

Working paper

# Dollarization in Tanzania

Empirical Evidence  
and Cross-Country  
Experience



International  
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## **Abstract**

The use of U.S dollar as unit of account, medium of exchange and store of value in Tanzania has raised concerns among policy makers and the general public. This paper attempts to shed some light on the key stylized facts of dollarization in Tanzania and the EAC region. We show that compared to other EAC countries, financial dollarization in Tanzania is high, but steadily declining. We also present some evidence of creeping transaction dollarization particularly in the education sector, apartment rentals in some parts of major cities and a few imported consumer goods such as laptops and pay TV services. An empirical analysis of the determinants of financial dollarization is provided for the period 2001 to 2009. Based on the findings and drawing from the experience of other countries around the world, we propose some policy measures to deal with prevalence of dollarization in the country.

### **Acknowledgment:**

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## 1. Introduction

One of the most notable effects of the recent financial sector liberalization in Tanzania is the increased use of foreign currency (notably the U.S dollar) as a way of holding wealth and a means of transaction for goods and services by the domestic residents. This phenomenon (referred to in literature as dollarization) has gained ground in Tanzania since the initiation of economic liberalization from centrally planned to a market based system in early 1990s<sup>1</sup>. As part of financial sector reforms, commercial banks were allowed to open foreign currency deposit accounts to both residents and non residents in the third quarter of 1992. Immediately, foreign currency deposits accounted for about 5 percent of broad money but this rose sharply to about 15 percent within a year and maintained an average annual increase of around 2 percentage points per annum, reaching a peak of about 33.5 percent in 2003. In absolute terms, foreign currency deposits in 1992 stood at Tsh 16,957 million but rose sharply to Tsh 306,606 million in 2000 and in December 2009 the total private foreign currency deposits in the banking system was Tsh 2,158,834 million (about US\$1.6 billion), equivalent to two months' worth of imports and about 7.5 percent of GDP.

Along with this increase in foreign currency deposits, it has also become a common practice for some businesses and households to use the U.S. dollar as medium of exchange in preference of the Shilling. This tendency is more prevalent in parts of the urban service sector including real estate and private schools, and to a less extent in retail sector – mainly high value imported consumer goods such as computers and automobiles. There is evidence that a few private schools do not accept payments in Tanzanian shillings. Others quote prices in dollar and stand ready to accept equivalent of shillings, but the exchange rate quoted is typically significantly above the market rate, “forcing” the buyers of such services to pay in dollars. As a reflection of increased transaction dollarization, the value of U.S dollar checks processed at the clearing house has increased significantly since 2005 (Figure 3.3).

The growing tide towards the use of US dollar as a medium of exchange in the country has raised concerns among policy makers and the general public in Tanzania. For example, in the 2007 budget parliamentary session, members of parliament expressed concerns about this tendency and demanded Government intervention to curb the growing dollarization of the Tanzanian economy. Consequently, the Finance minister issued a Government statement in the parliament directing business community to quote prices of goods and services in Tanzanian shilling<sup>2</sup>. In June 2008 concerns about quoting prices and carrying out domestic transactions in foreign currency by some businesses were again raised in parliament.<sup>3</sup> Such concerns have also been in the front pages of many local news papers and recently the Finance and Economic Affairs Deputy Minister made remarks to the effect that extensive use of dollars in domestic transactions is weakening the Tanzanian shilling (Guardian on Sunday – 13th June 2010)<sup>4</sup>.

There are various reasons why policy makers may have cause to worry about the increased dollarization of the economy. First is the stability of financial sector. If a significant part of the financial system is dollarized, there are two major risks to financial sector stability: liquidity risk and solvency risk. The liquidity risk associated with foreign currency deposits is qualitatively different from that of domestic currency deposits. For domestic currency deposits, the central bank can step in as lender of last resort, since it can create domestic currency in case of emergency. For foreign currency deposits, international reserves are the only buffer that exists to stem a liquidity crisis, thereby limiting the central bank's scope for taking preventative measures. The other risk that policy makers should be concerned about is the solvency risk arising from potential currency mismatch. In the event of a large depreciation of local currency, dollar debtors

<sup>1</sup> The pre-liberalization period was characterized by far reaching foreign exchange restrictions which among others, required that all foreign exchange receipts be surrendered to the central bank. However, there is a strong evidence to suggest that foreign exchange transactions were carried out illegally on the black market – where the exchange rate was way above the official rate.

<sup>2</sup> Details available on <http://www.mof.go.tz/mofdocs/news/speeches/TAMKO.pdf>

<sup>3</sup> [http://parliament.go.tz/bunge/parl\\_answer.php?page=Nuwum\\_quest=19&totalRows\\_quest=59&memberid=1343](http://parliament.go.tz/bunge/parl_answer.php?page=Nuwum_quest=19&totalRows_quest=59&memberid=1343)

<sup>4</sup> [www.ippmedia.com/frontend/index.php?i=17740](http://www.ippmedia.com/frontend/index.php?i=17740)

whose receipts are in local currency may be unable to service their bank loans which would potentially lead to banking crisis. In addition, dollarization reduces the ability of central banks to raise revenue from money creation. In economies where the demand for money is growing, the revenue thereby foregone may be substantial. Also the use of foreign currency as means of exchange in the non-tradable sector may potentially amplify the magnitude of exchange rate pass through to domestic prices – making it harder for the monetary authority to control inflation through monetary targeting. Widespread transaction dollarization will likely increase demand for dollars in the economy to finance domestic transactions which would otherwise be financed by domestic currency, which will in turn put pressure on exchange rate, weakening the domestic currency (which may further increase the demand for dollars).

Despite these concerns, there is no study, to our knowledge, which has attempted to investigate the use of foreign currency and its implication to macroeconomic management in Tanzania. The objective of this study is to shed some light on the extent of dollarization in Tanzania and possible policy options that may be adopted by the authorities to attenuate its potential harmful effects. Specifically, we study the process of dollarization in East African countries and compare the trends of dollarization with those of Tanzania. We then provide empirical evidence on the determinants of dollarization in Tanzania and assess the implication of dollarization in macroeconomic policy management. Finally, based on the findings of the study and drawing from the experiences of other countries around the world, we propose specific policy measures to deal with the prevalence of dollarization in Tanzania.

## 2. Dollarization: definition and measurement

Dollarization does not refer just to the United States dollar. It is a generic term used to characterize the use of any foreign currency that effectively serves as a replacement for national currency. The substitute currency is typically the currency of a major trading partner or an important industrial power with a reputation of a sound monetary policy. Meyer (2000) distinguishes three types of dollarization. First is **official dollarization** which means a complete replacement of the domestic currency by a foreign currency. In this case the chosen foreign currency becomes a legal tender, and plays the three fundamental roles of domestic currency namely, store of value, means of payment and unit of account. Examples of countries which have abandoned their local currency and adopt another currency include Panama and Ecuador. Second is **official semi-dollarization** which refers to a situation where both domestic and foreign currencies are freely used in the domestic economy – the foreign currency becomes a legal tender but the country also issues its own currency. This is for instance the case with Lesotho and Swaziland, where South African rand is officially accepted as legal tender alongside with domestic currencies. Most of countries that opt for official or semi-official dollarization are either small countries that rely on large neighboring economies for much of their income and their imports (Swaziland and Lesotho) or countries that suffer from macroeconomic mismanagement leading to hyper inflation rates (Ecuador and Zimbabwe). There is a consensus in the literature that both official dollarization and official semi-dollarization can succeed in fighting hyper inflation and bring about economic stabilization. For example, in Ecuador annual inflation rate declined from over 90 percent in 2000 when the country officially replaced its currency with the U.S. dollar, to a single digit in 2002. Similarly, following the adoption of South African Rand and the US dollar as a legal tender in Zimbabwe in January 2009, inflation rate declined from 231,150,889 percent in January 2008 to an annual average of 6.5 percent in 2009. In case of full dollarization, where foreign currency replaces the domestic currency, authorities can no longer finance Government deficit through money printing (a major source of inflation) while for semi dollarization (as it is the case with currency board arrangement), the ability of the monetary authority to print more money is highly limited because an increase in the domestic money supply must be backed by foreign currency reserves. In this case, domestic monetary authorities can only increase money supply if they generate more foreign exchange by running a balance of payments surplus. With

official dollarization, all seigniorage revenue accrues to the issuer of the currency, while official semi-dollarization arrangement allows monetary authorities to earn some seigniorage in addition to interest income on the foreign currency reserves that back the domestic currency issue.

The final form is **unofficial dollarization** which means that foreign currency is widely used in private transactions (as a unit of account, a medium of exchange and as a store of value) but the local currency remains the only legal tender. Many countries, including Tanzania, fall into this category. De Nicolo et al. (2005) define three generic types of unofficial dollarization based on the three functions of money: i) **transaction dollarization** (also known as currency substitution) which is the use of foreign currency for transaction purposes, ii) **financial dollarization** (also referred to as asset substitution) which consist of residents' holdings of financial assets or liabilities in foreign currency and iii) **real dollarization** which is the indexing of local prices and wages to the foreign currency. This study is limited to unofficial dollarization, particularly the aspects of financial and transaction dollarization<sup>5</sup>.

## 2.1 Measure of unofficial dollarization

Conceptually, the degree of unofficial dollarization is measured by the stock of foreign currency held by domestic residents which includes foreign currency deposits (FCD) in the domestic banking system, foreign currency in circulation (FCC) within the domestic economy and the offshore deposits (OSD) held by the domestic residents at foreign banks. Currently offshore banking is legally prohibited in Tanzania, although given the recent progress in information and communication technology (ICT) in the context of globalization it is quite possible for some residents to open and maintain offshore accounts. For example, the Bank of International Settlement (BIS) reports indicate that Tanzanian residents' outstanding offshore deposits exceed those of residents of countries with full liberalized capital accounts, such as Zambia, Uganda and Rwanda. However, offshore deposits are not included in the various measures of dollarization used in this study for two reasons. First, while dollarization refers to the holding of foreign currency by domestic residents, the BIS report does not distinguish the offshore deposits by Tanzanians in the Diaspora, which should not count towards dollarization. Second, offshore deposits are not intermediated in the domestic economy, and as such their exclusion may not bias the measures of domestic dollarization.

Data on foreign currency deposits (FCD) is, in most cases, readily available and so much of the dollarization literature has focused on various ratios that use combination of foreign currency deposits, local currency deposits and money supply, broadly defined. Measures commonly used include foreign currency deposits as a ratio of local currency deposits (FCD/LCD), the ratio of foreign currency deposits to total deposits (FCD/(FCD+LCD)), the ratio of foreign currency to broad money supply (FCD/M2) and the ratio of foreign currency to extended broad money (FCD/M3)<sup>6</sup>.

By contrast, it is extremely difficult to measure the amount of foreign currency held by domestic residents in the form of cash (FCC) since no domestic institution is responsible for its issue. At best, foreign currency in circulation can only be estimated. A number of approaches have been proposed in the literature. For example, Kamin and Ericsson (2003) estimated foreign currency in circulation in Argentina by aggregating the net inflows of U.S. dollars based on the data obtained from the Currency and Monetary Instruments Reports (CMIR) of the U.S Treasury Department which documents the flow of U.S. currency between the U.S. and foreign countries. Also Feige et al. (2002) used these data to estimate the foreign currency circulating in Latin America and transition economies.

Erasmus *et al.* (2009) propose a method of estimating foreign currency in circulation based on the assumption that local currency money multiplier is identical to foreign currency money multiplier. The estimation procedure proceeds as follows: Money supply (M) is given by currency in

<sup>5</sup> In the context of this study, the term dollarization refers to unofficial dollarization.

<sup>6</sup> See for example Ize and Yeyati (2003), Martinez and Werner (2002), Gruben and Welch (1996).

circulation (CC) plus total deposits (TD). Letting  $f$  denotes foreign and  $l$  denotes local, then the foreign and local components of money supply can be represented as:

$$M^l = CC^l + TD^l$$

$$M^f = CC^f + TD^f$$

Likewise reserve money (B) defined as currency in circulation plus total reserves (R) can be presented as

$$B^l = CC^l + R^l$$

$$B^f = CC^f + R^f$$

The money multiplier (m) is given by the ratio of money supply to reserve money  
i.e.  $m = M/B$

$$m^l = (CC^l + TD^l)/(CC^l + R^l)$$

$$m^f = (CC^f + TD^f)/(CC^f + R^f)$$

There are two unobservable elements in these final expressions, foreign currency in circulation and the money multiplier for foreign currency. Erasmus et al make the assumption that the multipliers for the two currencies are identical. Thus  $m^l = m^f$ , which allows the two equations to be solved for foreign currency in circulation ( $CC^f$ ):

$$CC^f = [(m^l * R^f) - TD^f]/[1 - m^l]$$

Erasmus *et al.* 2009 used this method to estimate foreign currency in circulation for Liberia and concluded that the amount of U.S. dollar circulating in Liberian economy in 2007 was about nine times higher than domestic currency in circulation. As we point out below, however, this method depends entirely on the plausibility of the assumption that the domestic and foreign currency multipliers are equal.

Another method that has been used in the literature to estimate foreign currency in circulation is the denomination displacement method proposed by Feige et al. (2002). The thrust of this method is the hypothesis that foreign currency is typically used in *large ticket* transactions such as purchase of houses, automobiles and high value consumer durables<sup>7</sup>. Feige et.al 2002 argues that countries that are heavily dollarized will have domestic currency denomination structure that is skewed away from higher denomination domestic bills. This would occur as higher foreign currency denominations substitute for higher denominations of domestic currency. Foreign currency in circulation could therefore be estimated indirectly as a cumulative value of the reduction in higher denominations of domestic currency in circulation. Feige et al. applied this method to the Croatian data but did not find evidence of denomination displacement. In section 3.2 we attempt to estimate foreign currency in circulation for the EAC countries using the methods described above.

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<sup>7</sup> In the absence of foreign currency holding by domestic residents, high denomination of domestic currency would be used in these big ticket items.

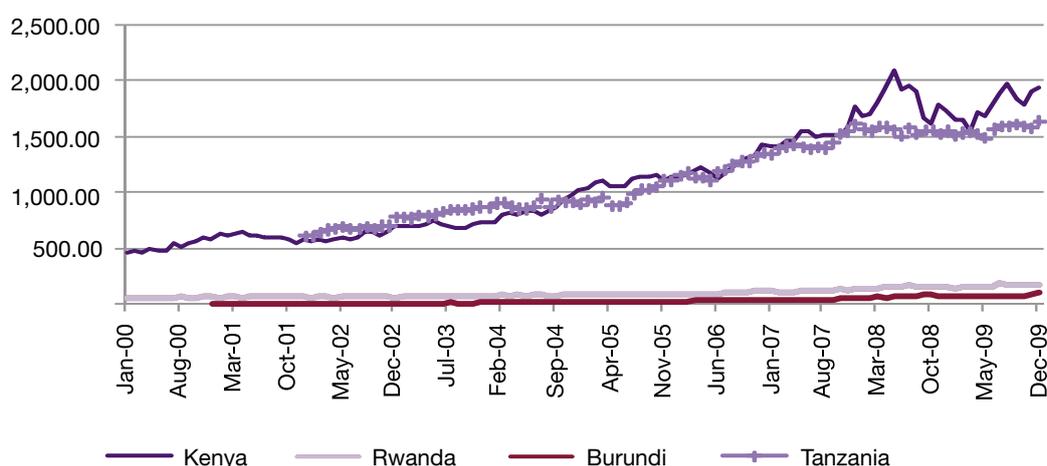
### 3. Trends of Dollarization in Tanzania – Comparison with Other EAC Countries<sup>8</sup>

#### 3.1. Financial dollarization

We experiment with two measures of unofficial dollarization to estimate the extent to which foreign currency, particularly the U.S. dollar is used in Tanzania as store of value. First we compute the Asset Substitution Ratio (ASR) defined as the ratio of foreign denominated deposits to total deposits in the banking sector (i.e.  $ASR = FCD/FCD+LCD$ ). Second, we compute the standard measure of dollarization which is widely used in literature – foreign currency deposits as proportion of broad money supply ( $FCD/M3$ ).

Figures 3.1(a) to 3.1(c) report absolute and relative measures of financial dollarization in East African Community countries. The figures reveal that dollarization is a fairly widespread phenomenon in the region, albeit to a varying degree. Compared to other countries, dollarization in Tanzania in any of its forms is high. For example, Tanzania's foreign currency deposits in December 2009 were about 30 percent of total bank deposits and the ratio of foreign currency deposits to broad money was about 25 percent. In contrast, Kenya, which appears to be the least dollarized economy in the region (in relative terms), holds less than 15 percent of bank deposits in foreign currency and the ratio of foreign currency to broad money was about 13 percent. However, in terms of trends, the dollarization ratios in Tanzania have trended downwards since mid 2007. The ratio of foreign currency deposits to total deposits declined from 39 percent in July 2007 to about 30 percent in December 2009. In Kenya, the ratio of dollar deposits to total deposits has generally been stable (in the range of 10 to 15 percent) throughout the sample period. In Burundi, the ratio of dollar deposits has been somewhat volatile and rapidly rising. The trend however, was reversed in July 2008 presumably due to the impact of global financial crisis, only recently, has the ratio started to rise again.

Figure 3.1(a) Foreign currency deposits (USD Millions)



<sup>8</sup> Uganda is excluded in much of the analysis because of data limitation

Figure 3.1(b): Foreign Currency Deposits to total deposits (%)

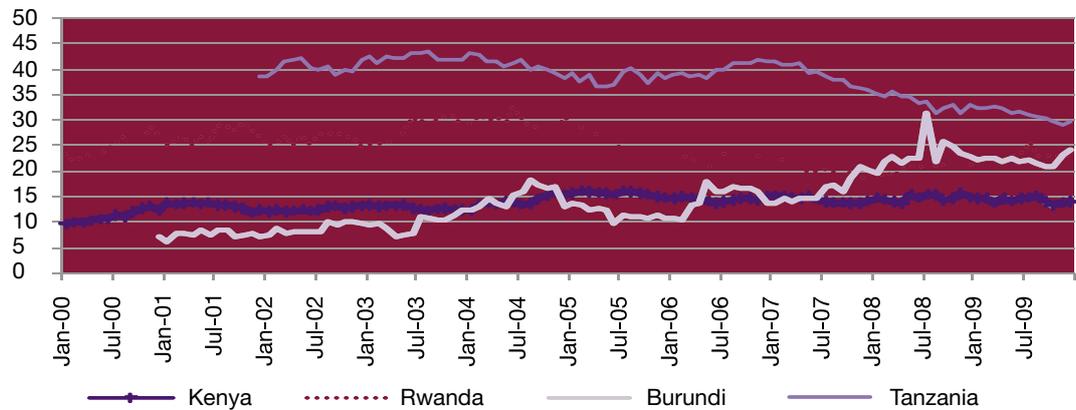
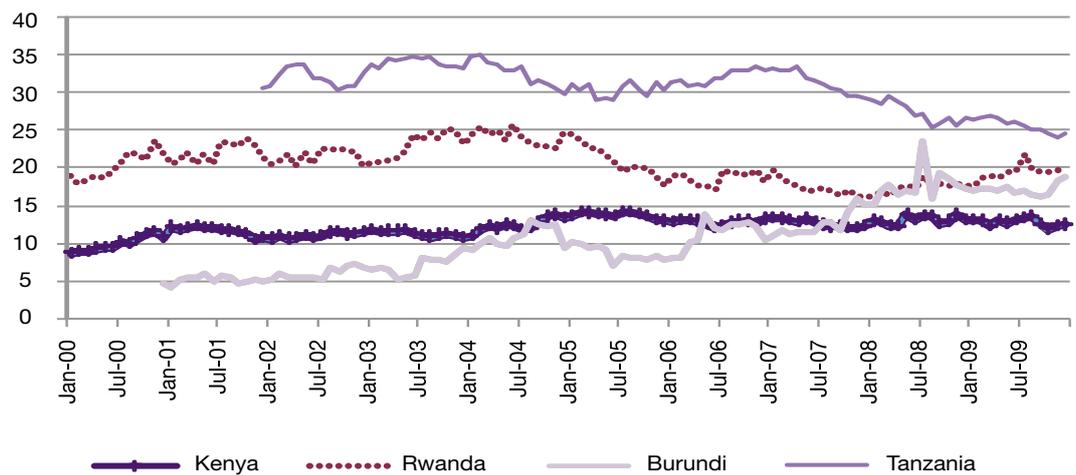


Figure 3.1(c): Foreign Currency Deposits as proportion of broad money

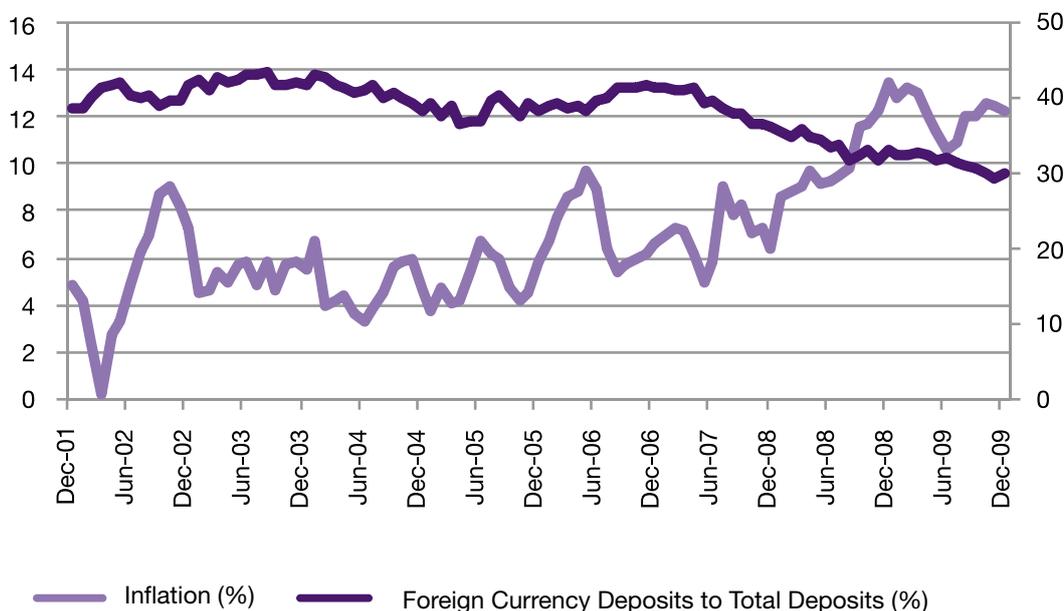


The literature<sup>9</sup> suggests that the main driver of dollarization in many countries is the attempt by residents to protect the value of their wealth and income from being eroded by **inflation** and **exchange rate depreciation**. This would suggest that economies with higher inflation rates would have relatively high ratios of dollarization as savers shelter the real value of their wealth. However this doesn't seem to hold in Tanzania as the correlation coefficient between dollarization ratio and inflation for the period 2000 to 2009 was found to be negative 0.8 which would imply that as inflation decline, dollarization rises<sup>10</sup> Figure 3.2 shows that throughout the period from 2000 to 2009 inflation in Tanzania was low and fairly stable but dollarization did not fall. However, since 2007 the ratio of foreign currency deposits to total deposits has been steadily declining even as inflation rates trended upwards. This suggests that dollarization in Tanzania does not respond to inflation in a manner that is predicted by the literature.

<sup>9</sup> See for example Honohan P. (2007)

<sup>10</sup> Correlation coefficients for Kenya and Rwanda were 0.4 and negative 0.2 respectively, suggesting a presence of weak positive correlation in Kenya.

Figure 3.2. Tanzania: The share of foreign currency deposits to total deposit (right scale) and Inflation rate (left scale), 2001(12) to 2009(12)



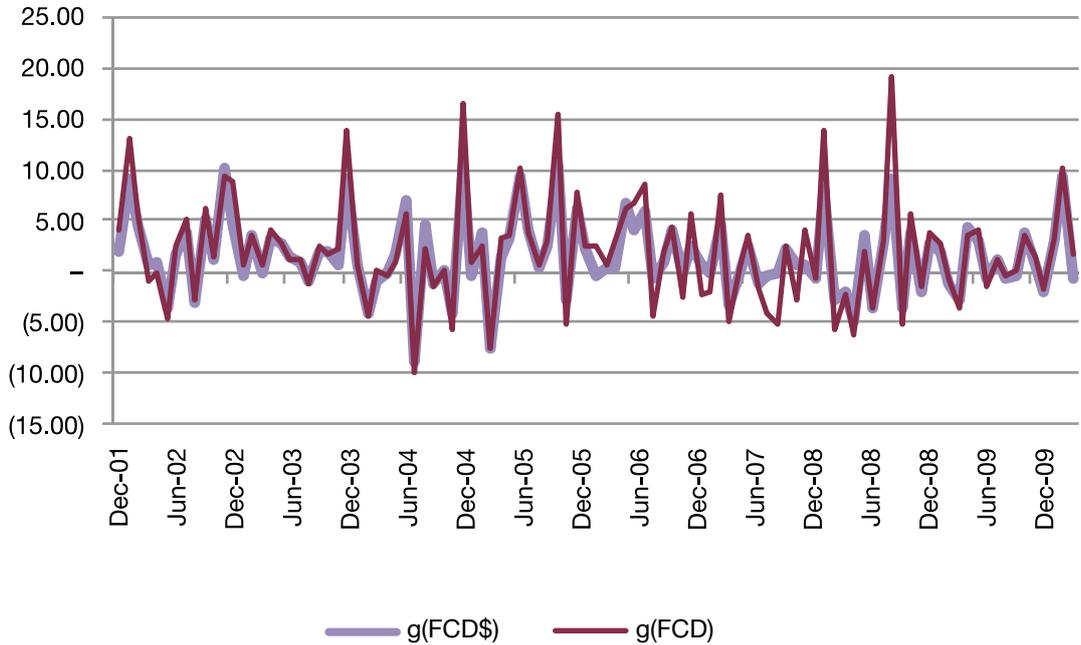
Another factor that may influence depositors' preference in holding foreign currency denominated assets is the exchange rate movements. Exchange rate depreciation could influence dollarization ratios both through direct and indirect mechanisms. The direct mechanism works through the valuation effect of exchange rate movements (i.e. depreciation may have an effect on the local currency value of dollar denominated assets even if there is no change in the dollar value of those assets).

$$\lambda = \frac{e \cdot d_f}{d_f + e \cdot d_l}$$

Denoting dollarization as  $\lambda = \frac{e \cdot d_f}{d_f + e \cdot d_l}$  where  $e$  is the exchange rate - measured as the amount of domestic currency required to purchase one unit of foreign currency,  $d_f$  is the dollar value of foreign currency deposits and  $d_l$  is the local currency denominated deposits, it can be observed that variations in the exchange rate will lead to a change in dollarization even if actual dollar deposits ( $d_f$ ) are constant. The indirect effect works through agents' expectations about future movements in the exchange rate. A persistent exchange rate depreciation will likely bias economic agents' expectations towards long-term path of the exchange rate, in which case they would take a deliberate action to re-balance their portfolio.

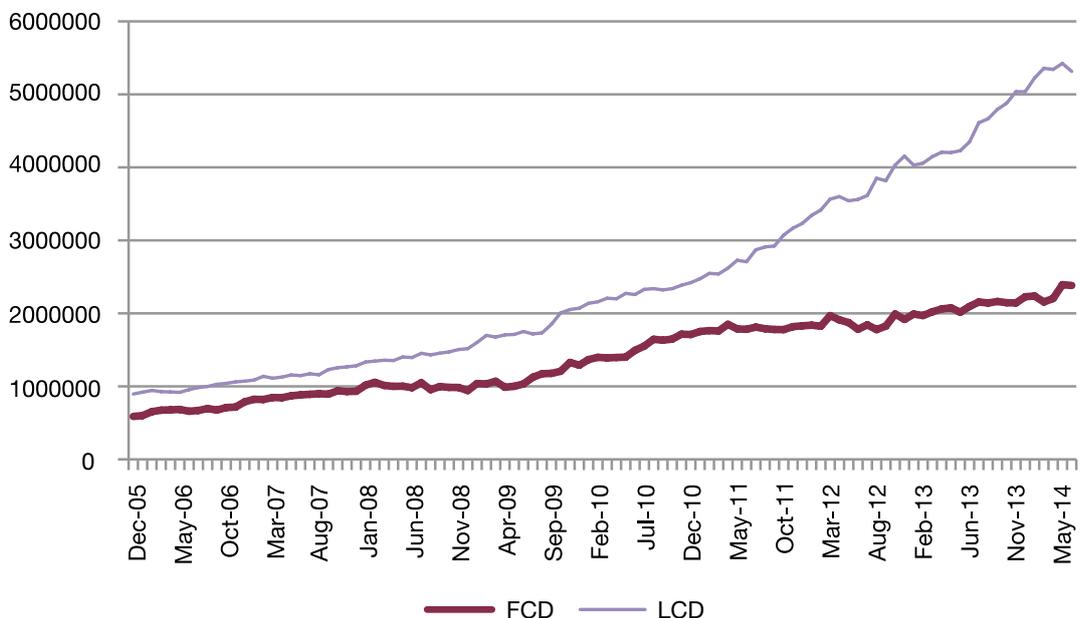
Figure 3.3 plots the growth rate of dollar and domestic currency values of foreign currency deposits in Tanzania for the period 2001 to 2009. As may be observed from the graph, there are many episodes of changes in the growth rate of dollar value of FCD which are associated with much larger changes in the growth rate of domestic currency value of FCD. This suggests that dollarization ratios during this period have been influenced by both the actual dollar deposits in the banking system and the valuation effects resulting from the exchange rate movements.

Figure 3.3: Growth rates of dollar value Vs domestic currency value of FCD (%)



The downturn in dollarization ratios in Tanzania that began in August 2007 was initially associated with the significant appreciation of the shilling witnessed from July 2007 which reduced the value of foreign currency deposits and also may have influenced depositor's expectations about future movements in the exchange rate. However, the exchange rate movements cannot fully explain the sizable and persistent decline in the dollarization ratio observed since the fourth quarter of 2007 because although the exchange rate appreciated substantially from 1,281 TZS/US\$ in July 2007 to 1,132 in December 2007, the trend was reversed in January 2008 with the exchange rate depreciating by about 21.5 percent from December 2007 to May 2010. This depreciation would be enough to lift up dollarization ratios back to the pre- September 2007 levels of above 30 percent due to valuation gain channel alone. However, as shown in figure 3.4, the domestic component of total deposits has increased faster than the counterpart foreign deposits, particularly since 2008. The slow growth in foreign currency deposits during this period could partly be explained by the slowdown in economic activity (FDI, tourism, goods exports etc.) in the wake of the global economic and financial crisis.

Figure 3.4: Tanzania: Foreign Currency Deposits (FCD) and Local Currency Deposits (LCD); Millions of TZS



### 3.1.1 Composition of Foreign Currency Deposits in Tanzania

Table 3.1 below shows different components of foreign currency deposits namely demand deposits, savings deposits and time deposits. One observation that can be made from the table is that demand deposits constitute the bulk of the total dollar deposits in Tanzania. For example, in 2009, about 62 percent of total foreign currency was held in the form of demand deposits, while 26.5 and 9 percent were held in time and savings deposits, respectively. The corresponding shares for domestic currency deposits are 42 percent for demand deposits and about 29 percent for both time and savings deposits. This apparent preference for more liquid foreign currency deposits suggests that foreign currency deposits in the country are held to facilitate transactions rather than as an investment or store of value instrument.

Table 3.1(a) Components of foreign currency deposits (% of total)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Demand	63.2	59.2	63.4	59.9	62.8	58.6	56.7	57.8	59.5	61.7
Time	34.0	37.7	31.6	33.5	30.4	30.9	34.1	32.5	30.5	26.5
Savings	1.0	2.8	4.8	5.8	6.6	7.0	8.0	8.8	8.5	9.1
Government	1.8	0.3	0.2	0.9	0.2	3.5	1.2	0.9	1.6	2.6

Table 3.1(b) Components of non government domestic currency deposits (% of total)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Demand	40.2	40.3	42.5	44.9	44.7	45.1	41.8	45.7	43.3	41.7
Time	25.2	25.9	23.5	21.2	20.9	21.7	20.9	20.0	24.7	29.3
Savings	34.6	33.8	34.0	33.9	34.4	33.2	37.3	34.4	32.0	29.0

### 3.1.2 Foreign currency assets

The growth of foreign currency deposits has dragged foreign currency denominated loans with it, although not on one to one basis. As Table 3.2 below shows, a sizable fraction of foreign currency deposits was placed in international banks abroad before the global financial crisis. This phenomenon was a reflection of exchange rate risks involved in dollar intermediation, which encouraged banks to limit loans in foreign currency and instead maintain large dollar liquidity buffers<sup>11</sup>. However, this trend changed in 2007 as the net balances with international banks abroad (net nostro) declined from about 59 percent of total foreign assets in 2006 to 31 percent in 2008, (before rising to 34 percent in 2009) apparently due to increased risks in international financial markets associated with the financial crisis. Accordingly, the foreign currency loans which was about 39 percent of total foreign assets in 2006 rose sharply to about 66 percent in 2008 indicating that most of the balances withdrawn from international banks abroad were used to finance foreign currency denominated private sector credit.

Table 3.2 Components of Foreign assets (percent of total)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Loans	0.0	20.1	23.0	26.0	34.4	38.5	38.9	51.9	65.8	62.5
Notes and coins	3.1	2.1	2.8	3.2	2.8	2.4	2.3	2.4	2.9	3.1
Nostro net	96.4	77.5	73.9	70.6	62.5	58.9	58.7	45.6	31.2	34.3
Loans/Deposit		31.0	30.0	34.3	39.7	40.8	41.1	53.9	70.4	63.1

<sup>11</sup> Banks can hedge their exposure to exchange rate movements by lending in foreign currency in the domestic economy or by investing in foreign securities abroad. However, banks find it safer to invest in foreign securities because extending dollar loans to domestic firms without foreign currency receivables may not be safe enough since the borrower may easily default in the event of significant exchange rate depreciation.

### 3.2 Estimation of Foreign Currency in Circulation

The measures of dollarization described in section 3.1 above ignore foreign currency in circulation which may be substantial for a cash-based economy like Tanzania. We attempt in this section to estimate foreign currency in circulation using methods described in section 2.1.

The first method (due to Feige et al. (2002) and Kamin and Ericsson (2003)) was that of aggregating the net inflow of US dollars based on CMIR data. We could not replicate such estimates in this study because this information is not readily available for Tanzania. A similar method would be to measure foreign currency shipments from the commercial banks in Tanzania who order bulk shipments of foreign currency from abroad. Unfortunately the Tanzanian authorities do not monitor currency inflows from abroad, nor is this information routinely reported by commercial banks. We therefore conducted a survey of 20 major commercial banks in Tanzania to determine the extent to which they import foreign currency from abroad. Only 10 banks responded, out of which five indicated that they do not import foreign currency. However, 5 banks, which together accounts for about 45 percent of the Inter-bank Foreign Exchange market transactions, were able to provide consistent data on shipment of foreign currency for 2005 – 2009 period. The survey reveals that for the five commercial banks, the import of foreign currency rose from US\$82 million in 2004 to US\$417 million in 2009 (Table 3.3a). If we assume that the five banks are representative of the entire banking system, this evidence would suggest that demand for foreign currency in the economy has been growing rapidly, partly to finance the growing demand for imports, but some of the imported foreign currency may have been used as store of value (FCD) and medium of exchange (FCC).

We could not use the survey data to generate reliable estimates of the stock of foreign currency in circulation for two reasons. First, even if reliable data on commercial banks’ shipment of dollars from abroad could be obtained, such data could only provide evidence on one source of gross additions to the already existing stock of foreign currency in circulation, not the stock itself. Second, there is substantial unrecorded dollar inflows and outflows from the country, much of it hand-carried by small traders engaged in importing. Since declaration of foreign currency holdings at border crossings is not required in Tanzania, it is impossible to net these flows off officially recorded banks’ shipments of foreign currency<sup>12</sup>.

Table 3.3a: Commercial Banks’ shipment of foreign currency from abroad (Millions of U.S. Dollars)

	Bank A	Bank B	Bank C	Bank D	Bank E	Bank F
2000					68	68
2001					68	68
2002					64	64
2003					68	68
2004	10			10	62	82
2005	28	160		15	60	263
2006	36	142	49.7	22	68	317.7
2007	41	124	73.3	30	64	332.2
2008	40	117	57.2	36	68	318.2
2009	56	160	92.9	40	68	416.9

**Note:** bank names have been anonymized for reasons of confidentiality.

The second method that has been used in literature to estimate foreign currency in circulation

<sup>12</sup> Note that much of imported consumer goods are cash-financed. Many small importers carry huge sums of dollars in their briefcases (normally in large denomination bills ) as they travel to Dubai, Hong Kong and China to purchase merchandise. This is partly the reason why demand for large denomination bills of U.S dollar (\$100s and \$50s) is higher compared to small denomination bills .

is denomination displacement, proposed by Feige et.al (2002) as discussed in section 2.1. In line with this method, we start by studying the denomination structures of the EAC countries to ascertain any evidence of denomination displacement from which foreign currency could be indirectly estimated. In table 3.4(a) to 3.4(e) we compare the current denomination structures of EAC countries. Casual observation of the tables reveal a sizable difference of EAC countries in terms of the value structure of their denominations. Uganda appears to have the largest denomination (50,000 Ugandan shilling note) which is equivalent to about 26.4 U.S. dollars. The largest denomination for Kenya is 1,000 Kenyan shilling note equivalent to about 13.3 U.S. dollars. Tanzania's largest denomination is 10,000 Tanzanian shilling note which is equivalent to about 7.5 U.S. dollars. Adjusted for the wealth of each country, which we approximate by per capita GDP, the purchasing power of the highest-denomination note in Tanzania and Kenya is very similar, being equivalent of approximately 1.5% of per capita GDP. This is somewhat smaller than the largest denomination note in Rwanda and second highest denomination note in Uganda but substantially lower than the largest-value notes in Uganda and Burundi. By contrast, the largest denomination notes in the US (the US\$100 note) and the UK (£50) are equivalent to around 0.25% of per capita GDP.

**Table 3.4(a-e): Denomination Structures of EAC Notes Currently in Circulation<sup>13</sup>**

#### Tanzania

Tanzania shilling notes	500	1000	2000	5000	10000
U.S. \$ equivalent	0.38	0.75	1.5	3.8	7.5

#### Uganda

Ugandan shilling notes	1000	2000	5000	10000	20000	50000
U.S. \$ equivalent	0.53	1.05	2.6	5.3	10.5	26.4

#### Kenya

Kenyan shilling notes	5	10	20	50	100	200	500	1000
U.S. \$ equivalent	0.07	0.13	0.26	0.66	1.3	2.6	6.6	13.3

#### Burundi

Burundian Franc notes	10	20	100	500	1000	2000	5000	10000
U.S. \$ equivalent	0.01	0.02	0.08	0.41	0.81	1.6	4.1	8.1

#### Rwanda

Rwandan Franc notes	500	1000	2000	5000
U.S. \$ equivalent	0.9	1.8	3.5	8.8

Figure 3.2a displays trends in the largest denominations notes as a percentage of total notes in circulation for three of the EAC countries for which data were available. The objective is to investigate any evidence of systematic denomination displacement from which foreign currency could potentially be estimated. The figure reveals that in Kenya and Tanzania the proportion of the highest denomination notes in circulation as of December 2009 was about 75 percent of the value of all notes in circulation. However, the proportion of 10,000 Tanzanian shilling notes has been gradually rising during the sample period except for the period April to July 2003, while that of 1,000 Kenyan shilling notes has remained fairly stable. In Burundi the highest denomination (10,000 BF) was introduced in February 2005 and its proportion to total notes in circulation rose sharply reaching a peak of about 70 percent in April 2009 and thereafter reveal a gradual downwards trend.

<sup>13</sup> Local currencies were converted to US\$ using the April 2010 Exchange rate and wealth adjustment was done using the 2008 per capita GDP (current US\$)

In general there is no evidence to indicate that foreign currency notes have displaced domestic high denomination currency notes in Tanzania. Instead there is evidence that high denomination domestic notes have been gradually displacing lower denomination notes (figure 3.2b). This is consistent with conventional wisdom that rising price levels that increase the average transaction size will induce economic agents to hold large proportion of high denomination bills as they attempt to economize on the number of bills used in any transaction (Feige et al. , 2002). It is also consistent with financial innovation, including the expansion of ATM networks, which raise the demand for high-denomination notes.

Figure 3.2a: The value of the largest denomination notes as a percentage of total value of notes in circulation

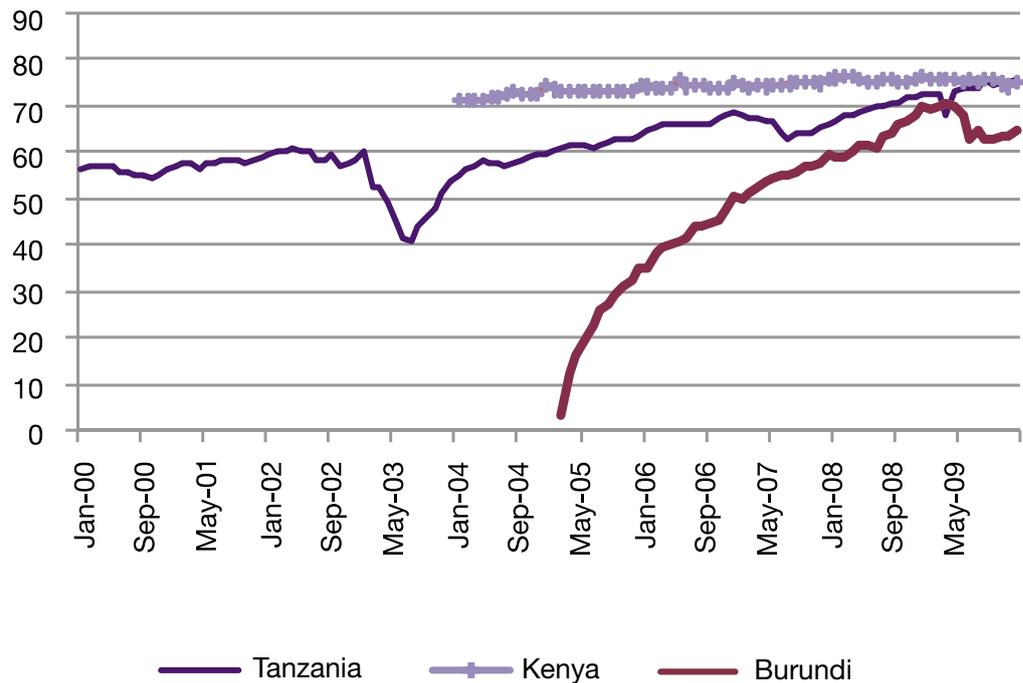
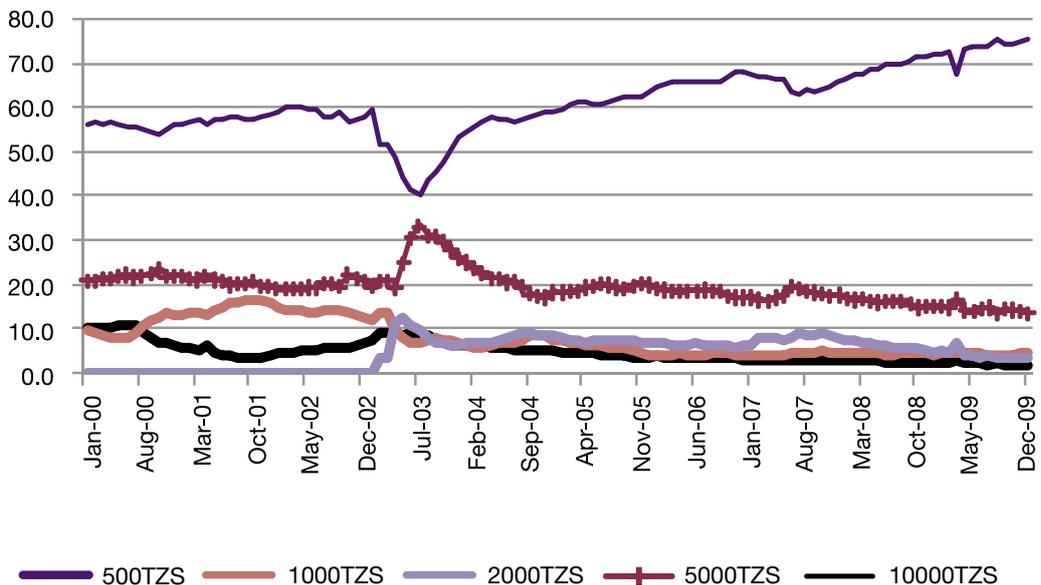


Figure 3.2b.: Tanzania: Denomination structure



Next we attempt to estimate foreign currency in circulation for EAC countries following a method suggested by Erasmus et al. (2009) as discussed in section 2.1. Tables 3.5(a) and 3.5(b) display EAC countries' estimated stock of foreign currency in circulation in millions of US dollar and as a proportion of total currency in circulation (CSR) respectively for the period 2000 to 2009. The tables suggest that currency substitution is more pronounced in Tanzania than elsewhere. Measured both in absolute terms and as a ratio of total currency in circulation, Tanzania appears to have more U.S. dollars circulating in the economy than the other EAC countries. For example, the estimates indicate that at the end of 2009 there was about \$512 million circulating in Tanzania compared to about \$243 million in Kenya. The estimated stock of foreign currency represents about 30 percent and 13 percent of total currency in circulation for Tanzania and Kenya, respectively.

As noted in section 2.1 the method used here assumes that the foreign currency money multiplier and the domestic money multiplier are identical. For countries like Tanzania, which maintain same required reserve ratios for foreign and domestic currency deposits, this is tantamount to assuming that foreign currency cash ratio is identical to domestic currency cash ratio.

To see why, note that money multiplier is given by where  $c$  is the cash ratio - defined as the ratio of currency in circulation to total deposits,  $r$  is required reserve ratio - which is the legal required reserves to total deposits and  $e$  is the excess reserve ratio - defined as reserves held by the banking system over and above the statutory minimum reserves to total deposits.

If we let  $m^f$  represent foreign currency money multiplier and  $m^d$  represent domestic money multiplier, then in a situation where  $r^f$  equals  $r^d$  and  $e^f$  equals  $e^d$ , foreign currency multiplier would only be identical to domestic money multiplier if  $c^f$  equals  $c^d$ .

Recalling that the cash-ratio is the ratio of currency in circulation to deposits, then the assumption that  $c^f = c^d$ , implies  $FCC/FCD = CC/LCD \Rightarrow FCC = c^d * FCD$ . In other words, the estimated quantity of foreign currency in circulation is simply the product of the domestic currency ratio and the level of foreign currency deposits. Since Tanzania has a high domestic cash ratio and there is a substantial degree of onshore foreign currency deposits, this method automatically generates a high estimate for foreign currency in circulation.

But the currency ratio is determined by portfolio asset decisions of the non bank public about their holdings of currency and deposits, which may differ between foreign currency and domestic currency holding. Foreign currency holding may vary significantly across income groups as well as across locations (e.g. rural versus urban). Generally most of the foreign currency is held in urban areas by high and middle income households, who have sufficient access to banking facilities. It would therefore be reasonable to assume that foreign currency ratio is much lower than domestic currency ratio so that the estimates in table 3.5 could rather be regarded as an upper bound of the stock of foreign currency in circulation.

Table 3.5(a): Estimated Foreign Currency in Circulation (U.S \$ Millions)

	Kenya	Rwanda	Burundi	Tanzania
2000	94.3	21.9	3.3	
2001	96.5	23.2	3.5	272.1
2002	124.9	18.5	5.0	364.9
2003	115.5	22.8	6.3	382.3
2004	167.0	30.8	8.4	411.9
2005	183.9	22.4	8.9	476.9
2006	228.6	24.9	14.3	580.5
2007	301.0	24.2	21.1	581.6
2008	250.0	40.9	30.1	555.5
2009	243.2	43.2	35.5	512.1

Table 3.5(b): Estimated foreign currency in circulation to total currency in circulation (%)

	Kenya	Rwanda	Burundi	Tanzania
2000	12.4	29.5	7.0	
2001	12.5	29.2	7.3	38.8
2002	13.3	25.2	9.9	41.8
2003	12.2	28.0	12.4	41.9
2004	15.4	30.2	13.2	38.2
2005	14.8	20.9	10.8	38.4
2006	15.1	20.6	15.7	41.5
2007	14.0	17.2	20.2	36.2
2008	14.4	22.0	23.0	33.1
2009	12.9	24.3	24.3	30.0

Knowledge of the stock of foreign currency in the domestic economy is vital especially for countries implementing monetary policy regime that use monetary aggregates as intermediate targets. In such regimes, the existence of large amount of unknown foreign currency in the economy may potentially make the outcome of monetary policy uncertain because the recorded broad money supply fall short of the “true” money supply by the amount of foreign currency in circulation.

To increase the confidence interval or reliability of our estimates, it would be useful to estimate foreign currency in circulation using different methods and see how close the results would be to the estimates presented in table 3.5 above. We propose here two potential methods that could be used to supplement the above estimates. One possibility is to conduct a survey to determine holdings of foreign currency by domestic residents. For example, Hakob Zoryan (2005) conducted a survey of 700 households in Armenia and obtained an estimate of foreign currency in the economy by asking respondents about their cash holding portfolio (i.e. the ratio of foreign to domestic currency holdings). Since the aggregate stock of domestic currency in circulation is known, it was possible to extrapolate the average foreign currency holdings from the survey results. For the survey to yield reliable results however, one will have to cover fairly a large sample from different strata of society in both urban and rural areas. Note also that survey method can not reflect changes over time on the behavior of public holdings of foreign currency in the form of cash vis-a-vis bank deposits.

An alternative method would be for the authorities to monitor and collect data on the flow of foreign currency in and out of the country. Since a substantial portion of Tanzania’s import is cash-financed, this would involve a requirement for both residents and non residents to declare to the customs the foreign currency they import or export. In addition, commercial banks would be required to report information on currency shipments and cross border money transfers (letters of credit, wire transfer, travelers’ cheque etc). From such information, the authorities would be able to estimate net inflow of foreign currency in the country.

### 3.3 Transaction Dollarization

As mentioned in section 2, transaction dollarization refers to the use of foreign currency for purchase of goods and services in the domestic economy. It is a common practice in many countries for businesses to use foreign currency (normally U.S. dollar) in pricing goods and services for which a large share of customers come from outside the country. In Tanzania, this involves for example, tourist services such as hotels and parks, international schools and the transit trade. Similarly foreign employees working as expatriates may have their salaries and wages denominated in foreign currency. By definition, this does not constitute dollarization in the real meaning of the word. However, there is evidence that businesses in Tanzania are increasingly carrying out domestic transactions in U.S. dollars instead of Tanzanian shillings. For example, as figure 3.3 shows, the percentage of dollar denominated checks processed at

the Bank of Tanzania clearing house (in value terms) increased from about 17 percent of total checks in the first quarter of the fiscal year 2005/06 to about 57 percent in the third quarter of 2009/10 financial year. This is clearly a sign of creeping transaction dollarization in the country.

In order to determine the extent and the driving force behind this situation, we conducted a small survey which included about 20 firms located in Dar es Salaam region. The survey included questions designed to investigate the extent to which the U.S. dollar is used as a unit of account for pricing purposes, salaries and wages as well as financial reporting. The sample was limited only to those firms which, price their products in U.S. dollar.

### 3.3.1 Survey results

Since all the firms surveyed had been identified a priori as those that price their goods and services in foreign currency, questions were designed to first investigate the currency in which the firms quote salaries and prepare financial statements. Then the respondents were asked if they would allow their clients to pay Tanzanian shillings equivalent of the quoted dollar price and how they would determine the exchange rate. In addition the respondents were asked to identify three most important factors that make it necessary to price their products in U.S. dollars even for goods and services which are mainly consumed by Tanzanians.

The results of the survey indicate that all the interviewed firms quote salaries and wages for Tanzanian employee exclusively in Tanzanian shilling. This was the case even for firms such as tourist hotels and international schools – whose income is almost exclusively earned from foreigners. Also the results indicate that for most firms, although revenue is earned in foreign currency, financial statements are prepared in local currency. Only 2 firms indicated that they prepare their financial statements in both local and foreign currencies<sup>14</sup>. Next, the survey asked the respondents if they would accept Tanzanian shilling equivalent to the quoted U.S. dollar, should their clients request to settle payments in domestic currency. All firms indicated that although prices are quoted in U.S. dollar, they freely accept payments in both Tanzanian shilling and U.S. dollar. However, follow-up discussions with some clients/customers yielded contradicting results as it was clear that some firms strictly do not accept payments in Tanzania shillings.<sup>15</sup>

For firms which accept Tanzanian shilling equivalent of the quoted U.S dollar, a follow up question was posed to investigate the exchange rate used in converting U.S. dollar to Tanzanian shilling. Majority of the firms indicated that they obtain exchange rates from the Bank of Tanzania's website or call their banks to obtain the market exchange rate for the day. However, some schools indicated that they use "internal rate" determined by the school management at the beginning of the school year and kept unchanged throughout the year. The evidence from the survey suggest that many firms which quote prices of their products in foreign currency [but with an option of making payment in local currency equivalent] they use above the market exchange rate to discourage payment in local currency.

To determine the extent to which the surveyed firms require foreign currency for their day-to-day operations, the respondents were asked to indicate the percentage of their operating costs which require the use of foreign currency (such as imported goods/raw materials, payments of salaries/wages, utility fees, rental fees, taxes etc.). As table 3.6 shows, most of the respondents (13 out of 20) indicated that more than 50 percent of their operating costs require foreign currency. Only 2 firms indicated that less than 10 percent of their day to day operating costs require foreign currency, with 5 firms indicating 40 to 50 percent. These figures are somewhat

<sup>14</sup> There is no legal requirement on the currency for which firms should prepare financial statements. However, the two firms indicate that they prefer to keep their accounts in both currencies for convenience. Statements prepared in foreign currency makes it more convenient when reporting the operations of the firm to share holders and management, while those which are prepared in local currency facilitate computation of tax liabilities.

<sup>15</sup> For example, some private schools require all payments to be made directly to their bank accounts, which are dollar accounts and leaves no option for making payments in Tanzanian shilling. One of the firms surveyed has a clear policy (which is also posted in the firm's website) that all payments must be made exclusively in U.S. dollars

contrary to what we had expected given that most of the firms surveyed are service oriented /providers (such as schools, real estate operators, hotels etc.) which obtain the bulk of their inputs from the domestic markets. Moreover, evidence from the survey indicates that most firms pay taxes, wages and salaries, in local currency.

Finally the respondents were asked to mention three reasons why they price their products/ services in U.S. dollar. The most important factor that was pointed out by almost all respondents was that the U.S. dollar is perceived to be a stable currency and therefore it makes it easier to predict their profits with greater degree of certainty. This is consistent with the anecdotal evidence that businesses price their products in U.S. dollar to shield the real value of their income from currency depreciation. It is likely therefore that as the Shilling continues to depreciate against the dollar, transaction dollarization will continue to deepen.

Another important reason that was mentioned by many respondents is that significant amount of their operating costs are denominated in foreign currency. As mentioned above, this finding is not consistent with our expectation. It is less clear why firms in the service sector and especially schools which implement the Tanzanian curriculum would have more than 50 percent of their operating cost denominated in foreign currency. Some firms also indicated that pricing their products in U.S. dollar facilitates transaction with foreign clients/customers. Again, this would apply only to those firms whose large portion of clientele is foreigners (e.g. tourist hotels and international schools).

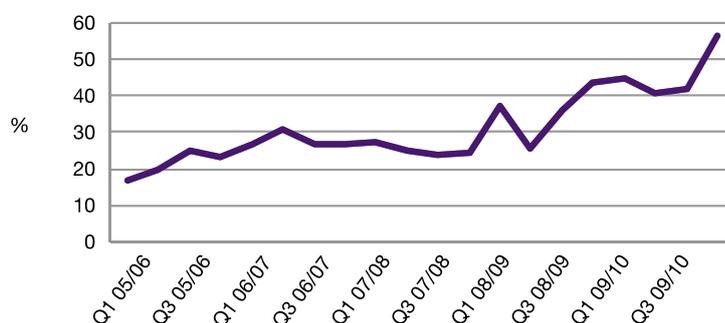
Taken together the survey results suggest that U.S. dollar is gradually displacing the Tanzanian shilling –as preferred unit of account – most notably in real estate and education sectors largely due to its reputation as a stable currency. There was also evidence of transaction dollarization in the retail sector mainly associated with selling of high value imported products such as computers, automobile and pay TV services. Although this tendency is currently limited to a few sectors, the use of U.S dollar as unit of account and medium of exchange can be expected to rise with time as a result of network externality effect – i.e. as more and more economic agents become involved in paying/receiving foreign currency in exchange for goods and services, it become less costly to carryout transaction in foreign currency, creating incentive for more economic agents to demand payments in dollar.

Table 3.6(a): Percentage of operating costs that require foreign currency

Percentage	Number of firms in this category
Below 10%	2
Between 10 and 20%	0
Between 20 and 30%	0
Between 30 and 40%	0
Between 40 and 50%	5
Above 50%	13
Total	20

Table 3.6(b): Denomination of Financial Accounts and Wages/Salaries

Variable	TZS	US\$	Both	Total
Currency used in the preparation of financial statements	17	1	2	20
Currency used for quoting salaries and wages	17	–	3	20



Source: Bank of Tanzania and author's calculations

## 4. Challenges Associated with Dollarization

In this section we consider some of the risks and challenges associated with increased dollarization. The starting point for this discussion is the view that when foreign currency deposits are prohibited, residents may opt to keep their foreign currency “under the mattress” or otherwise engage in capital flight with the result that onshore financial intermediation is retarded. Hence the relaxation of foreign exchange controls is seen as a way of discouraging capital flight and enhancing financial sector deepening. Moreover, the holding of foreign currency deposits allows economic agents to protect the real value of their wealth from being eroded by domestic inflation and exchange rate depreciation. It is in this context that Tanzania removed exchange rate controls and opened its doors to foreign banks in early 1990s as part of financial sector reforms. However, these policy reforms have also accelerated the use of foreign currency especially as store of value and means of payment in the domestic economy. The literature identifies at least four potential costs associated with dollarization: currency mismatch, loss of seigniorage, loss of the lender of last resort facility of monetary authorities and reduction in the effectiveness of monetary policy.

**Currency mismatch:** Financial systems of highly dollarized economies are prone to exchange rate fluctuation risks. In Tanzania the extent to which commercial banks are exposed to exchange rate risks is limited by the restriction on the net open position for foreign currency assets and liabilities which is set at 20 percent of core capital. However, the indirect effects of portfolio deterioration may arise through un-hedged bank borrowers. Large depreciation of local currency will have a negative impact on the financial position of firms producing for the local market with loans in foreign currency. Foreign currency debtors whose receipts are in local currency may fail to service their loans, increasing the possibility of default and potentially weakening the financial position of banks. In the absence of hedging instruments, the currency mismatch problem could potentially be eliminated by encouraging banks to extend foreign loans only to firms whose stream of income is denominated in foreign currency. In Rwanda for example, the foreign exchange regulation require that foreign currency loans be aimed at pre-financing exports in order to avoid the currency mismatch problem. Also evidence from Latin America countries suggests that firms that produce tradable goods tend to hold more foreign currency loans than firms that produce non-tradable goods (Bleakley and Cowan, 2002).

When banks (or their clients) are exposed to currency miss -match of this form, this can draw the central bank into a form of ‘fear of floating’ which sees them acting to stabilize the exchange rate, in order to protect the banks from exchange rate related losses on their balance sheets, even though they are otherwise committed to a freely-floating exchange rate regime. This risks brings in a degree of incoherence into the conduct of monetary policy, especially in inflation targeting or other domestic-anchor regimes.

**Loss of seigniorage:**

Full dollarization eliminates possibility for governments to finance fiscal deficit with seigniorage - the revenue associated with the issue of domestic currency. Since the country eliminates its currency and adopts foreign currency as legal tender, the central bank can no longer print units of domestic currency at a minimum cost and use it to finance public spending. Under partial dollarization, Government faces loss of seigniorage but in smaller magnitude than in the case of full dollarization. The substitution of domestic currency by foreign currency in transactions limits the revenue that the government receives from printing domestic currency. However, there is little empirical evidence to support the hypothesis that high level of dollarization are associated with loss of seigniorage. Evidence presented in Table 4 suggests that average revenue from money creation among EAC countries during 2000 to 2008 was generally independent of the degree of dollarization. Reinhart et. al (2003) found similar results for Latin American countries.

Table 4.0: Seigniorage revenue in EAC Countries (2000 -2008)

	Tanzania	Kenya	Rwanda	Burundi
2000	0.4	0.2	0.6	1.1
2001	1.3	1.1	0.1	2.2
2002	0.9	-0.4	0.9	0.3
2003	1.7	1.0	0.7	1.5
2004	2.2	0.6	0.8	2.3
2005	1.3	1.2	0.7	0.8
2006	2.4	2.0	1.0	0.8
2007	1.9	0.2	1.4	3.1
2008	1.7	0.5	-0.4	1.0
<b>Mean</b>	<b>1.5</b>	<b>0.7</b>	<b>0.6</b>	<b>1.5</b>

Seiniorage revenues were calculated as the change in base money to nominal GDP

**Loss of Lender of Last resort Facility of the Central Bank:**

Another challenge associated with partial dollarization is the restriction it imposes on central bank's role as a lender of last resort to the domestic banking system. As a lender of last resort, central banks provide loans to illiquid but solvent banks. In a financial sector that holds large amounts of foreign currency, central bank may not be able to accommodate bailout requests by the domestic banking sector in case of bank runs on foreign currency deposits, because official foreign exchange reserves are the only buffer that exists to stem such a crisis.

**Effectiveness of monetary Policy**

A common view shared by many studies<sup>16</sup> is that dollarization makes monetary policy more complicated and less effective. The first challenge that policy makers have to resolve relates to the choice of intermediate target of monetary policy, particularly in the case of reserve money targeting framework. The key issue here is whether central banks should choose monetary aggregates that include or exclude foreign currency component. For example, three of the EAC countries (Tanzania, Uganda, and Burundi) targets monetary aggregates that excludes foreign currency component while the other two (Kenya and Rwanda) target monetary aggregates that include foreign currency deposits. As the five countries strive to harmonize the conduct of monetary policy in the region, the issue of appropriate intermediate target will have to be resolved. While the literature does not offer a reliable answer to this question, Balino et.al (1999) argue that the suitability of an intermediate target depends on its influence on the final target (price level) which is essentially an empirical matter. Along this line of argument, Patricia et.al (2008) propose a rule of thumb arguing that if the main criterion to choose the intermediate target is

<sup>16</sup> See for example Galindo A et.al 2005 and Erasmus et. al 2009

its influence on the price level through transaction demand for money, then foreign currency in circulation should form part of the targeted monetary aggregate. However, foreign currency deposits may not be included because such financial assets are used as store of value but not as means of payment or unit of account. Contrary to this rule of thumb, Berg and Bonensztein (2000) find evidence in Latin American countries which suggests that in general, monetary aggregates that include foreign currency deposits are superior to the ones that exclude such deposits and that inclusion of foreign currency in circulation does not improve the forecasting power of narrow monetary aggregates.

Another key issue regarding challenges of conducting monetary policy in a dollarized economy is the extent to which the pass-through from exchange rate to domestic prices is amplified. The argument is that exchange rate in a highly dollarized economy where non-tradable goods and services are priced in foreign currency will be passed to domestic prices through a broader set of goods than in a non-dollarized economy where the pass-through is limited to tradable sector only. Using a VAR model on a number of Latin American countries, Patricia et.al (2008) confirms that in highly dollarized countries, the pass-through from nominal exchange rate to domestic price level is large and tend to persist while countries with moderate level of dollarization exhibit smaller and non persistent exchange rate pass through. The finding that highly dollarized economies tend to experience a large pass-through implies that exchange rate volatility will be more painful in a dollarized economy, and as such exchange rate stabilization should be given policy priority.

## 5. Empirical Evidence of the Determinants of Financial Dollarization

### 5.1 Model specification

This section deals with empirical analysis of the determinants of dollarization in Tanzania. Most of the empirical studies on the determinants of dollarization assume that demand for foreign currency deposits by residents is driven by difference between returns on domestic and foreign currencies. Variables widely used include interest rate differentials between domestic and foreign currency, expected exchange rate depreciation, expected inflation rate and institutional variable (see for example El-Erian (1988) Rojas-Suarez (1992)). Other studies have added to these variables a measure of credibility of macroeconomic policies (see Irfan, 2003). The empirical analysis in this study is based on a simple model similar to the ones used in the studies mentioned above. However, instead of using expected rate of depreciation and interest rate differentials, we use expected returns on foreign currency deposits based on interest rate parity condition only. We also add a volume variable which is intended to capture foreign currency inflows to the economy. The basic form of the estimated model in this study can be expressed as follows;

$$ASR_t = \beta_0 + \beta_1 RETURN_t + \beta_2 VOLT_t + \beta_3 INF_t + \beta_4 VOLUME_t + u_t \dots \dots \dots (1)$$

Following the discussion in section 3.1, we define financial dollarization (*ASR*) as the ratio of onshore foreign currency deposits to total bank deposits. We do not use measures of dollarization which involve the estimated foreign currency in circulation because we are not yet comfortable with the reliability of the estimates. We also do not normalize the foreign currency with broad money (which includes the local currency in circulation) to avoid underestimating the relative weight of foreign currency in the banking system.

The variable *RETURN* is the expected return on foreign currency deposits. Holding of foreign currency deposits is essentially a portfolio selection between domestic and foreign assets, which is determined by the relative rates of returns of domestic and foreign currency assets. The theory of asset demand suggests that the most important factor affecting demand for

domestic currency deposits (TShs) and foreign currency deposits (US\$) is the expected return on these assets relative to each other. When the economic agents expect the interest rate on dollar deposits to be higher relative to that of shilling deposits, they will tend to balance their portfolio holdings by shifting some of their shilling deposits to dollar deposits. In Tanzania however, foreign currency deposit rates have always been lower than those of the counterpart domestic currency deposits. Nonetheless, this has not discouraged agents from holding their wealth in foreign currency. Since large proportion of transactions in the domestic economy is conducted in domestic currency, which requires the holders of foreign assets to eventually convert their returns to domestic currency, the expected returns in dollar deposits must be adjusted for any appreciation of the dollar.

Denoting spot monthly exchange rate (amount of shillings required to purchase one unit of dollar) by  $e_t$  and the expected exchange rate for the next 12 months period by  $e_{t+1}$  then the expected appreciation of the dollar over a twelve months period can be expressed as  $\frac{e_{t+1} - e_t}{e_t}$ . Thus the variable RETURN is simply the sum of the interest rate on dollar deposits ( $i^d$ ) and the expected appreciation of the dollar, which can be expressed as:  $ERD_t = i^d + \frac{e_{t+1} - e_t}{e_t}$ . The correlation between dollarization and this variable is expected to be positive.

*INF* is the inflation rate and is included in the model to measure the overall macroeconomic stability with assumption that declining inflation will improve resident's confidence on domestic currency and therefore reduce foreign currency holdings, all else held constant.

*VOLUME* is a ratio of foreign currency inflows to GDP. Foreign currency inflows is approximated by three variables identified as the main sources of foreign currency inflow into the economy, namely the value of export earnings, capital inflows in the form of FDI and foreign aid. Other sources of foreign exchange inflows such as nongovernmental organization (NGOs) and migrant remittances are excluded because of data limitation. The hypothesis is that large inflow of dollar in the economy will tend to have positive impact on dollarization as economic agents find it easier to obtain foreign currency.

*VOLT* is the exchange rate volatility which is intended to capture exchange rate risk. The hypothesis is that major fluctuations in the exchange rate will create uncertainty among economic agents about likely future path of exchange rate, in which case they will feel safer in foreign currency holdings. Following Gujarati (2003), the exchange rate volatility was computed as follows:

Let  $e_t$  = Tshs/US\$ monthly exchange rate at time t

$$e^*_t = \text{logarithm of } e_t$$

$$de^*_t = e^*_t - e^*_{t-1} \text{ (where } t-1 \text{ represents a 12 months lag)}$$

$$de^*_t = \text{mean of } de^*_t$$

$$\phi = de^*_t - de^*_t \text{ (mean adjusted relative change in the exchange rate)}$$

$$\phi^2 = VOLT$$

Where *VOLT* is a measure of volatility. Since it is a squared number, its value will be high in periods when there is a big change in exchange rate and comparatively small when there are modest changes.

Monthly series data were used in the estimation of the above model and the sample extends from 2001(12) to 2009(12).

## 5.2 Estimation and Empirical Results

Before proceeding to regression it was necessary to test for the presence of unit roots in our variables in order to avoid spurious regression. The Augmented Dick-Fuller (ADF) procedure was used to test the order of integration of the variables. The computed ADF test statistics and critical values for the level and first difference of the variables are summarized in appendix 1. The results show that the null hypothesis of a unit root is accepted for the level of series but rejected at the first difference of the variables. This suggests that each variable is non-stationary in the level and stationary in the first difference (i.e. all variables are integrated of order one).

The test for determining the number of cointegrating vectors was conducted using the Johansen procedure. The null hypothesis that there is no cointegration was rejected, but the null that the number of cointegrating vectors is one was not rejected. The long run relationship between dollarization and the explanatory variables is given by equation 2 below, with t-statistics given in parenthesis.

$$\ln ASR_t = 0.06 ERETURN_t + 0.098 \ln volume_t - 0.145 \ln INF_t + 0.073 \ln VOLT_t + u_t \quad (2)$$

(2.76)                      (5.24)                      (-1.99)                      (1.66)

All variables have the expected signs except for inflation rate which has a wrong (negative) sign and significant at the ten percent level of significance. This is counterintuitive as the declining inflation rate of the domestic currency would be expected to improve the resident's confidence on the local currency and therefore hold less of their wealth in foreign currency. The negative relationship between foreign currency deposits and inflation rate is however consistent with the observed trend in Tanzania as the level of foreign currency holding was constantly rising even as inflation rate declined from above 30 percent in late 1980s to the current single digits. Many other countries however, have experienced a similar phenomenon.

The estimated long run semi-elasticity of the expected return on foreign currency deposits is 0.06 and significant at 1 percent level. This implies that in the long run a percentage point increase in the rate of return on foreign currency deposits (due to depreciation and/or increase in the interest rate) would on average increase the ratio of foreign currency deposits to total deposits by about 6 percent, all else held constant. This is consistent with the hypothesis that demand for dollar deposits by the public is driven by the real rate of return on those deposits.

The coefficient of volume variable is also significant at 1 percent level and is positive as expected. The magnitude of the coefficient is about 0.1 indicating that in the long run ten percent increase in the ratio of foreign currency inflows to GDP will, on average, lead to about one percent increase in the ratio of foreign currency deposits to total deposits. The positive association between the volume variable and the ratio of dollarization suggests that integration of Tanzanian economy to the global economy following economic liberalization has played a role in influencing the level of dollarization in Tanzania, mainly through the significant increase in foreign direct investment and export earnings. The coefficient of exchange rate volatility which is a measure of expected risk is positive as expected, but statistically insignificant at conventional levels.

To check the robustness of these results, we replaced the variable *RETURN* with two other variables, one at a time. First, we employed the expected exchange rate depreciation using nominal exchange rate depreciation as a proxy. Second, we used return differentials between exchange rate adjusted foreign currency deposits rate and domestic currency deposits rate

i.e. 
$$\left[ i^f + \frac{e_{t+1} - e_t}{e_t} \right] - i^d$$

The assumption is that decision by economic agents to hold dollar deposits will depend on the difference between the rate of returns on dollar deposits and shilling deposits. Replacement of the

RETURN variable with these two variables did not change the results significantly. The magnitude of coefficients changed slightly but signs and level of significance remained largely the same.

In estimating the error correction model to determine short run and long run interactions, we used equation (2) to obtain residuals which were used as adjustment parameter in the error correction estimation. The residuals were tested for a unit root and found to be stationary at level. Using lags of 6 periods, we started with a very general specification in which the dependent variable (ASR) was regressed on its lagged values, the current and lagged values of expected returns, inflation rate, exchange rate volatility, the volume variable and the adjustment parameter lagged once. By using the standard variable deletion test we arrived at the following parsimonious equation.

$$\begin{aligned}
 d\ln ASR_t = & 2.18 + 1.02d\ln ASR_{t-1} + 0.102d\ln ASR_{t-2} + 0.74dRETURN_{t-1} + 0.88dRETURN_{t-2} \\
 & (4.18) \quad (3.88) \quad (1.95) \quad (2.86) \quad (3.03) \\
 + & 1.7d\ln VOLUME_{t-2} - 0.59d\ln INF_{t-2} - 0.21ECM_{t-1} \quad \text{-----} \quad (3) \\
 & (2.66) \quad (-2.29) \quad (-2.29)
 \end{aligned}$$

Where d stands for a difference operator and ECM<sub>t-1</sub> is the lagged residual from equation 2. Diagnostic tests showed an Adjusted R-squared of 0.982410, Durbin-Watson statistic of 2.042855 and F-statistics of 5.721375. The coefficient of the lagged error term, which serves as feedback mechanism is significant at 5 percent level and has the expected negative sign. This implies that about 21 percent of the departure from the equilibrium in the current period will be corrected in the next period. This means that it would take about five months for the public to fully adjust their portfolio after a change in exchange rate. Also equation 3 indicates that in the short run the desire for economic agents to hold foreign currency in the current period is also influenced by the level of dollarization in the previous periods. This suggests that the more people can easily use dollars as a store of value in the current period, the more they will tend to increase their desire to hold more of their wealth in foreign currency in the future.

## 6. Lessons and Policy Implications

The evidence presented in this study reveals that the significance of the US dollar as a store of value is greater in Tanzania than in other EAC countries. The percentage share of Tanzania’s bank deposits that are denominated in US dollars is higher than that of a country like Kenya with the biggest economy and more developed financial sector in the region. Also the absolute dollar deposits in Tanzanian banking sector is on average equal to those of Kenya and well above those of the other countries in the region.

This may partly be a reflection of extensive economic reforms implemented since early 1990s which transformed Tanzania from centrally planned to market oriented economy. In this case, the increase in dollar inflow to the economy may just be a natural phenomenon resulting from the fact that Tanzanian economy has become much more open and outward oriented than it was some 15 years ago. Increased confidence in the financial sector and economic situation in general may partly explain the large share of foreign currency deposits in the financial system, as foreign currency held by residents in offshore banks finds its way back following the removal of foreign exchange controls in 1992. Also since the 1990’s Tanzania has attracted more foreign direct investment (FDI) than other countries in the region. FDI flows to Tanzania increased rapidly following the economic reforms to a peak of about 6 percent of GDP in 1999 before declining gradually to the current levels of about 4 percent of GDP (figure 6.1). During the same period, Tanzania’s export growth has also accelerated significantly (Table 6.1). In addition, total aid flows to Tanzania as measured by the total net official development assistance (ODA) has increased from about 10.5 percent of GDP in the second half of the 1990’s to about an average of 12.5 percent for the 2000 to 2008 period<sup>17</sup>. The counterpart to this relatively high aid share in GDP

<sup>17</sup> See Roger Nord et al. (2009)

is the presence on the ground of a large number of aid agencies and international NGOs, most of whom tend to conduct their business substantially in foreign currency.

On the other hand, unlike other countries in the region, there is substantial restrictions in the Tanzania's capital account, with all types of capital outflows (FDI and portfolio) essentially prohibited. Such restrictions, to a large extent, limits residents from investing their wealth abroad, in which case, foreign currency deposits may become second-best form of inflation-hedging investment. The significant inflows of foreign currency in the economy accompanied with restricted outflows may partly explain the apparent higher levels of dollarization ratio in the Tanzanian banking sector.

It is worth noting that although Tanzania appears to be the most dollarized economy in the region, the dollarization ratios are moderate in international standards. For example, according to Baliño et al (1999) an economy is considered to be highly dollarized if the ratio of foreign currency deposits to broad money exceeds 30 percent. Many countries in Africa including Zambia, Angola, Liberia, Mozambique etc. have their ratios in excess of 30 percent. In Tanzania this ratio is currently about 25 percent. Also the use of foreign currency in carrying out transactions is so far limited to housing and apartment rentals, sale of plots in some parts of major cities, fees for some private schools and a few imported durable consumer goods such as laptop computers<sup>18</sup>. However, we share the views of those who believe that if left unchecked the extent of dollarization in the country can potentially explode to levels that will be difficult or costly to reverse. Evidence from countries like Cambodia, Viet Nam and Israel suggest that once an economy becomes highly dollarized, the process of de-dollarization may be very costly and protracted. As Reinhart *et al* (2003) noted, economies remain "addicted to dollars" even after the disappearance of the factors that initially led to the dollarization phenomenon. Fischer (2006) also observes that "*dollarization typically has a long life, generally surviving long after the period of instability that gave rise to the phenomenon*" pp.3. Thus, it may not be surprising to see current levels of dollarization in Tanzania lingering around for some years, and as such, the authorities need to remain vigilant on the potential risks associated with high levels of dollarization.

There are several policy measures that may warrant consideration. First, regarding financial dollarization, the first order policy priority could be directed towards putting in place proper policies necessary to mitigate the potential risks to the financial sector that may be associated with dollarization. For example, as noted earlier, while current banking sector regulation imposes restrictions on the direct exchange rate risk exposure in the banks' balance sheets through the 20 percent net open position requirement, there is no provisions that deal with possible solvency risks that may emanate from un-hedged foreign exchange borrowers in the non tradable sector. To deal with this kind of risk, authorities could encourage banks to extend foreign exchange denominated loans mostly to the tradable sector. For the non tradable sector, banks could be asked to require foreign currency borrowers to actively hedge their loans against exchange rate risk – for instance by buying forward. Alternatively, commercial banks could implement a more rigid set of collateral requirement on foreign currency denominated loans to their non-exporting borrowers. The experience of Peru for example, indicates that in order to mitigate risks associated with lending in foreign currency, the authorities have put in place a higher supervision provisions for foreign currency loans relative to domestic loans. For example, banks are required to carry out a routine evaluation of currency mismatch risks or alternatively set up a reserve of between 0.25 to 1 percent of the credit in foreign currency that has not been evaluated (Mercedes, 2010)

It was also noted in section four that liquidity risk emanating from bank runs on foreign currency deposits may potentially result to a financial crisis because monetary authorities may not be able to play their traditional role of lender of last resort. To mitigate this potential risk, the Tanzanian

<sup>18</sup> The survey to determine the extent of transaction dollarization was limited to a very small sample of only 20 firms operating in Dar es Salaam. A more vigorous survey covering a large sample of firms and more regions such as Arusha may be required in order to fully understand the extent and dynamics of the transaction dollarization in the country.

authorities could ensure that commercial banks are keeping adequate levels of foreign currency liquid assets (in cash or reserves) in order to serve as a buffer in the event of a bank run. Policies aimed at mitigating the impact of foreign currency liquidity risks are common in other dollarized countries, and have in most cases taken a form of higher reserve requirement. For example, Galindo and Leiderman (2005) show that in Bolivia, all foreign currency deposits have a 10 percent reserve requirement while fixed-term domestic currency deposits have zero reserve requirement. Also in Peru, differential reserve requirement between foreign and domestic currency deposits are applied as a policy measure to reduce liquidity risks (for example as of 1998 the domestic currency reserve requirement was 8 percent while that on foreign currency deposits was 20 percent). For similar reasons, Paraguay maintains relatively high levels of reserve requirement on foreign currency deposits. Tanzania maintains same required reserve ratio for both domestic and foreign currency deposits and they are all held in domestic currency.

As noted earlier, financial dollarization is at moderate levels, and there does not appear to be an urgent need for authorities to directly intervene. However, implementing some policy measures could help to lower financial dollarization to levels similar to those of other countries in the region. First, the authorities need to ensure that long-term macroeconomic stability is maintained. There is substantial evidence which suggests that dollarization in general is driven by a desire by firms and households to hedge against inflation and exchange rate risks. As such, macroeconomic policies that ensure long periods of low inflation rate and stable exchange rate could go a long way towards reducing demand for foreign currency deposits. Second, concerted efforts could be directed towards developing a vibrant financial market with increased range of investment outlets in the form of local currency denominated interest bearing assets. Such a move could provide alternative investment opportunities to foreign currency deposits. Available evidence suggests that dollarization of deposits tend to be higher in countries with limited capital markets and lack of competing investment instruments. Therefore additional financial and banking sector reforms aimed at deepening and broadening the domestic financial markets would be a worthwhile endeavor to pursue.

The authorities should also avoid seeking to reduce financial dollarization through direct measures because international evidence suggest that enforcing de-dollarization can potentially be counter-productive. Galindo and Leiderman (2005) present evidence of unsuccessful forced de-dollarization in some Latin American countries. For example, they show that in 1982 the Bolivian authorities forced all dollar deposits in the banking system to be converted to domestic currency deposits at an exchange rate below the market rate and subsequently prohibited holding of dollar deposits. In response to this (and the high rates of inflation prevailing at the time) off-shore deposits grew significantly and financial intermediation declined sharply. Peru experienced a similar incidence. In 1985 dollar deposits in the banking sector were forcefully converted to domestic currency deposits but two years later the ban on foreign currency holding was lifted, largely due to substantial decline in the domestic financial intermediation and capital flight. Other countries that have gone the route of forced de-dollarization with little success include Pakistan (1998) and Argentina (2001).

There are also examples of countries where a gradual, market-driven de-dollarization have had some success. Galindo and Leiderman (2005) identifies three countries (Chile, Israel and Poland) that have been able to de-dollarize their financial systems successfully through market oriented measures and better macroeconomic management<sup>19</sup>. In general, these countries implemented policies to promote market oriented de-dollarization as part of broad economic stabilization programs. This includes policies to keep exchange rate and prices stable, introduction of hedging instruments (such as financial derivatives) and development of CPI- indexed debt instruments (for full discussion of de-dollarization experience in Chile see Herrera and Valdes , 2003).

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<sup>19</sup> Successful de-dollarization is defined as a country been able to reduce the ratio of foreign currency deposits from above 40 percent to less than 20 percent and maintain it at those levels for at least 5 consecutive years

Also Mercedes (2010) presents a case of successful market-driven financial de-dollarization in Peru since 2001 to the present. The author suggests that de-dollarization in Peru during this period has mainly been driven by macroeconomic stability following the adoption of inflation targeting framework in 2002 and subsequently decline in inflation and significant improvement in the public debt. Also during this period the Government introduced several prudential policies intended to lower bank's incentives to borrow and lend in foreign currency. In addition the Peruvian Government has been actively developing its domestic asset market in order to provide alternative savings instruments. As a result of these policies, financial dollarization in Peru declined by about 25 percentage points during 2001 to 2009.

With respect to transaction dollarization, there are potential risks associated with excessive use of foreign currency as a medium of exchange in the domestic economy. First, it increases the demand for foreign currency to finance non traded goods and services which in turn put undue pressure on the exchange rate. Second, empirical evidence show that exchange rate movements in dollarized economies feed through domestic inflation more rapidly compared to non-dollarized economies. This is because the local price of goods and services quoted in foreign currency changes immediately even for a small change in exchange rate. In addition, transaction dollarization creates some inconvenience to residents whose stream of income is in domestic currency, and have to incur *shoe leather* cost of converting their income in to foreign currency before they can use it.

There are several options that Tanzanian authorities could consider pursuing in order to limit the use of foreign currency as a medium of exchange for goods and services in the domestic economy. A guiding principle here is that policy measures should generally aim to enhance the attractiveness of domestic currency (Tanzanian shilling) rather than seeking to outlaw the use of foreign currencies, but a minimum amount of direct intervention such as instituting certain laws may also be warranted. Measures to improve the attractiveness of domestic currency, in addition to maintaining stable exchange rate, could include for example, increasing the denomination of Tanzanian banknotes. As noted in section 3 the largest denomination of Tanzanian shilling is currently the equivalent of about 7.5 US dollars, which is the smallest in the EAC region. Given that Tanzanian economy is largely cash based; this may potentially make the currency less attractive for carrying large ticket transactions. Erasmus et al (2009) for example, noted that issuance of large denominations of banknotes in Cambodia increased the demand and use of the local currency.

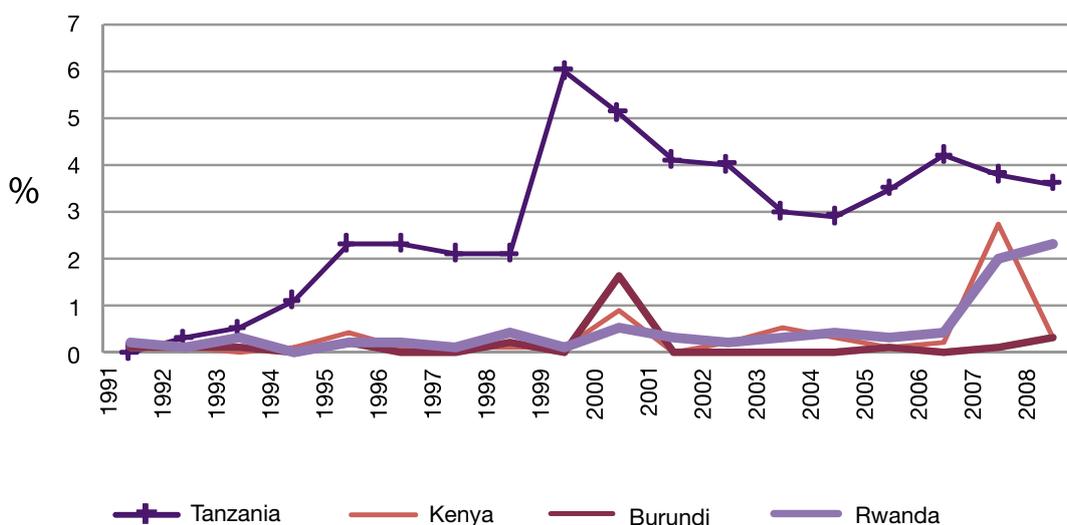
A more direct intervention would be for the authorities to impose a regulation that requires that only Tanzanian Shilling can be used as a medium of exchange in domestic transactions. As noted in section 1, a move in this direction was attempted in August 2007 when the Minister for Finance issued a "Government Statement" in the Parliament stipulating that all commercial transactions in the country should henceforth be priced in Tanzanian shilling. The Minister directed that for goods and services whose main consumers are foreigners, prices could be quoted in both local and foreign currencies using the market exchange rate. The Minister's directives were essentially a direct intervention by the Government to promote Tanzanian shilling as the sole medium of exchange in the country<sup>20</sup>. However, these directives have had no effect partly because they are not backed by the existing laws or regulations. The current law declares the Tanzanian shilling as "the only legal tender" in Tanzania<sup>21</sup> but this does not mean that no payment can be made in other currencies. All it means is that no one in Tanzania can legally refuse settlement of a debt in Tanzanian shilling. The Foreign Exchange Regulations, 1998 (part II section 3(5)) implicitly permits payments in foreign currency within Tanzania as it states that "*any person maintaining a Foreign Currency Account may at any time and without any restrictions, draw any amount of foreign currency for the purpose of making payment within or outside Tanzania*".

<sup>20</sup> A similar but more targeted intervention was successfully implemented in early 2000's to ban the use of foreign currency in pricing mobile phone airtime cards.

<sup>21</sup> The Bank of Tanzania Act 2006, Article 26 and 27

The Foreign Exchange Act 1992 (section 6 and 7) empowers the Bank of Tanzania to make regulations, rules, orders or directives in relation to foreign exchange matters. The Bank could use these provisions to impose a limit to which businesses can use foreign currency in domestic transactions. For example, a law could require all businesses intending to perform transactions in foreign currency to obtain a license from relevant authorities (BOT , MOFEA etc.). The Bank of Tanzania could then develop a set of criteria that applicants should have to meet in order to qualify. The objective of such a policy measure would not be to outright ban the pricing or selling of goods and services in foreign currency but rather would be to ensure that such practices are done for bona fide reasons. It would also make it easier for authorities to monitor the flow of foreign currency in the country because businesses operating in foreign currency could be required to report the volume of their transaction for monitoring purposes. A similar regulation is in place for example, in Malawi, where all firms performing transactions in foreign currency including tourist hotels and international schools are required to obtain a license from Reserve Bank of Malawi. Other countries have tried to discourage the use of foreign currency as medium of exchange by imposing a tax on payments made in foreign currency. For example Peru introduced a 2 percent tax on checks denominated in foreign currency to encourage the use of local currency in payments (Erasmus et al 2009).

Figure 6.1: EAC Countries: Foreign Direct Investment, Net Inflows (% of GDP)



Source: World Bank (World Development Indicators)

Table 6.1: Average Growth of Goods Exports- Some EAC Countries (1970 – 2008)

	1970's	1980's	1990's	2000-2008
Tanzania	9.2	-0.8	3.5	17.5
Kenya	17.1	-0.2	7.6	13.4
Uganda	-	5.9	14.5	14.9

Source: WEO database

## Appendix 1: Unit root test results<sup>22</sup>

Variable	ADF test statistics in levels	Critical values	ADF test statistics in first difference	Critical values	Order of integration
Asset Substitution Ratio	-1.8	-2.58	-12.48	-2.58	I(1)
Volatility	0.48	-2.61	-11.20	-2.59	I(1)
Volume	-0.31	-2.58	-12.3	-2.58	I(1)
Inflation	-1.79	-3.49	-10.15	-3.49	I(1)
Expected return	-1.45	-2.59	-8.97	-2.59	I(1)

<sup>22</sup> The decision rule is that if the absolute calculated values are lower than the absolute critical values then the series have a unit root or are non-stationary.

## References

- P. Álvarez-Plata and A. García-Herrero, (2008) "To Dollarize or De-dollarize: Consequences for Monetary Policy". Paper prepared for the Asian Development Bank, also DIW Discussion Paper 842.
- H. Bleakley and K. Cowan, (2002) "Corporate dollar debt and depreciations: much ado about nothing?," Inter-American Development Bank, Research Department, Working Paper #532
- T. Bolino, A. Bennett and E. Borensztein (1999). "Monetary Policy in Dollarized Economies", IMF Occasional Paper n. 171 (Washington, DC: IMF).
- E. Borensztein and A. Berg, (2000) "The Choice of Exchange Rate Regime and Monetary Target in Highly Dollarized Economies," IMF Working Papers 00/29, (Washington, DC: IMF).
- M. Čihák and R. Podpiera, (2005) "Bank Behavior in Developing Countries: Evidence from East Africa". IMF Working Papers *WP/05/129* (Washington, DC: IMF).
- G. De Nicolo, P. Honohan and A. Ize (2005) "Dollarization of bank deposits: Causes and Consequences," *Journal of Banking and Finance* 29: 1697-1727.
- E. L. Feige, M. Faulend, V. Sonje and S. Vedran, (2002) "Currency Substitution, Unofficial Dollarization and Estimates of Foreign Currency Held Abroad: The Case of Croatia" in Mario Blejer and Marko Skreb (ed) *Financial Policies in Emerging Markets* (Massachusetts: MIT Press).
- S. Fischer, (2006) "*Dollarization*", Keynote address at the 75th Anniversary Conference of the Central Bank of the Republic of Turkey, Istanbul, December 13-15 2006.
- A. Galindo and L. Leiderman, (2005) "Living with dollarization and the route to dedollarization", IADB *Research Department Working Paper # 526*.
- W. Gruben and J. Welch, (1996) "Default Risk and Dollarization in Mexico". *Journal of Money, Credit and Banking* 28:393-401.
- N. D. Gujarati, (1995) *Basic Econometrics* (New York: McGraw-Hill).
- L.O. Herrera, and R. Valdés. 2003. "Dedollarization, Indexation and Nominalization: The Chilean Experience." United States: Inter-American Development Bank Discussion Paper. Available at <http://www.bcentral.cl/estudios/documentos-trabajo/pdf/dtbc261.pdf>.
- P. Honohan, (2007) "Dollarization and exchange rate fluctuations," World Bank Policy Research Working Paper Series 4172 (Washington, DC: World Bank).
- A. Ize and E. Levy-Yeyati, (2003) "Financial dollarization," *Journal of International Economics*, (59), 323-347.
- B. Kamin and N. R. Ericsson, (2003) "Dollarization in post-hyperinflationary Argentina," *Journal of International Money and Finance*, Elsevier, vol. 22(2):185-211.
- E. Lodewyk, J. Leichter and J. Menkulasi, (2009) "Dedollarization in Liberia: Lessons from Cross-country Experience". IMF Working Papers WP/09/37 (Washington, DC: IMF).

S. Meyer, (2000) "Dollarization: An Introduction", paper presented at the Philadelphia Council of Business Economics.

L. Martinez and A. Werner, (2002) "The Exchange Rate Regime and the Currency Composition of Corporate Debt: The Mexican Experience." *Journal of Development Economics* 69: 315-334.

R. Nord et al, (2009) "Tanzania: The Story of an African Transition" *IMF Paper*. Available at: <http://www.imf.org/external/pubs/ft/books/2009/tanzania/tanzania.pdf>.

M. Reinhart, S. Carmen, K. Rogoff, and A. M. Savastano, (2003) "Debt Intolerance." *Brookings Papers on Economic Activity* 1 (Spring): 1-74.

M. Saxegaard, (2006) Excess Liquidity and Effectiveness of Monetary Policy: Evidence from Sub-Saharan Africa; *IMF Working Paper 06/115* (Washington, DC: IMF).

H. Zoryan, (2005) "The Measurement of Co-Circulation of Currencies and Dollarization in the Republic of Armenia" *European Journal of Comparative Economics* 2(1): 41-65

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