (0.015) | -0.07** (0.032) | -0.05*** (0.017) | -0.05 (0.034) | -0.02 (0.032) | 0.01 (0.056) | 0.02 (0.030) | -0.03 (0.021) |
| Real lending rate: $i(t) - \ln(i(t+1))$ | 0.88 (0.750) | | 0.65 (0.589) | | 0.11 (0.084) | 0.26* (0.154) | -0.08*** (0.028) | 0.14* (0.081) | -0.07** (0.032) | 0.16** (0.077) | -0.05 (0.050) | -0.03 (0.079) | -0.02 (0.050) | 0.11*** (0.020) |
| Market Failure | | | | | | | | | | | | | | |
| CA index | 3.50 (3.119) | | 3.99 (2.817) | | 2.02** (0.913) | -1.09 (0.712) | 0.39 (0.369) | -1.30 (1.168) | 0.98** (0.395) | 0.19 (0.854) | 2.57*** (0.829) | 0.90 (3.238) | 0.83 (0.712) | 0.40 (0.843) |
| External debt to GDP ratio | 0.46 (0.305) | | 0.32 (0.285) | | 0.29*** (0.060) | 0.10*** (0.033) | 0.15*** (0.022) | 0.06** (0.027) | 0.15*** (0.024) | 0.11*** (0.030) | 0.16*** (0.031) | 0.05* (0.028) | 0.05* (0.025) | 0.06** (0.026) |
| M2 to GDP ratio | -0.07 (0.157) | | -0.12 (0.136) | | -0.26*** (0.036) | -0.19* (0.102) | -0.28*** (0.023) | -0.36*** (0.084) | -0.28*** (0.024) | -0.32*** (0.078) | -0.44*** (0.055) | -0.48*** (0.187) | -0.11** (0.052) | 0.06 (0.073) |
| GDP p.c. | 0.66 (0.514) | | 0.22 (0.459) | | 0.29** (0.120) | -2.59*** (0.911) | 0.19*** (0.072) | -1.06 (0.803) | 0.19** (0.081) | -2.32*** (0.808) | 0.39*** (0.105) | -0.36 (1.200) | 0.28*** (0.122) | -0.74 (0.695) |
| Access to FX Finance | | | | | | | | | | | | | | |
| BIS deposits+loans to GDP ratio | -0.54* (0.292) | | -0.47 (0.321) | | -0.28*** (0.069) | -0.07** (0.031) | -0.04 (0.029) | 0.00 (0.019) | -0.05* (0.032) | 0.00 (0.015) | 0.09 (0.054) | -0.01 (0.082) | -0.04 (0.037) | 0.00 (0.007) |
| Export to GDP ratio | -0.20 (0.256) | | -0.16 (0.203) | | -0.16*** (0.062) | 1.31*** (0.109) | -0.13*** (0.028) | 0.69*** (0.114) | -0.11*** (0.031) | 0.68*** (0.099) | -0.14** (0.059) | 0.10 (0.142) | 0.00 (0.098) | 0.12 (0.119) |
| Oil export to GDP ratio | 0.02 (0.441) | | 0.02 (0.421) | | -0.11 (0.107) | -0.54*** (0.102) | -0.27*** (0.067) | -0.19 (0.130) | -0.26*** (0.068) | 0.06 (0.117) | -0.28** (0.127) | 0.16 (0.259) | -0.22 (0.172) | -0.01 (0.123) |
| Institutions (Monetary) | | | | | | | | | | | | | | |
| Defacto Peg | -30.93** (12.985) | | -49.62*** (13.984) | | -41.07*** (4.163) | -12.25*** (3.159) | -12.05*** (2.962) | -2.45 (3.669) | -11.21*** (2.837) | -2.92 (3.582) | -9.59*** (3.416) | -24.39 (14.871) | 0.06 (3.193) | 0.51 (1.982) |
| Defacto Float | -20.15 (13.410) | | -35.26*** (12.532) | | -21.26*** (3.448) | | -1.45 (2.348) | | -2.09 (2.265) | | 2.14 (2.663) | | 5.37*** (1.948) | |
| Institutions (Political) | | | | | | | | | | | | | | |
| Polity Score | -0.81 (0.905) | | -1.05 (0.762) | | -0.68*** (0.216) | -2.08*** (0.268) | -0.25** (0.116) | -1.29*** (0.378) | -0.13 (0.112) | -0.84** (0.363) | 0.41** (0.205) | 0.68 (0.664) | -0.01 (0.133) | -0.72*** (0.221) |
| Controls | | | | | | | | | | | | | | |
| Population | -0.13* (0.072) | | -0.12* (0.068) | | -0.15*** (0.021) | -0.03 (0.043) | -0.23*** (0.022) | 0.08 (0.065) | -0.21*** (0.020) | 0.25*** (0.071) | -0.16** (0.075) | 0.32*** (0.122) | -0.03* (0.019) | 0.01 (0.029) |
| Lag dependent | | | | | | | | | | | | | | |
| Constant | 43.18 (25.836) | | 61.47** (24.442) | | 67.26*** (5.489) | -0.58 (3.260) | 50.21*** (2.811) | 12.41*** (4.688) | 47.27*** (2.802) | 9.24** (4.676) | 44.39*** (5.945) | 3.22 (11.752) | 7.24 (4.741) | -1.45 (2.645) |
| Observations | 39 | 15 | 41 | 14 | 368 | 142 | 368 | 142 | 368 | 142 | 368 | 142 | 356 | 142 |
| R-squared | 0.656 | | 0.725 | | 0.580 | 0.788 | | | | | | | | |
| Number of countries | | | | | | | 41 | 15 | 41 | 15 | 41 | 15 | 41 | 15 |
| Time dummies | | | | | | | | | X | X | | | | |

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Annex 2.2. Unit-Root Tests

Levin-Lin-Chu unit-root test for Deposits in Foreign Currency

Ho: Panels contain unit roots Number of panels = 94
Ha: Panels are stationary Number of periods = 12

AR parameter: Common Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1.36 lags average (chosen by AIC)
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

| | Statistic | <i>p</i> -value |
|--------------|-----------|-----------------|
| Unadjusted t | -50.5829 | |
| Adjusted t* | -49.3483 | 0.0000 |

Levin-Lin-Chu unit-root test for Credit in Foreign Currency

Ho: Panels contain unit roots Number of panels = 88
Ha: Panels are stationary Number of periods = 12

AR parameter: Common Asymptotics: N/T -> 0
Panel means: Included
Time trend: Not included

ADF regressions: 1.55 lags average (chosen by AIC)
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)

| | Statistic | <i>p</i> -value |
|--------------|-----------|-----------------|
| Unadjusted t | -5.4932 | |
| Adjusted t* | -2.8166 | 0.0024 |

3. Effective De-Dollarization Strategies

The previous chapters have highlighted that dollarization in SSA is relatively high and that, in contrast to other regions, it has failed to decline over the past decade (except in a few countries). As noted, financial dollarization has many downsides: it hampers the effectiveness of monetary policy, limits the flexibility of fiscal policy, and increases financial sector vulnerabilities.

How should country authorities respond to these challenges? To gain some insights into this question, this chapter reviews the experience of countries that have managed to reduce significantly the domestic use of foreign currencies, and compares it with the experiences of other countries that have remained instead highly dollarized, in order to infer what policies and other conditions can facilitate de-dollarization.

This chapter follows a two-pronged approach, addressing this question both on the basis of country case studies and through an econometric analysis. The findings suggest that dollarization is difficult to reverse and can only be reduced through long, consistent, and credible stabilization efforts. An effective de-dollarization strategy requires a mix of sound macroeconomic policies, microprudential measures, and sustained efforts to create the conditions for longer-term domestic capital market development. Measures that provide market-based incentives are most successful, while administrative measures aimed at forcing de-dollarization can easily backfire and could encourage capital flight and reduce financial sector intermediation, ultimately hindering growth. In sum, key ingredients for a successful de-dollarization include: (i) a sustained and credible macroeconomic stabilization; (ii) a proper liberalization effort encouraging de-dollarization by removing distortionary direct controls or constraints that discourage the use of the local currency, and (iii) prudential measures that reduce banks' incentives to borrow and lend in foreign currencies—such as asymmetric reserve requirements and the provisioning for currency-induced credit risks.

A. De-Dollarization: Cases of Countries that Have Successfully De-Dollarized

While many countries have attempted to de-dollarize, only a few have succeeded in these efforts. Among them, Israel, Poland, Bolivia, and Peru provide a good illustration of the comprehensive policy package needed to reduce financial dollarization. In SSA, Angola and São Tomé and Príncipe also represent useful examples (Boxes 3.1 and 3.2). This section examines the experience of these countries, with a view to highlight useful lessons.²⁴

²⁴ Kokenyne and others (2010) provide a summary of the key policies that encourage de-dollarization.

Israel

- Israel had high and rising inflation throughout the 1970s, which further accelerated, reaching about 445 percent in 1984, in the context of a broad deterioration in macroeconomic conditions.²⁵ As a result, the share of dollarized deposits peaked at 39 percent in 1984, as depositors attempted to protect the value of their assets.
- To address these imbalances, including the high level of dollarization, Israel adopted a comprehensive strategy based on macroeconomic stabilization and prudential measures. On the macroeconomic side, fiscal consolidation cut the fiscal deficit from 19 percent of GDP in 1985 to about 10 percent in the late 1990s. This effort contributed to restore confidence in the local currency by reducing inflation under an inflation targeting regime, while gradually increasing exchange rate flexibility. On the prudential side, reserve requirements in domestic currency were remunerated at a higher rate than those in foreign currency. Regulations were issued to ensure that banks adequately incorporated the risks arising from foreign currency deposits, including by imposing stronger requirements for borrowers that did not have foreign exchange income. Concurrently, the securities market in domestic currency was deepened as the public sector—which in 1985 only issued bonds indexed to inflation or in foreign currency—began to finance its deficit with bonds in local currency. Following the implementation of policies to stabilize the economy, the share of deposits in dollars dropped significantly.

Poland

- Poland's economic situation deteriorated in the late 1980s, with severe macroeconomic imbalances: monthly inflation reached 55 percent in October 1989 and the fiscal deficit increased to 7 percent of GDP.²⁶ Due to the lack of credibility of the government's economic policies, only about 20 percent of bank deposits were zloty-denominated and most depositors moved to dollar deposits. By 1993, however, the level of dollarization had declined to about 35 percent, making it one of the few countries that have successfully de-dollarized. The level of dollarization declined, reaching 4.5 percent in 1999.
- The background to this successful de-dollarization process was a significant strengthening of the macroeconomic environment. In 1990, Poland began to implement a comprehensive reform program to address the macroeconomic imbalances and to transition from central planning to a market economy. While the reform program initially resulted in a sharp recession (real GDP contracted by more than 11 percent in 1990), growth resumed in 1992 and rebounded to about 4 percent in 1993. Using the exchange rate as a nominal anchor helped reduce average inflation from 585 percent in 1990 to 35

²⁵ Offenbacher (2003).

²⁶ Ebrill (1994).

percent in 1993. Starting in May 1991, the issuance of local currency treasury bills, which were seen as a high yield and safe investment, also helped reduce the share of dollar deposits.

Bolivia

- Among the Latin American countries that have achieved a significant reduction in dollarization, Bolivia is a prominent example.²⁷ In 2001, the Bolivian banking sector was almost completely dollarized: only 6 percent of deposits and 3 percent of loans were denominated in local currency. By 2012, the share of deposits and loans denominated in foreign currencies had declined to 25 percent and 21 percent, respectively.
- Bolivia's successful de-dollarization clearly illustrates that market-driven policies are more effective in the long run than forced measures. Twenty years before, in 1982, there had been a botched attempt to force de-dollarization through a mandatory conversion of foreign currency deposits into domestic currency. These measures led to severe macroeconomic instability and, by 1985, the government had to allow residents to hold deposits in foreign currency again.
- In contrast, the market-driven de-dollarization strategy implemented in the early 2000s was based on prudent macroeconomic policies accompanied by incentives to hold financial assets in domestic currency. Inflation was reduced to single digits and fiscal and external imbalances were addressed. Prudential measures included, among other things, higher reserve requirements on foreign currency deposits and higher provisioning requirements on foreign currency loans. In addition, a capital market for local currency bonds was developed, beginning with government bonds and moving gradually to longer maturities (9 to 15 years).

Peru

- Peru had high levels of financial dollarization following periods of very high inflation (which reached a peak rate of over 7,600 percent a year in 1990). While high levels of financial dollarization persisted for a long period despite significant improvements in macroeconomic stability, they declined in the last decade following the implementation of a successful de-dollarization strategy. Both deposit and loan dollarization declined from about 79 percent in 2001 to about 50 percent in 2010.²⁸
- Like Bolivia, Peru first attempted (in the mid-1980s) to reduce dollarization by forcibly converting foreign currency deposits to local currency, a measure that resulted in capital flight and a decline of financial intermediation. In contrast, a comprehensive strategy implemented since the early 2000s successfully reduced dollarization. The three-pronged

²⁷ Uruguay has also reduced dollarization levels, although more gradually than Bolivia.

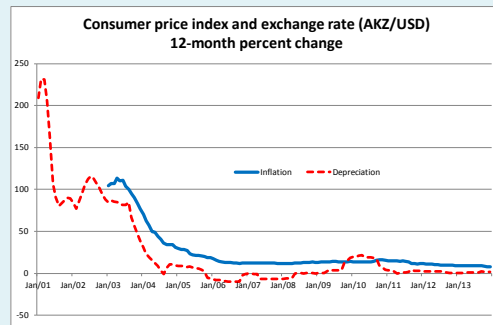
²⁸ Garcia-Escribano (2010).

approach reduced incentives to financial dollarization by: (i) strengthening macroeconomic stability through fiscal surpluses, lower public debt, inflation targeting, and boosting international reserves, all of which enabled Peru to obtain an investment grade rating; (ii) introducing prudential measures to better reflect the risks of currency mismatches; and (iii) developing a securities market with longer maturities in domestic currency.

Box 3.1. De-Dollarization in Angola (as of 2014)

In 2013, the Banco Nacional de Angola (BNA) designed a package of measures intended, *inter alia*, to reduce the economy's significant dollarization and address severe foreign currency shortages in the retail market. Despite an initial (positive) impact, Angola remained heavily dollarized. The U.S. dollar remained the legal tender, like the local currency, the kwanza. The dollar is still extensively used as a unit of account and for transaction purposes, and banks are heavily dollarized. However, while a decade ago, nearly three-fourths of deposits and two-thirds of credit to the private sector were in foreign currency, both ratios were closer to 40 percent in 2014.

Causes of dollarization: Dollarization has been driven by the long-lasting civil conflict and the significant uncertainty about Angola's macroeconomic conditions and the value of the kwanza. Inflation was at hyperinflation levels in the early 2000s. It topped 100 percent when the civil war ended in 2002 and still exceeded 30 percent in 2004. As a result, since 2001 the kwanza has depreciated by nearly 1,600 percent vis-à-vis the dollar. Dollarization has also been fed by Angola's high dependence on oil revenues; until recently, the oil sector made extensive use of dollars to settle payments to local suppliers. These dollars were subsequently retained rather than sold to commercial banks, producing severe foreign currency shortages in the retail market. Until recently, dollarization was also encouraged by higher reserve requirements on kwanza than on dollar deposits, which encouraged banks to offer clients more attractive rates on dollar deposits and loans. The dollar has also been sought as a vehicle for capital flight: Angola has tight capital controls and the kwanza is not convertible outside the country, so much of this capital flight is disguised, especially through the over-invoicing of current foreign payment obligations. Since the BNA has sought to tailor its foreign currency sales to its estimates of valid import demand, this over-invoicing has led to perceived foreign currency shortages in the retail market.



Impact of dollarization: High dollarization has reduced the effectiveness of monetary policy and obliged the BNA to rely on the exchange rate as the nominal anchor. Indeed, the BNA's policy rate is still a relatively weak monetary policy instrument.

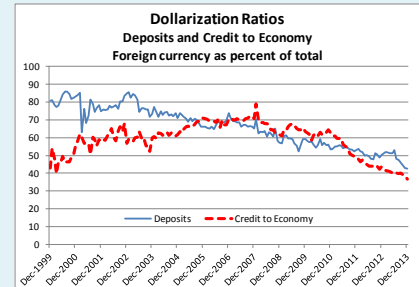
Measures to reduce dollarization: By 2014, Angola recently had made considerable progress in improving macroeconomic stability and increasing confidence in the kwanza. Inflation had been reduced to single digits (below 8 percent in 2013) and the foreign exchange rate had been stabilized. The BNA had elaborated a package of administrative measures intended, *inter alia*, to further reduce dollarization and address the severe foreign currency shortages in the retail market.

- The most important measure was the oil sector foreign exchange law phased in during 2013. *Inter alia*, the law requires the oil sector, since mid-2013, to settle all domestic transactions including taxes and payments to local suppliers, in local currency purchased from domestic banks. This effectively channeled the supply of dollars entering the nonoil sector through commercial banks.
- In addition, measures were introduced in mid-2013 that make it more difficult for importers to overstate foreign currency obligations and to make the demand registered by banks at the primary auctions a more accurate reflection of import needs.

(cont.)

- The BNA also tightened banks' foreign exchange exposure limits. As a result, while the oil sector foreign exchange law channels more dollars into banks, the foreign exchange exposure limits also oblige banks to sell surplus dollars into the retail or the interbank market. The BNA also limited the extension of foreign exchange-denominated consumer credit to foreign exchange earners only.
- In early 2014, the BNA reduced the reserve requirements on kwanza deposits below those on dollar deposits. This allows banks to offer more attractive rates on kwanza deposits and loans.

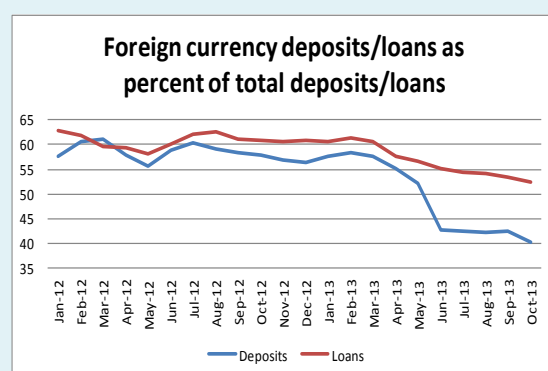
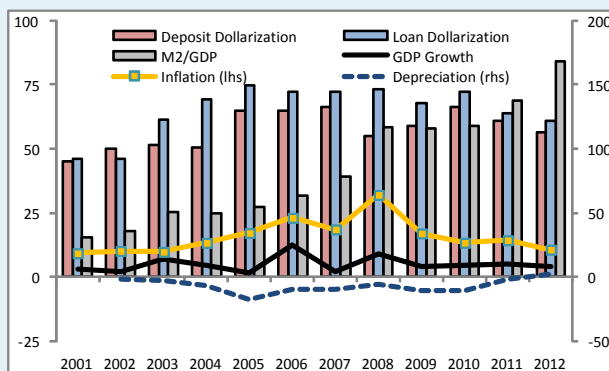
Impact on dollarization: By 2014, preliminary evidence showed that the package of measures has had the intended effect. Foreign exchange shortages had been eliminated and an interbank market had emerged. In addition, dollar deposit and loan ratios had trended down through the past decade and the decline has accelerated since the implementation of the oil sector foreign exchange law in mid-2013. From June to December, dollar deposits fell from 53 to 42 percent of total deposits and dollar credit fell from 41 to 37 percent of total credit to the economy. Anecdotal evidence suggests that the oil sector foreign exchange law has also had an impact on payment dollarization and the kwanza was rapidly becoming the primary unit of account and medium of exchange.



Box 3.2. São Tomé and Príncipe

Dollarization has been a defining feature of São Tomé and Príncipe's banking sector. As inflation rose from 9 percent in 2001 to about 28 percent in 2008, concerns about an erosion of incomes and purchasing power in the wake of depreciation led to a high degree of currency substitution. The ratio of foreign currency-denominated deposits to broad money rose from 35 percent in 2001 to about 57 percent by 2007. Commercial banks operated largely with foreign currency and, correspondingly, foreign currency loans accounted for almost ¾ of the credit portfolio.

However, efforts to reduce dollarization in the financial system in recent years, which included prudential regulations regarding reserve requirements, led to a reversal in the share of foreign currency loans from 77 percent in 2010 to 58 percent in 2012. In March 2010, the central bank updated its policy to require 90 percent of the reserve requirements be paid in local currency. At the same time, the central bank lowered the required reserve ratio for domestic currency to 18 percent, while keeping the statutory requirements for foreign exchange at 21 percent. A peg to the euro was implemented in January 2010, achieving a slow decrease in inflation and dollarization. In 2013, banks actively sought funding in local currency, causing an increase in the spread between foreign currency and domestic currency interest rates and steering an increase in domestic currency-denominated deposits.



B. When Does De-Dollarization Succeed? A Quantitative Analysis

In this section, we examine evidence from 42 highly dollarized countries, one-fourth of which reduced significantly their degree of dollarization between 2001 and 2012, to identify what policies and conditions are most likely to induce de-dollarization. The results highlight that macroeconomic stability—low inflation, high growth, and a prudent fiscal balance—are key ingredients for success.

In the following discussion, a country is considered to be “dollarized” if its “dollarization ratio”—the ratio of foreign currency deposits (FCD) to total deposits (TD)—exceeds 30 percent; a country is considered “initially dollarized” if its dollarization rate exceeded 30 percent on average between 2001 and 2003, or if its maximum dollarization rate between 2001 and 2003 exceeded 30 percent. A country that was initially dollarized is said to have “de-dollarized” if (1) its three-year average dollarization ratio has declined by at least 20 percent²⁹ between the period 2001–03 and the period 2010–12; and (2) the average proportion of foreign currency loans to total bank loans has not increased between these two three-year periods.³⁰ To simplify the narrative, a country that de-dollarized will henceforth be called successful, while a country that has remained dollarized will be called unsuccessful.

Out of 194 countries for which data are available, 42 were initially dollarized (of which nine in sub-Saharan Africa)³¹; out of these, 11 countries were successful and de-dollarized³²; and the remaining 31 countries were unsuccessful and remained dollarized (Table 3.1). We then exclude from this set four countries that stand out as outliers due to peculiar economic conditions: Qatar, whose unusually large current account surplus is driven by exports of natural gas; and the Democratic Republic of the Congo, Liberia, and São Tomé and Príncipe that have a stock of debt well in excess of their GDP, and have either high inflation (Democratic Republic of the Congo), a large fiscal and current account deficit (Liberia, São

²⁹ For instance, if the initial dollarization rate is 50 percent, a country is said to have de-dollarized if its dollarization rate has declined below 40 percent (that is, by 10 percentage points, or 20 percent of 50 percent).

³⁰ Reinhart and others (2003) used a stricter criterion, considering a country to have experienced a “large and lasting” reversal of dollarization if the share of foreign currency deposits on total deposits had declined by at least 20 percentage points, had settled below 20 percent immediately after the decline, and had remained below 20 percent until the end of the sample period.

³¹ Excluding Canada, which had a dollarization rate slightly above 30 percent in 2001 but for which data on foreign currency deposits were available only until 2008.

³² Of these, only two—Angola and Mozambique—were in SSA. In Angola, the share of foreign currency deposits on total deposits has declined from about 75 percent in 2001 to less than 50 percent in 2012; in Mozambique, the same share has declined from 56 percent in 2001 to 32 percent in 2012.

Tomé and Príncipe), or a low “Polity IV” democracy index³³ associated with conflict (Democratic Republic of the Congo, Liberia). All these outliers were unsuccessful.

Table 3.1. Successful and Unsuccessful De-Dollarization, 2001–03

| Successful | Unsuccessful | |
|------------|------------------------|-----------------------|
| Angola | Albania | Moldova |
| Azerbaijan | Armenia | Mongolia |
| Bolivia | Belarus | Nicaragua |
| Georgia | Bosnia And Herzegovina | Qatar |
| Kazakhstan | Cambodia | Romania |
| Mozambique | Costa Rica | São Tomé and Príncipe |
| Paraguay | Croatia | Suriname |
| Peru | Dem. Rep. of the Congo | Serbia |
| Turkey | Dominican Republic | Tajikistan |
| Uruguay | Guatemala | Tanzania |
| Uzbekistan | Haiti | Uganda |
| | Honduras | Ukraine |
| | Jamaica | Vanuatu |
| | Liberia | Zambia |
| | Macedonia, F.Y.R. | Zimbabwe |
| | Maldives | |

What Distinguishes Successful and Unsuccessful Countries

Among the 42 countries that were initially dollarized, those that de-dollarized generally had low or declining inflation, comparatively high growth, and experienced a nominal appreciation of their exchange rates at some point between 2002 and 2012.

Initial conditions differed between the two groups. Predictably—given the criterion used to define “de-dollarization”—successful countries started from higher *initial* levels of dollarization; they also started with more external debt but with a better current account balance and a higher Polity IV democracy index, compared with unsuccessful countries, over the period 2001–03 (Table 3.2).

³³ The Polity IV democracy index, published by the Center for Strategic Peace as part of its INSCR (Integrated Network for Societal Conflict Research) database, measures institutional democracy on an 11-point scale (0–10) by combining indices that assign a quantitative measure (coding) to different features that qualify the competitiveness of political participation, the openness and competitiveness of executive recruitment, and constraints on the chief executive (such as, the presence of contested elections). The index takes large negative values (–66, –77, –88) to describe particularly fluid or volatile situations, such as foreign interventions, anarchy/interregnum, or transition between regimes.

The main differences between the two groups are observed however in the years after 2003. In this period, the successful countries performed better than the unsuccessful countries in terms of macroeconomic stability, enjoying (or achieving) higher growth, a better external and fiscal balance, and persistently lower debt (although debt declined more rapidly among unsuccessful countries). The Polity IV democracy index also remained persistently higher. Between 2001–03 and 2010–12, successful countries reduced inflation by 14 percentage points on average, while inflation remained broadly unchanged in unsuccessful countries. The exchange rates of successful countries remained, on average, unchanged, while unsuccessful countries experienced an average nominal depreciation above 15 percent. Successful countries also experienced a larger reduction of public and external debt, while unsuccessful countries experienced deterioration in their index of democracy.

There are, of course, significant differences within each of these groups. For instance, the data show that countries with a dollarization rate higher than 65 percent on average between 2001 and 2003 had a probability³⁴ of success (becoming de-dollarized by 2010–12) 43 percent higher than other, less dollarized, countries (Figure 3.1). A current account surplus or a deficit below 3 percent of GDP between 2001 and 2003 also increased the probability of success by about 30 percent while an initial stock of public or external debt above 40 percent of GDP increased the probability of success by 25 percent.

Most countries that de-dollarized experienced a nominal appreciation of the currency of at least 15 percent at some point between 2001 and 2012.³⁵ The data show that a current account deficit above 3 percent of GDP between 2001 and 2012 significantly increased the probability of de-dollarizing (by almost 70 percent) while a fiscal balance above 2 percent of GDP also increased the probability of success.³⁶ Lastly, countries that de-dollarized implemented a significant reduction in external debt.³⁷

On the basis of these observations, it is possible to identify a subset of countries that, based on their initial conditions, would initially appear as likely candidates for de-dollarization, although not all of them eventually de-dollarized. Comparing the policies and

³⁴ The word *probability* is used here to describe a statistical correlation, and not in a stochastic sense. We define the probability of success of a country satisfying a certain condition as the share of successful countries that met that condition.

³⁵ In sub-Saharan Africa, Angola and Mozambique (which de-dollarized) experienced a maximum appreciation of 14 percent and 23 percent, respectively, while Tanzania and Uganda (which did not de-dollarize) had a maximum appreciation slightly above 10 percent.

³⁶ All dollarized countries in SSA, except Angola, had an average current account deficit above 5 percent of GDP between 2001 and 2012, and all, except Angola, Sao Tomé and Príncipe, and Zambia, had an average fiscal deficit above 2 percent of GDP.

³⁷ Owing largely to the HIPC initiative, all dollarized countries in SSA, except Zimbabwe, experienced a significant reduction in external debt.

macroeconomic conditions subsequently prevailing in successful and unsuccessful countries can then shed some light on what policies and conditions are most favorable to de-dollarization. The set of candidates is selected on the basis of the initial levels of public and external debt as a proxy for macroeconomic imbalances accumulated over time. We identify a set of 17 candidates, eight of which were successful.³⁸ Besides their initial levels of debt, these candidates share other similar characteristics: they had comparatively high initial levels of inflation and a better index of democracy (Table 3.2).

Why did some of these candidates de-dollarize while others did not? The key difference appears to be the level of inflation that prevailed after 2003. Six of the eight candidates that kept average inflation below 9 percent eventually de-dollarized, while seven out of the nine that did not, failed to de-dollarize. The fiscal balance also played an important role: other things being equal, candidates that maintained a fiscal balance above –2 percent of GDP after 2003 had a success rate of about 70 percent, equal to five times the success rate of the other candidates. All countries that de-dollarized had either low inflation or a fiscal surplus, and only four countries out of 12 that met at least one of these conditions failed to de-dollarize (of the six that met both, only one³⁹ failed to de-dollarize) (Figure 3.1).⁴⁰ These are, of course, only empirical relations: the causal link could run in the opposite direction (de-dollarization could have facilitated the maintenance of low levels of inflation and better fiscal balances), or improvements in all these variables could have been caused by a third common factor (such as structural reforms).

In summary, compared to the unsuccessful countries, those countries that de-dollarized started with higher dollarization rates and debt levels, implemented sounder macroeconomic policies, were more democratic, and experienced a larger exchange rate appreciation at some point during the past decade.

³⁸ Only four of these candidates (Angola, Mozambique, Tanzania, and Uganda) are countries in SSA. Angola and Mozambique are successful countries that significantly reduced their dollarization ratios between 2001 and 2012. Tanzania and Uganda started with lower dollarization rates (about 40 percent in Tanzania and 27 percent in Uganda) but failed to reduce them over time (in Uganda the rate of dollarization even increased, to 33 percent, by 2012). Five countries in SSA are not candidates; of these, three are outliers (the Democratic Republic of the Congo, Liberia, and São Tomé and Príncipe); for the other two, the public debt data are either missing (Zimbabwe) or show an initial level of public debt below 40 percent (Zambia).

³⁹ F.Y.R. of Macedonia.

⁴⁰ The two unsuccessful candidates in SSA (Tanzania and Uganda) had both an average inflation rates above 9 percent of GDP and an average fiscal deficit above 2 percent of GDP. By comparison, Mozambique had an inflation rate below (albeit close to) 9 percent and Angola kept an average fiscal surplus.

Table 3.2. Difference between Successful and Unsuccessful De-Dollarizing Countries, 2001–12

(In percent of GDP, unless otherwise indicated)

| | Country group | |
|---|---------------|--------------|
| | Successful | Unsuccessful |
| Initial conditions (average 2001-03) | | |
| Dollarization | 67.4 | 48.4 |
| Real GDP growth (in percent) | 4.8 | 4.3 |
| Inflation (in percent) | 21.6 | 9.4 |
| Current account balance | -5.0 | -5.6 |
| Fiscal balance | -2.8 | -3.3 |
| Stock of public debt | 60.1 | 54.6 |
| Stock of external debt | 63.8 | 59.3 |
| Democracy | 5.0 | 2.7 |
| Conditions after 2003 (average 2004-12) | | |
| Real GDP growth (in percent) | 7.3 | 4.5 |
| Inflation (in percent) | 8.5 | 8.9 |
| Current account balance | 0.3 | -7.6 |
| Fiscal balance | 1.4 | -2.6 |
| Stock of public debt | 33.6 | 39.4 |
| Stock of external debt | 41.1 | 48.4 |
| Democracy | 5.2 | 1.5 |
| Net change between 2001-03 and 2010-12 | | |
| Inflation (difference) | -14.4 | -1.8 |
| Public debt (difference) | -32.4 | -14.4 |
| External debt (difference) | -27.7 | -4.6 |
| Public debt (percentage change) | -53.5 | -14.9 |
| External debt (percentage change) | -43.7 | 15.2 |
| Democracy (difference) | 0.2 | -2.8 |
| Other indicators | | |
| CPIA (average) | 3.55 | 3.45 |
| Exchange rate appreciation (average 2004-12 compared to average 2001-03) | 2.2 | -33.8 |
| Exchange rate appreciation (average 2010-12 compared to average 2001-03) | 2.0 | -15.0 |
| Exchange rate appreciation (maximum consecutive appreciation during the period) | 18.5 | 14.1 |

Source: country authorities; and IMF estimates.

Figure 3.1. Initial Conditions in Successfully and Unsuccessfully De-Dollarizing Countries, 2001–03

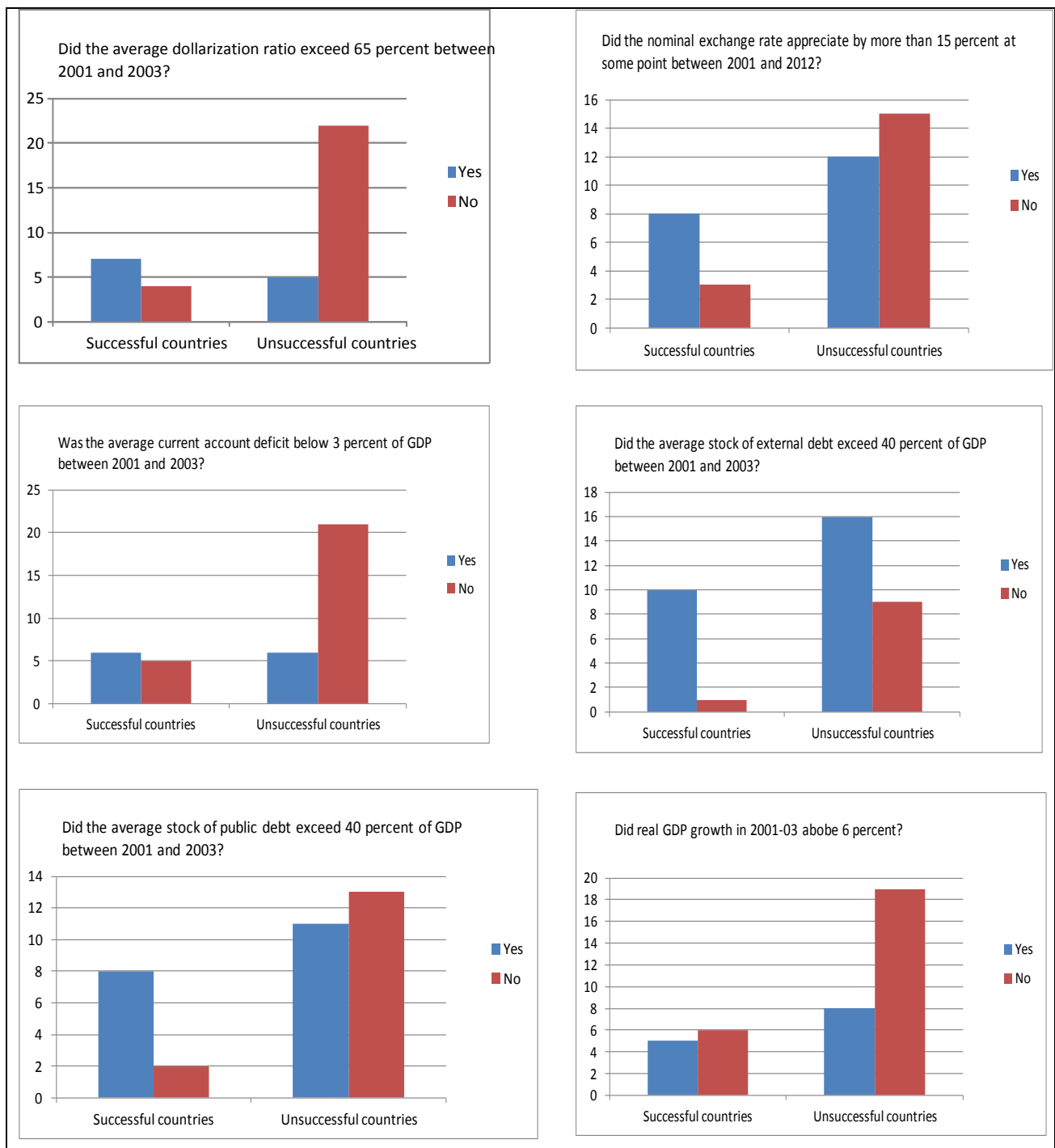
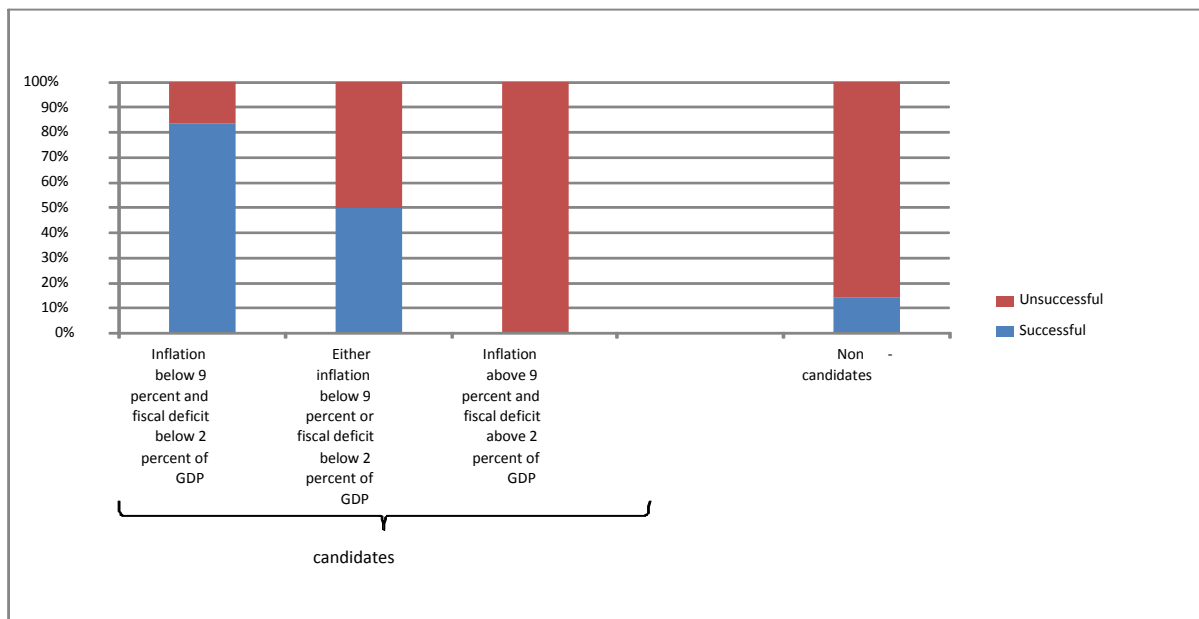


Figure 3.2. Factors Affecting the Probability of Success



Evidence from Cross-Country Analysis

Further insights on the impact of these conditions and policies can be gained through a cross-sectional regression relating the cross-country differences in de-dollarization to a set of initial conditions and macroeconomic policies:

$$\Delta Doll_i = a_0 + a_1 \cdot Initials_i + a_2 \cdot Developments_i + a_3 \cdot Appreciation_i + \varepsilon_i \quad (2)$$

where the dependent variable, $\Delta Doll$, is the net change in the three-year average dollarization ratio between the period 2001–03 and the period 2010–12, *Initials* are initial conditions (measured as country averages over the period 2001–03), *Developments* capture policies and outcomes in the years after 2003 (measured as country averages for the period 2004–12), which include policy variables such as the fiscal balance, institutional variables such as the level of democracy, and macroeconomic outcomes such as real GDP growth, the current account balance, and the levels of public and external debt. *Appreciation* are different measures of nominal exchange rate appreciation vis-à-vis the U.S. dollar (alternatively measured as the average appreciation between the period 2001–03 and the period 2004–12 or 2010–12, or as the maximum appreciation observed in any period in time between 2001 and 2012 during which the annual average exchange rate continued to appreciate), and ε_i is an error term.

In this different exercise—relative to the one conducted in Chapter 2—we run a pooled cross-sectional regression on country averages, instead of panel data estimates on annual data, because our focus here is on the factors that facilitate de-dollarization over the medium term. This is because dollarization tends to be sluggish and responds to changes in

policies and other variables with long and variable lags. A cross-sectional regression on averages also removes the noise produced by short-term fluctuations in exchange rates and other temporary factors that are not relevant for the purposes of this analysis.⁴¹

As can be seen in Table 3.3, the initial dollarization rate has a significant positive impact on de-dollarization (the impact of other initial variables, instead, is not statistically significant). After 2003, real GDP growth, inflation, and the fiscal balance have a significant impact on de-dollarization, with the expected sign (negative for inflation and positive for the other variables). De-dollarization is also significantly positively correlated with nominal exchange rate appreciation, but this variable is not significant when the other policy variables are included, suggesting that it acts as a proxy that captures the effects of low inflation and a sound fiscal balance.⁴² Altogether, these variables explain about 70 percent of the cross-country variance in the dependent variable.

The model has a strong predictive power. Figure 3.2 shows the relation between actual dollarization rates in the period 2010–12 and the rates predicted by the model. The model correctly predicts success in all countries that actually de-dollarized except Turkey and Mozambique,⁴³ and incorrectly predicts success in no more than six unsuccessful countries,⁴⁴ returning (in different specifications) between 28 and 30 correct predictions out of 38 cases considered (Table 3.3). Guided by these results, we ran a series of Probit regressions using the same explanatory variables to estimate the probability of de-dollarization. We consider the model to predict “success” whenever it returns an estimated probability of de-dollarization equal or higher than 50 percent.

⁴¹ About 70 percent of the variance of the dependent variable is across countries, and only 30 percent within countries. Panel data estimates obtained running the same model of Table 3.3 on annual data explains only about 25 percent of the total variance, and has a poor fit.

⁴² Real GDP growth, inflation, and the fiscal balance explain 54 percent of the cross-country variance in nominal exchange rate appreciation after 2003.

⁴³ The model incorrectly predicts that Turkey’s dollarization rate would decline only marginally, from 50 percent in 2001–03 to 43–45 percent in 2010–12, whereas in fact it declined below 30 percent. Mozambique’s dollarization rate is projected to remain broadly constant at about 50 percent, or decline marginally to 44 percent, depending on the specification, while it actually declined to 34 percent.

⁴⁴ This group includes Nicaragua and Cambodia and, depending on the specification, Armenia, Bosnia and Herzegovina, Croatia, Macedonia, and Vanuatu. The dollarization rate in Cambodia and Nicaragua remained broadly constant at about 90 percent, whereas the model predicts a decline to 65–75 percent in both countries. In Vanuatu the model actually *underpredicts* the reduction in deposit dollarization; nevertheless, Vanuatu failed to meet our criterion for de-dollarization as its share of foreign currency loans on total bank loans increased over time. In the other countries, the dollarization rate declined more modestly than predicted by some specifications of the model.

Figure 3.3. Actual and Predicted Average Dollarization Rates, 2010–12

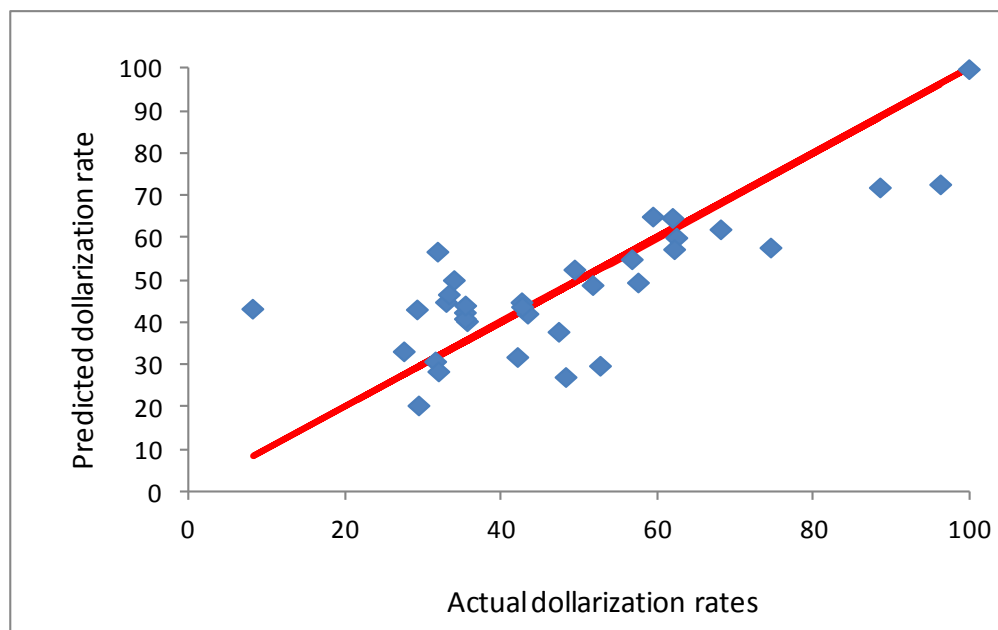


Table 3.3. Pooled Cross-Sectional Regressions¹

| Explanatory variables (in percent of GDP unless otherwise indicated) | OLS estimates | | | |
|--|---------------|-----------|----------|------------|
| Constant | 0.255 | -0.985 | -10.063 | -20.662*** |
| Initial dollarization rate (in percent) | 0.294* | 0.343*** | 0.415*** | 0.543*** |
| Real GDP growth after 2003 (in percent) | 0.803 | 2.187** | -- | -- |
| Average inflation rate after 2003 (in percent) | -1.244 | -2.196*** | -- | -- |
| Average current account balance after 2003 | 0.323 | -- | -- | -- |
| Average fiscal balance after 2003 | 2.813 | 1.984** | 2.194** | -- |
| Average stock of external debt after 2003 | -0.029 | -- | -- | -- |
| Average stock of public debt after 2003 | 0.130 | -- | -- | -- |
| Average democracy index after 2003 | 0.114 | -- | -- | -- |
| Average nominal exchange rate appreciation ² | 4.361* | -- | 7.142*** | 7.069*** |
| R ² | 0.706 | 0.644 | 0.647 | 0.582 |
| Variable deletion F-test | -- | 1.08 | 0.64 | 1.41 |
| Number of observations | 34 | 38 | 37 | 37 |

¹Dependent variable: average dollarization rate in the period 2001-03 minus average dollarization rate in the period 2010-12.

²Difference between the average values before 2004 and after 2003 (in logarithms)

Table 3.4. Pooled Cross-Sectional Probit Estimates of the Probability of De-Dollarization

| Explanatory variables (in percent of GDP unless otherwise indicated) | Probit estimates | | | |
|--|------------------|----------|----------|---------|
| Constant | -2.536 | -1.683 | -1.331 | -2.597 |
| Initial dollarization rate | 0.015 | 0.015 | 0.020 | 0.034 |
| Real GDP growth after 2003 (in percent) | 0.298 | 0.281 | -- | -- |
| Average inflation rate after 2003 (in percent) | -0.089 | -0.110 | -- | -- |
| Average current account balance after 2003 | -0.016 | -- | -- | -- |
| Average fiscal balance after 2003 | 0.437 | 0.403 | 0.369 | -- |
| Average democracy index after 2003 | 0.095 | -- | -- | -- |
| Average nominal exchange rate appreciation ¹ | 1.259 | -- | 1.089 | 0.606 |
| Log-likelihood | -10.119 | -11.762 | -12.695 | -16.771 |
| Likelihood ratio test | 21.64*** | 22.20*** | 17.79*** | 9.64*** |
| Number of observations | 35 | 38 | 37 | 37 |
| Correct predictions ² | 31 | 33 | 32 | 28 |
| False positives | 2 | 2 | 2 | 3 |
| False negatives | 2 | 3 | 3 | 6 |
| Total positives predicted | 10 | 10 | 9 | 7 |

¹Difference between the average values before 2004 and after 2003 (in logarithms).

²An estimated probability higher than 50% is considered a prediction of success (positive), while an estimated probability below 50% is considered a prediction of unsuccess (negative).

As shown Table 3.4, the model returns between 28 and 33 correct predictions (under different specifications) out of 38 cases. The most accurate predictions (returning 33 correct outcomes out of 38) are obtained using a parsimonious specification that includes (besides the initial value of dollarization) the average values of growth, inflation, and the fiscal balance after 2003. The Probit model fails to predict the de-dollarization of Turkey and Mozambique (estimating their probability of success at less than 20 percent) and (marginally, in some specifications) Uruguay; if only the initial dollarization rate and the exchange rate appreciation are included among the explanatory variables, the model also incorrectly predicts that Angola, Kazakhstan, Paraguay, and Peru would fail to de-dollarize, which suggests that in these countries the exchange rate appreciation contributed only marginally to de-dollarization.⁴⁵ Conversely, the model incorrectly predicts success (depending on the specification) for Cambodia, Nicaragua, Vanuatu, Mongolia, and (in the specification that only includes the initial dollarization rate and exchange rate appreciation) Armenia.

⁴⁵ The model estimates the probability of success at 40 percent for Angola, 17 percent of Kazakhstan, 39 percent for Paraguay, and slightly less than 50 percent for Peru.

Altogether, these results confirm that high growth and sound fiscal and monetary policies (low inflation and a moderate fiscal deficit) are critical factors for a successful de-dollarization. Exchange rate appreciation helps but is not, in itself, critical, and seems to be mostly an outcome of sound policies. Remarkably, a stronger current account balance does not appear to have a significant impact on de-dollarization, but this could be due to multicollinearity with other explanatory variables.⁴⁶

C. Key Ingredients for a Successful De-Dollarization

Macroeconomic Policies

A sustained and credible macroeconomic stabilization is crucial. Sound macroeconomic policies are a critical ingredient for success. In the case studies reviewed above, countries that de-dollarized have significantly reduced inflation and improved their fiscal stance. The cross-sectional empirical analysis confirms that low inflation and a sound fiscal balance are critical factors of success.

These results are not surprising. Low inflation reduces the need to hold liquid balances in foreign currencies to preserve their purchasing power; fiscal consolidation reduces the government's need to borrow in foreign currency and to resort to inflationary financing from the central bank; a stronger fiscal balance can also encourage local investors to purchase longer-term government bonds in local currency, facilitating the extension of the yield curve and the development of the local financial market, which—as discussed below—reduces the need to hold foreign currency for portfolio diversification purposes.

Financial Liberalization and Market Development

The evidence from case studies also shows that liberalizing the domestic banking system and developing the domestic financial system facilitates de-dollarization. Liberalization encourages de-dollarization by removing distortionary direct controls or constraints that discourage the use of the local currency. Financial innovations such as the introduction of hedging instruments and indexed local currency bonds reduces the need to use foreign currencies to hedge against currency or inflation risk.

Other technical financial improvements also help. Efficient liquidity management by the central bank makes the local currency more attractive by dampening the volatility of short-term interest rates. The issuance of medium- and long-term government bonds in local currency can promote financial sector development by extending the domestic yield curve, which provides a benchmark to potential investors (facilitating the issuance of local currency bonds by private enterprises) and a matching asset for long-term local currency credit

⁴⁶ Real GDP growth, inflation, and the fiscal balance explain 64 percent of the cross-country variance in the current account balance after 2003.

(encouraging bank lending in local currency). The development of an interbank market in local currencies (for example, through the issuance by the central bank of negotiable certificates of deposit and repurchase agreements as collateral for interbank lending) also promotes financial sector development. A well-functioning foreign exchange market backed by an adequate level of official reserves, by ensuring prompt access to foreign exchange, reduces the need to hold foreign exchange for precautionary reasons.

Appropriate Supervision and Prudential Regulation

The use of the local currency can also be encouraged by prudential measures that reduce banks' incentives to borrow and lend in foreign currencies, such as asymmetric reserve requirements and the provisioning for currency-induced credit risks. These measures provided a key contribution to the successful de-dollarization of several South American countries, such as Bolivia, Peru, Paraguay, and Uruguay.

A proper sequencing of policies is critical. Generally, the credibility of monetary policy needs to be reestablished as a first step. While this may take a long time, other market-based policies and measures promoting de-dollarization can be adopted during this period. Administrative measures that force de-dollarization have been taken in specific circumstances as part of a comprehensive and market-based stabilization strategy, but carry risks, including capital flight, disintermediation, and banking sector instability.

Concluding Remarks

The record in reducing dollarization in SSA countries is mixed. Dollarization has been more persistent in SSA than in the rest of the world and there have been few successful episodes of de-dollarization. From the five most dollarized economies (Democratic Republic of the Congo, Liberia, São Tomé and Príncipe, Angola, and Zambia) only Angola has recorded a downward trend in both the share of bank deposits and loans denominated in foreign currency in the period considered. The Democratic Republic of the Congo, Liberia, and São Tomé and Príncipe, by contrast, recorded an upward trend during the recent decade.⁴⁷

Overall, SSA has lagged behind other regions in reversing the dollarization process.

- Deposit dollarization in SSA countries has been relatively more stable than in other regions. It hovers around 30 percent, similar or above the level prevailing in other regions—except in the transition economies of Eastern Europe where reported dollarization levels are still much higher.
- Loan dollarization has increased in SSA while it has remained broadly stable or it has fallen in other regions. In 2001, 26 percent of the credit in SSA was denominated in foreign currencies. By 2012, this share had increased to 34 percent.

The results of this study confirm that inflation and/or nominal exchange rate depreciation are key drivers of dollarization, supporting the “currency substitution” argument that foreign currencies are used to hedge against inflation risk, in the absence of more sophisticated instruments. Portfolio considerations are also important. In SSA, in particular, dollarization is largely driven by demand, as bank customers tend to respond to relatively low interest rates on local currency deposits and high rates on local currency loans by holding deposits in foreign currencies and contracting loans in foreign currencies. Political instability, strong dependence on primary commodities exports, and limited financial market development also play a role in explaining the SSA dollarization record.

Altogether, the evidence in this study suggests that successful de-dollarization requires an appropriate mix of sound macroeconomic policies, market-based incentives, and microprudential measures. De-dollarization requires time and persistent, coordinated efforts. Success is usually the outcome of a sustained process of disinflation and stabilization, often supported by appropriate prudential efforts.

The countries around the world and in SSA that eventually managed to reduce significantly the use of foreign currencies generally implemented sound macroeconomic policies as well as microeconomic and prudential measures aimed at strengthening the financial system and

⁴⁷ Contrasting with the previous cases, Zambia presents a peculiar characteristic: a downward trend in deposits’ dollarization but an upward trend in loans’.

increasing the attractiveness of the local currency. Mandatory measures and direct controls have been useful only when they were used as a complement to a market-based strategy, and proved ineffective or worse, counterproductive, otherwise. Key elements of a successful de-dollarization strategy include:

1. **Restoring macroeconomic stability.** The most critical component of a de-dollarization strategy is bringing back confidence in the value of the domestic currency by implementing policies aimed at reducing inflation and making fiscal policy sustainable.
2. **Strengthening the prudential framework to reflect the risks from currency mismatches.** As an example, Bolivia introduced measures to reflect higher risks from unhedged foreign currency deposits, including a tax on financial transactions in U.S. dollars, higher reserve requirements for foreign currency deposits, and higher provisions for foreign currency loans. Israel and Uruguay also introduced higher prudential requirements for deposits in foreign currency. Within the SSA region, the example of Angola and São Tomé and Príncipe also shows the usefulness of implementing prudential measures that provide incentives to hold deposits in domestic currency and curb the growth of foreign currency loans.
3. **Pursuing a market-based rather than administrative approach to de-dollarization:** Bolivia and Peru's experiences provide a clear example of the superiority of market-based strategies. Both of these countries initially put in place forced de-dollarization strategies that led to capital flight and reduced financial intermediation. In contrast, the market-based de-dollarization strategies they implemented in later years succeeded in reducing dollarization levels and contributed to financial deepening.
4. **Facing the original sin challenge:** Developing a capital market with longer-term maturities in domestic currency can be challenging. Nonetheless, providing investment opportunities in domestic currency securities with medium- and long-term maturities and ensuring adequate rates of return can also increase incentives to move from dollar-denominated financial instruments, thereby contributing to de-dollarization.

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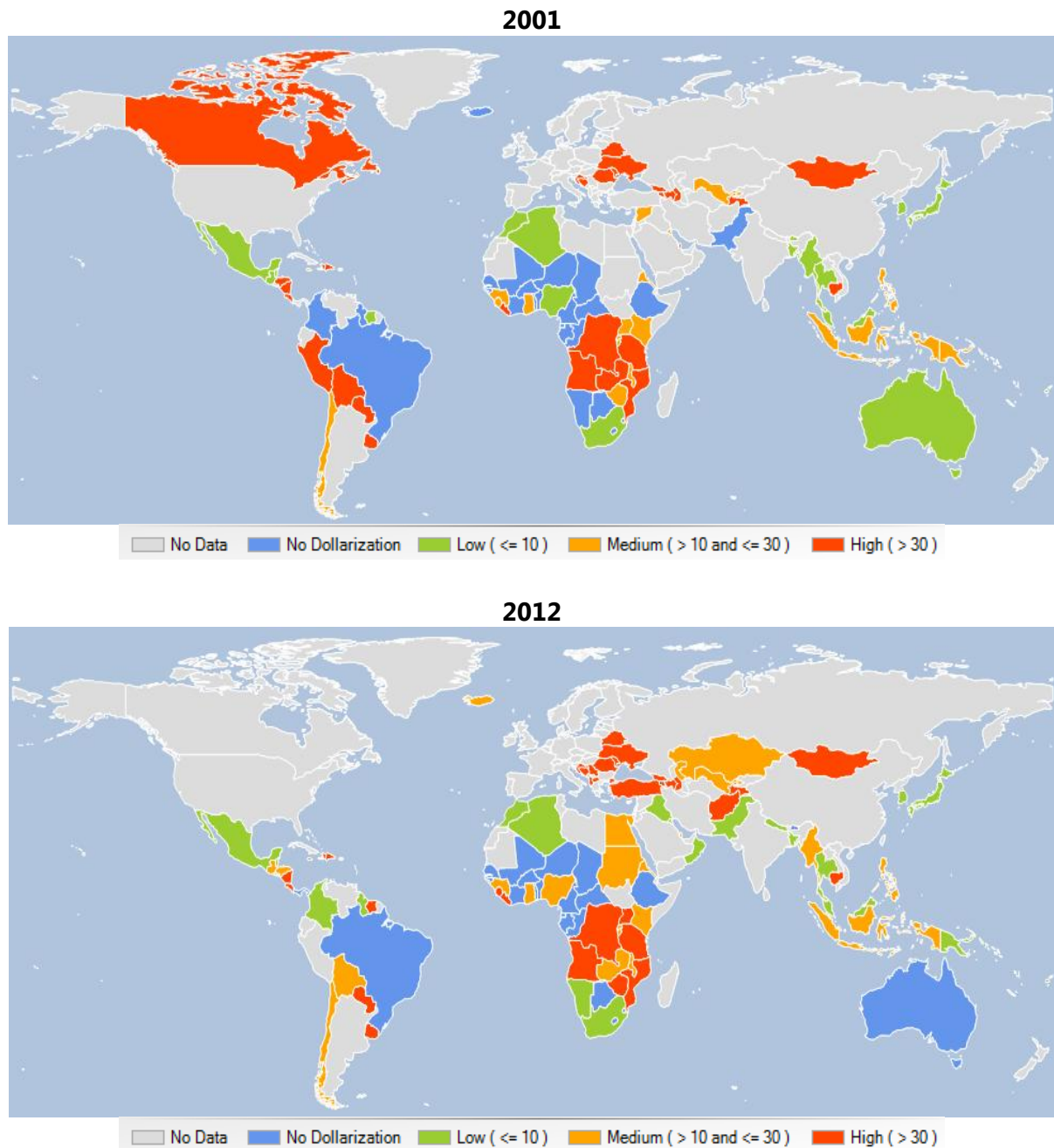
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Annex 1. World Dollarization Picture

Figure A.1. Deposits Dollarization, 2001 and 2012

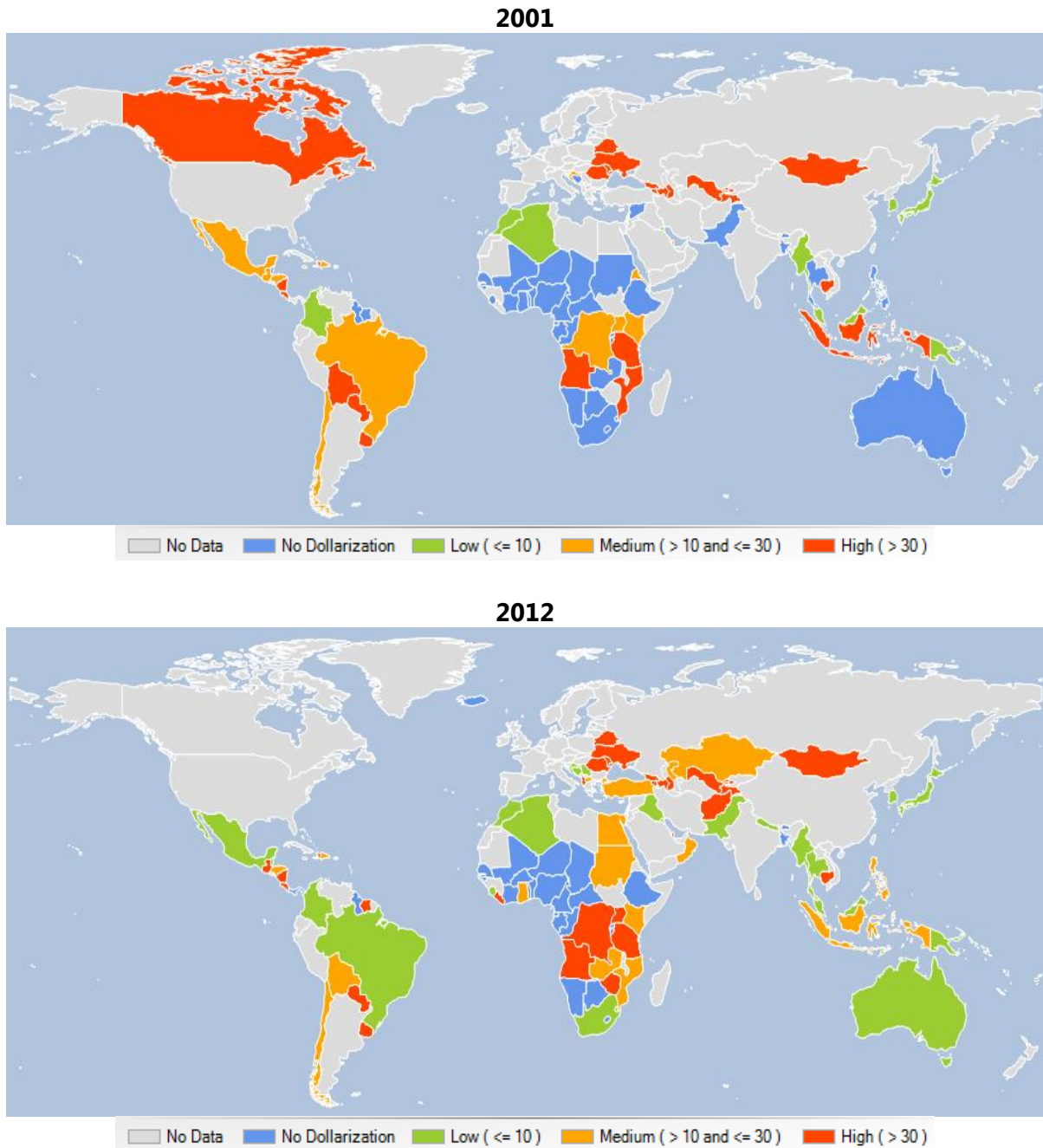
(Deposits in Foreign Currency over Total Deposits)



Source: International Financial Statistics (IFS) database, IMF.

Figure A.2. Loans Dollarization, 2001 and 2012

(Loans in Foreign Currency over Total Loans)



Source: International Financial Statistics (IFS) database, IMF

Table A.1. Dollarization, 2001–11*(Average ratios of deposits/loans in foreign currency over totals)*

| | Deposits | | | | Loans | | | |
|----------------------|----------|---------|-------------|-----|---------|---------|-------------|-----|
| | 2001-06 | 2007-11 | t-statistic | | 2001-06 | 2007-11 | t-statistic | |
| Angola | 74.0 | 57.6 | (4.78) | *** | 63.1 | 60.8 | (0.52) | |
| Benin | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Botswana | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Burkina Faso | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Burundi | 10.4 | 16.8 | (-5.01) | *** | .. | .. | .. | |
| Cameroon | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Cape Verde | 5.0 | 5.0 | (-0.06) | | .. | .. | .. | |
| Central African Rep. | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Chad | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Comoros | 0.9 | 0.2 | (2.09) | * | 1.2 | 0.5 | (1.27) | |
| Congo, Dem. Rep. of | 83.2 | 88.2 | (-2.01) | * | 65.0 | 88.5 | (-2.33) | ** |
| Congo, Republic of | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Cote d'Ivoire | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Equatorial Guinea | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Eritrea | 17.9 | 16.1 | (2.54) | ** | 17.1 | 0.0 | (9.64) | *** |
| Ethiopia | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Gabon | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Gambia, The | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Ghana | 29.2 | 26.4 | (2.09) | * | 19.0 | 27.3 | (-1.21) | |
| Guinea | 25.6 | 24.5 | (0.33) | | .. | .. | .. | |
| Guinea-Bissau | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Kenya | 16.3 | 16.5 | (-0.26) | | 14.4 | 16.0 | (-1.44) | |
| Lesotho | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Liberia | 86.8 | 87.7 | (-0.59) | | 72.3 | 83.2 | (-6.69) | *** |
| Madagascar | .. | .. | .. | | .. | .. | .. | |
| Malawi | 19.0 | 13.1 | (3.31) | *** | .. | .. | .. | |
| Mali | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Mauritius | 16.2 | 18.4 | (-1.05) | | 0.0 | 0.0 | .. | |
| Mozambique | 45.7 | 37.6 | (2.64) | ** | 47.0 | 28.1 | (3.81) | *** |
| Namibia | 0.3 | 0.7 | (-0.81) | | 0.0 | 0.0 | .. | |
| Niger | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Nigeria | 9.4 | 13.4 | (-2.21) | * | 0.0 | 0.0 | .. | |
| Rwanda | 25.9 | 19.4 | (4.02) | *** | 0.0 | 0.0 | .. | |
| Sao Tome & Principe | 54.3 | 61.4 | (-1.67) | | 51.2 | 71.0 | (-1.53) | |
| Senegal | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Seychelles | 4.7 | 27.4 | (-6.86) | *** | 9.5 | 31.7 | (-4.02) | *** |
| Sierra Leone | 28.4 | 35.4 | (-3.17) | ** | 0.0 | 0.1 | (-1.14) | |
| South Africa | 1.4 | 2.0 | (-1.80) | | 0.6 | 0.6 | (-0.12) | |
| Swaziland | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Tanzania | 40.4 | 33.4 | (5.62) | *** | 30.6 | 31.2 | (-0.40) | |
| Togo | 0.0 | 0.0 | .. | | 0.0 | 0.0 | .. | |
| Uganda | 29.1 | 29.2 | (-0.05) | | 22.7 | 25.0 | (-1.36) | |
| Zambia | 44.5 | 40.0 | (1.56) | | 33.5 | 36.58 | (-0.39) | |
| Zimbabwe | 26.5 | 94.9 | (-10.38) | *** | .. | .. | .. | |
| Albania | 32.5 | 44.9 | (-5.83) | *** | 76.1 | 68.8 | (3.30) | ** |
| Armenia | 68.7 | 54.3 | (1.99) | * | 64.8 | 48.4 | (2.94) | ** |
| Azerbaijan, Rep. of | 78.4 | 48.5 | (6.45) | *** | 67.5 | 40.4 | (5.31) | *** |
| Bangladesh | 1.8 | 1.9 | (-0.79) | | 0.0 | 0.0 | .. | |
| Barbados | 12.3 | 8.1 | (1.35) | | 0.0 | 0.0 | .. | |
| Belarus | 50.0 | 48.6 | (0.19) | | 45.2 | 32.0 | (3.07) | ** |
| Belize | 5.8 | 4.0 | (4.08) | *** | 0.9 | 8.4 | (-6.55) | *** |
| Bhutan | 4.0 | 4.1 | (-0.04) | | 0.0 | 0.0 | .. | |
| Bolivia | 83.5 | 44.9 | (6.68) | *** | 93.6 | 57.8 | (4.55) | *** |
| Bosnia & Herzegovina | 52.7 | 48.9 | (1.55) | | 1.8 | 8.5 | (-3.00) | ** |
| Brazil | .. | .. | .. | | 7.7 | 2.5 | (2.68) | ** |
| Brunei Darussalam | 0.0 | 7.7 | (-1.83) | *** | 0.0 | 0.5 | (-1.80) | |
| Cambodia | 96.1 | 97.0 | (-1.15) | | 94.7 | 97.6 | (-2.74) | ** |
| Canada | 26.9 | 41.3 | (-6.79) | *** | 33.7 | 38.8 | (-1.51) | |
| Chile | 10.5 | 14.4 | (-2.71) | ** | 10.3 | 9.9 | (0.37) | |
| Colombia | 0.0 | 0.0 | .. | | 6.1 | 6.5 | (-0.43) | |

In parenthesis student t-stadistic for the null hypothesis of difference between means equal zero

***, ** and * correspond to 0.01, 0.05 and 0.1 significance level respectively

Table A.1. Dollarization, 2001–11 (continued)

TABLE A.1. DOLLARIZATION, 2001-2011 (CONTINUED)
(average ratios of deposits/loans in fx over totals)

| | Deposits | | | Loans | | | | |
|----------------------|----------|---------|-------------|---------|---------|-------------|---------|-----|
| | 2001-06 | 2007-11 | t-statistic | 2001-06 | 2007-11 | t-statistic | | |
| Costa Rica | 44.9 | 45.4 | (-0.16) | 46.7 | 41.2 | (4.62) | *** | |
| Croatia | 63.9 | 59.7 | (1.08) | 9.5 | 8.5 | (1.00) | | |
| Dominica | 3.5 | 1.9 | (1.79) | 0.6 | 0.9 | (-0.66) | | |
| Dominican Republic | 36.7 | 33.4 | (2.08) | 21.9 | 15.9 | (2.07) | * | |
| Egypt | 29.5 | 22.2 | (3.81) | *** | 24.2 | 28.7 | (-3.18) | ** |
| Fiji | 5.4 | 3.9 | (1.72) | 1.1 | 2.5 | (-2.23) | * | |
| Georgia | 78.1 | 65.9 | (2.69) | ** | 79.1 | 68.0 | (4.71) | *** |
| Grenada | 6.5 | 6.7 | (-0.43) | 4.7 | 5.4 | (-0.76) | | |
| Guatemala | 24.2 | 30.3 | (-1.01) | 31.6 | 35.8 | (-1.00) | | |
| Guyana | 1.3 | 4.1 | (-4.81) | *** | 0.0 | 0.0 | .. | |
| Haiti | 48.0 | 54.6 | (-3.03) | ** | 50.0 | 54.2 | (-1.23) | |
| Honduras | 30.9 | 28.0 | (4.09) | *** | 24.7 | 23.4 | (0.80) | |
| Indonesia | 16.7 | 15.1 | (1.62) | 24.6 | 17.9 | (2.37) | ** | |
| Iraq | 21.8 | 6.2 | (3.69) | ** | 0.4 | 0.3 | (0.76) | |
| Jamaica | 32.9 | 36.9 | (-1.65) | 25.1 | 28.6 | (-1.60) | | |
| Japan | 0.7 | 0.9 | (-3.22) | ** | 0.6 | 0.9 | (-3.09) | ** |
| Kazakhstan | 41.9 | 35.5 | (1.92) | * | 49.3 | 40.1 | (3.31) | ** |
| Korea, Republic of | 2.0 | 2.1 | (-0.55) | 5.2 | 7.1 | (-2.38) | ** | |
| Kosovo | 3.4 | 5.2 | (-4.36) | ** | .. | .. | .. | |
| Kuwait | 11.3 | 9.2 | (2.01) | * | 1.7 | 8.2 | (-3.92) | *** |
| Kyrgyz Republic | 66.4 | 51.9 | (5.16) | ** | 71.0 | 63.2 | (7.55) | *** |
| Macedonia, FYR | 52.4 | 47.8 | (2.51) | ** | 21.2 | 24.2 | (-1.27) | |
| Malaysia | 2.2 | 4.1 | (-4.51) | *** | 1.7 | 2.3 | (-1.69) | |
| Maldives | 57.9 | 53.4 | (1.76) | 57.5 | 69.5 | (-4.67) | *** | |
| Mexico | 5.3 | 4.7 | (2.39) | ** | 8.7 | 6.7 | (1.83) | |
| Moldova | 46.2 | 44.3 | (0.97) | 40.2 | 43.2 | (-2.47) | ** | |
| Mongolia | 41.9 | 35.1 | (3.14) | ** | 40.0 | 32.3 | (4.45) | *** |
| Myanmar | 0.5 | 0.2 | (3.14) | ** | 0.8 | 0.4 | (3.68) | *** |
| Nepal | 7.2 | 6.5 | (1.44) | 1.1 | 1.9 | (-0.89) | | |
| Nicaragua | 93.9 | 89.1 | (7.79) | *** | 100.0 | 100.0 | (1.33) | |
| Pakistan | 2.5 | 7.6 | (-2.92) | ** | 0.5 | 2.0 | (-2.13) | * |
| Papua New Guinea | 8.8 | 10.7 | (-1.59) | 6.9 | 4.7 | (1.87) | * | |
| Paraguay | 58.8 | 34.5 | (6.20) | *** | 45.1 | 34.1 | (3.90) | *** |
| Peru | 71.4 | 24.6 | (6.39) | *** | .. | .. | .. | |
| Philippines | 28.1 | 21.9 | (7.02) | *** | 2.2 | 12.9 | (-4.25) | *** |
| Qatar | 32.9 | 20.8 | (3.06) | ** | 23.6 | 28.9 | (-0.99) | |
| Romania | 36.9 | 35.4 | (0.64) | 56.6 | 58.2 | (-0.52) | | |
| Samoa | 4.4 | 3.1 | (1.59) | 0.0 | 6.2 | (-15.35) | *** | |
| Serbia, Republic of | 62.9 | 69.1 | (-2.15) | * | 24.8 | 6.0 | (4.00) | *** |
| Solomon Islands | 2.5 | 5.2 | (-1.35) | 0.0 | 0.0 | .. | | |
| St. Kitts and Nevis | 21.9 | 18.9 | (1.81) | 4.8 | 4.9 | (-0.21) | | |
| St. Lucia | 3.4 | 4.4 | (-0.74) | 9.8 | 20.6 | (-5.02) | *** | |
| St. Vincent & Grens. | 2.4 | 4.6 | (-3.83) | *** | 0.4 | 2.3 | (-6.80) | *** |
| Suriname | 45.5 | 54.2 | (-0.85) | 41.0 | 42.9 | (-0.21) | | |
| Syrian Arab Republic | 11.7 | 23.7 | (-4.29) | *** | 0.0 | 2.6 | (-3.59) | *** |
| Tajikistan | 57.9 | 61.6 | (-0.78) | 64.4 | 60.5 | (0.82) | | |
| Thailand | 0.9 | 1.3 | (-2.48) | ** | 2.3 | 2.7 | (-0.37) | |
| Tonga | 8.9 | 4.5 | (2.47) | ** | 6.1 | 3.5 | (1.65) | |
| Trinidad and Tobago | 26.6 | 29.3 | (-1.09) | 8.3 | 20.6 | (-2.20) | * | |
| Turkey | 42.0 | 30.2 | (2.99) | ** | 21.3 | 14.8 | (1.51) | |
| Ukraine | 34.3 | 41.5 | (-2.85) | ** | 41.3 | 48.1 | (-2.25) | * |
| Uruguay | 85.0 | 71.7 | (6.23) | *** | 63.7 | 54.7 | (3.75) | *** |
| Uzbekistan | 30.6 | 22.4 | (5.09) | *** | 76.2 | 40.8 | (8.95) | *** |
| Vanuatu | 63.5 | 44.9 | (4.14) | *** | 12.3 | 15.6 | (-1.09) | |

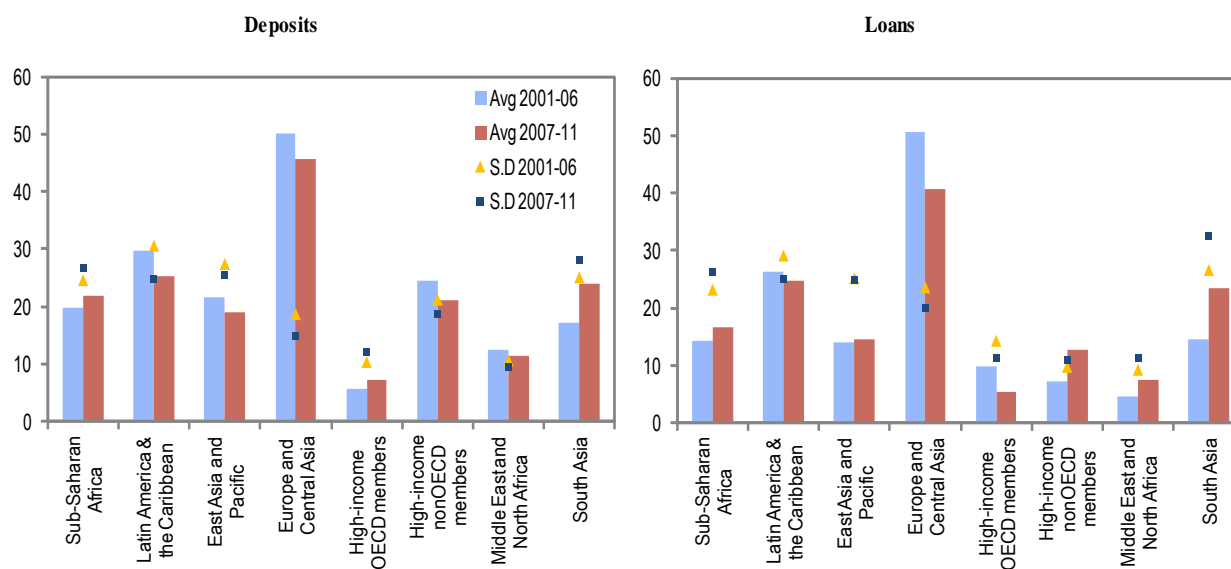
In parenthesis student t-stadistic for the null hyphotesis of difference between means equal zero

***, ** and * correspond to 0.01, 0.05 and 0.1 significance level respectively

Table A.2. Dollarization Levels by Region

| (average of ratios of deposits/loans in fx over totals) | | | | | | | | | | |
|---|----------|------|---------|------|-------------|---------|------|---------|------|-------------|
| | Deposits | | | | | Loans | | | | |
| | 2001-06 | S.D | 2007-11 | S.D | t-statistic | 2001-06 | S.D | 2007-11 | S.D | t-statistic |
| Sub-Saharan Africa | 19.9 | 24.6 | 21.8 | 26.7 | (-0.74) | 14.2 | 23.2 | 16.6 | 26.2 | (-0.89) |
| Latin America & the Caribbean | 29.8 | 30.6 | 25.2 | 24.8 | (1.31) | 26.3 | 29.1 | 24.6 | 25.0 | (0.48) |
| East Asia and Pacific | 21.6 | 27.4 | 19.0 | 25.5 | (0.60) | 14.1 | 25.2 | 14.5 | 24.8 | (-0.10) |
| Europe and Central Asia | 50.1 | 18.6 | 45.7 | 14.9 | (1.69) * | 50.6 | 23.6 | 40.7 | 20.1 | (2.86) *** |
| High-income OECD members | 5.6 | 10.3 | 7.2 | 12.1 | (-0.53) | 9.9 | 14.3 | 5.4 | 11.3 | (1.17) |
| High-income nonOECD members | 24.5 | 21.2 | 21.0 | 18.7 | (0.74) | 7.2 | 9.8 | 12.6 | 10.9 | (-2.19) ** |
| Middle East and North Africa | 12.4 | 10.6 | 11.4 | 9.4 | (0.35) | 4.7 | 9.2 | 7.5 | 11.3 | (-0.93) |
| South Asia | 17.1 | 25.1 | 24.0 | 28.1 | (-1.00) | 14.6 | 26.6 | 23.3 | 32.5 | (-1.14) |

Figure A.3. Loan and Deposit Dollarization by Region



Annex 2. Measures to Mitigate Dollarization

Durable de-dollarization relies on a credible disinflation plan and specific microeconomic (market-based) measures that facilitate financial sector development, increase the attractiveness of the local currency, and internalize risks associated with the use of foreign currencies, such as:

Measures aimed at facilitating the development of the local financial market

- *Strengthening the payments system and enhancing the usability of the local currency.* Dollarization often reflects the inadequacy of the domestic payments system in local currency. Addressing these deficiencies can encourage residents to enlarge their use of the local currency, build up credibility, and enhance confidence in the local currency.
- *Strengthening the central bank liquidity management and instruments.* The use of the local currency can be made more attractive through a set of measures involving the central bank, which include: (1) imposing higher reserve requirements for foreign currency than for local currency; (2) strengthening the monetary transmission channels by introducing longer maturities, medium-term government bonds in local currency, and developing a benchmark yield curve; and (3) developing a foreign exchange market that reduces the need to hold precautionary foreign currency balances.
- *Developing domestic financial market and retail banking.* Dollarization sometimes stems from the lack of liquid financial instruments (and markets) in local currency. In such situations, the issuance of local currency-denominated securities or assets should help develop domestic liquid monetary and capital and bond markets. Greater incentives to tap into retail banking should also enhance the potential for de-dollarization since most retail transactions are denominated in local currency.
- *Strengthening fiscal and public debt management.* Fiscal prudence and consolidation, coupled with the issuance of local currency-denominated bonds, would help de-dollarize the government's balance sheet by reducing the need for the government to borrow in foreign currency. Foreign aid ought to be absorbed in local currency and taxation designed so that it does not discriminate in favor of foreign currencies.

Measures aimed at increasing the attractiveness of the local currency

- *Creating an interest rate wedge.* The substitution between foreign currency and local currency can be encouraged by positive interest differentials that provide a higher remuneration to deposits in local currency; this has, however, in some cases, encouraged excessive and potentially destabilizing capital inflows.

Measures aimed at internalizing the risks associated with the use of foreign currencies

- *Implementing effective supervision and prudential regulations.* An enhanced regulatory compact can effectively encourage de-dollarization through the internalization of the risks of doing business in foreign currency. For instance, in many countries, banks lending in foreign currency to nonexporters have to abide by stricter regulatory requirements and to set up higher provisions.
- *Excluding foreign currency deposits from deposit insurance schemes.*

Concerning direct and administrative controls, some countries have tried different measures, including forced de-dollarization, such as:

- *Imposing higher reserve requirements on foreign currency.* Measures aimed at either remunerating reserve requirements on local currency deposits at a higher rate or at imposing higher reserve requirements on foreign currency deposits may increase the deposit rate differential but also complicate banks' management of net open positions (such as, Bolivia, Honduras, Israel, and Nicaragua).
- *Mandating the use of local currency in domestic transactions.* This measure has been widely adopted in many countries, and can be either limited to tax payments and transactions involving the government and other public entities or can be applied to all transactions between, or involving, residents (such as, Israel, Lao P.D.R., and Peru).
- *Introducing regulatory discrimination against the use of foreign currency.* Supervisory authorities can encourage the use of the local currency by imposing limits on foreign currency borrowing and lending (such as, Angola, Argentina, Israel, Turkey, and Vietnam).

Forced de-dollarization

- *Mandating the conversion of foreign currency obligations and balances into domestic currency.* Some countries (such as, Bolivia, Mexico and Peru) have attempted to use this measure but reversed it after it triggered capital flight and reduced financial intermediation.