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The Impact of Deposit Dollarization on Financial Deepening

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ABSTRACT Banks in highly dollarized economies face risks that significantly affect their ability to perform their financial intermediation role. In these economies, dollarization plays a dual role: on one hand, it provides a hedging instrument protecting the value of savings and, on the other hand, it generates currency mismatch on banks' balance sheets and increases default risk. Through these effects deposit dollarization can impact credit extension. This paper investigates the role of deposit dollarization on the financial depth of 44 emerging market economies. Findings suggest that deposit dollarization has a consistent and negative impact on financial deepening, except in high-inflation economies.

Keywords: Dollarization, Financial Development, Financial Deepening
JEL: F31 G21 O24

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Introduction

Financial deepening refers to the availability of funds provided by financial intermediaries to the final users (individuals, governments and firms). Previous literature have shown that financial deepening over the long run is an important catalyst for economic growth in emerging markets (see Darrat et al.(2006) among others). Besides cultural and institutional variables; macroeconomic stability, especially a low inflation rate, is closely linked with strengthening of financial systems. In general, in an inflationary environment banks lend and allocate less capital, stock markets become smaller and less liquid and, savers save less and prefer physical assets than financial ones.

It is also recognized that one of the main reasons for the appearance of dollarization¹ is the erosion of money's function as a store of value (the Currency Substitution hypothesis).² It has not been uncommon for countries with high inflation rates to also have high dollarization ratios. Dollarization gives consumers a shelter from domestic inflation and enables savers to retain the value of their savings. In this sense, dollarization does not only serve as a hedging instrument but also provides an incentive for savings which are very much needed in developing financial systems. As Feige (2003) points out, by offering an alternative investment mechanism, dollarization also helps to stop capital flight from those economies.

Following the Currency Substitution hypothesis, it is expected that dollarization ratios of an economy should decrease with declining inflation. However, in many developing countries this is not the case, i.e. even though inflation has been effectively controlled, dollarization has not declined significantly (at least not as much as it is expected by the Currency Substitution hypothesis).

In economies where inflation is controlled and dollarization ratios remain high, dollarization could have a negative economic impact: as dollarization increases, the more vulnerable a country's banking system becomes to sudden exchange rate movements. This is explained by considering two types of risks that any banking system faces: Banks' currency mismatch and loan default risks. The former occurs when banks receive deposits in foreign currency and lend in local currency. In this case, if there is a sudden drop in the value of the local currency, banks' liabilities increase in local currency terms, while their assets remain the same. In such cases, banks might need extra local currency in their reserves to cover their liabilities.

The latter type of risk, i.e. the default risk, appears when banks receive foreign currency deposits and lend in foreign currency to offset the possibility of the first type risk (natural hedge). In this case if a sudden devaluation (or depreciation) occurs, banks are not faced with a mismatch on their balance sheets. However, the sudden devaluation (or depreciation) will have a direct impact on debtors' ability to repay their loans, i.e. debtors face -directly- the currency risk increasing the banks' clients' default risk.

In a recent paper Kutun et al. (2010) provide supporting evidence to this effect and show that deposit dollarization has a negative and persistent impact on bank profitability in dollarized economies. In another recent paper Ozsoz et. al. (2010) have showed that central banks' interventions in foreign currency markets can be predicted to a great degree of certainty in highly dollarized transition economies. Ozsoz et al.(2010) argue that policy makers in these countries intervene in forex markets in an effort to avoid bank crises that could result from banks' exposure to currency mismatch risk on their balance sheets. Feridun (2009) provides partial support to this view by showing that there is a causal and a feedback relationship between speculative pressure on a currency in the case of Turkey and banking-sector fragility.

In another related paper Ozkan et al. (2010) evaluate banks' reliance on foreign currency financing in emerging market economies and show that the greater the government's reliance on bank lending in these economies, the greater is its exposure to exchange rate risk.

Even though there have been studies on the effects of full dollarization on real economic variables such as growth and employment³ there has been limited literature on the effects of partial dollarization on the development of financial systems. De Nicolo et al. (2005) are the first to empirically assess the effect of dollarization of bank deposits on the financial deepening of a country.⁴ Their findings suggest that mainly for higher inflation economies, dollarization strengthens the financial system through the moderating effect of dollarization on the adverse effects of inflation on monetary depth and that “...*dollarization may have little impact on monetary depth where risk factors summarized by inflation are low...*” (De Nicolo et al, pp 1712). Furthermore, they recognize that the more the dollarized the system, the riskier it is.

In this paper we estimate the impact of dollarization on financial deepening by using different models and specifications. We also use two new regressors that control for creditor rights and consumer credit information availability that has been used recently by Galindo and Micco (2005), Djankov et al. (2005) and Dehesa et al. (2007). Strong creditor rights enable seizure of delinquent assets and reduce the cost of monitoring borrower quality. Banks are expected to lend more in environments where they have a clear system in place for the repayment of loans. Availability of a credit monitoring bureau increases efficiency in the banking system through exchange of information between creditors regarding the credit-worthiness of a borrower. Such information sharing lowers each bank’s monitoring costs. Banks are also expected to lend more in such environments as previous studies by Stiglitz and Weiss (1981) have shown.

Using a sample of 44 developing countries with high dollar denominated deposits and different levels of inflation, we study the effect of deposit dollarization (measured as the ratio dollar deposits to total bank deposits) on financial deepening of these countries (measured as the ratio of domestic credit extended by the banking system to the private sector to the GDP).

We find that in countries with moderate inflationary processes, deposit dollarization consistently and significantly exerts a negative impact on financial deepening. Our findings also indicate that dollarization has a moderating effect on the adverse effects of inflation on financial depth in high inflation economies.

We provide evidence from a battery of models and by using alternative measures to verify the consistency of our results. We analyze the results by regions (Asia, Transition Economies and Latin American),⁵ introduce the use of a different coefficient of the Minimum Variance Portfolio as suggested by Neanidis and Savva (2009)⁶ and finally, we use the specification of De Nicolo et al. (2005) and regress our dataset on the same set of variables used by these economists. In order to make our results comparable we follow their methodology and also use the same institutional, regulatory and macroeconomic variables.

The results we obtain under different specifications verify that indeed deposit dollarization has a negative impact on financial deepening in low inflation environments. Moreover and consistent with De Nicolo et al. (2005), we find that dollarization moderates the effects of inflation on financial deepening under high inflation. The plan of the paper is as follows: in the following section we describe the data used in the paper. In the “Methodology” Section we present the methodology followed; Section titled “Estimation Results” shows the results of our paper under different models; and we conclude in the last section.

Data

The panel dataset used in the empirical estimations covers twelve years (1990-2002) and 56 countries. However, a full dataset is only available for a six year period between 1996 and 2002 that corresponds to 44 countries when we use DDOLL as our dollarization measure. The credit-to-GDP ratios are calculated using the domestic credit and nominal GDP figures reported by the IMF in its IFS database. Inflation data is also obtained from the IMF-IFS and is

calculated as the change in CPI.

In measuring dollarization ratios we use the ratio of foreign currency deposits to the overall level of deposits in the banking system (). We also use foreign currency deposits to M2 ratio () as a variable for additional robustness check.⁷ The amount of foreign exchange deposits in the banking system is obtained from Central Bank bulletins. For countries and for years for which the data is not available from the CB bulletins, the foreign currency deposit database compiled by Levy-Yeyati (2006) is used.

Regarding our instrumental variables used, two of them, Creditor Rights Index (CRI) and Private Credit Bureau Availability Dummy (PB) are obtained from Simeon Djankov and Shleifer (2007) and available by the authors on World Bank's Doing Business website. The other variable is obtained from Kaufmann et al. (2009). We use the real Gross Domestic Product per capita in US dollars () as reported by Penn World Tables. A complete list of countries included in the study along with data definitions and sources can be found in Table 1.

[Table 1]

Methodology

Financial deepening is usually measured as the ratio of either M2 or M3 to the level of nominal GDP (World Bank (1998), King and Levine (1993)). However, the ratios of M1 to GDP or bank deposits plus currency to GDP have also been used. Another proxy is the development of credit markets. This proxy was used in recent literature by De Nicolo et al. (2005) and Dehesa et al. (2007). The two studies have taken the ratio of domestic credit to the nominal GDP. In this paper we follow these authors and employ their proxy as the main indicator of financial deepening. As mentioned earlier, we employ a battery of different models from literature to check whether deposit dollarization has any impact on the financial depth of an economy as suggested. These models are presented below:

Model 1

One of the important determinants of financial deepening as recent literature has showed is institutional quality and creditor rights. In studying the impact of deposit dollarization on financial deepening we first follow the work of Dehesa et al. (2007) who have recently used two new regressors that control for creditor rights and consumer credit information availability. Our econometric specification takes the following form:

$$\text{---} \quad (1)$$

Where, is the domestic credit for country i in year t , represents the nominal GDP in country i in year t ; is the creditor rights index which ranges from 0 (low protection) to 4 (high protection). This index shows the relative easiness of seizing collateral by creditor if the debt obligation is not fulfilled.

The variable equals 1 if a private credit bureau operates in the country, 0 otherwise. A private bureau is defined as a private commercial firm or non-profit organization that maintains a database on the standing of borrowers in the financial system and its primary role is to facilitate exchange of information amongst banks and financial institutions. The variable is an equally-weighted average of the six institutional quality variables

compiled by Kaufmann et al. (2009): Government Efficiency, Political Stability, Regulatory Quality, Rule of Law, Voice, and Corruption. The six governance indicators are measured in units ranging from -2.5 to 2.5, with higher values corresponding to better governance outcomes. Finally, $\ln y_{it}$ is the logarithm of per capita income in country i in year t ; $\ln d_{it}$ is the ratio of the dollar deposits in country i in year t to the overall deposits in the banking system. I_{it} is a dummy variable that takes the value of 1 if the inflation rate in country i in year t is over 20% and 0 otherwise and, ϵ_{it} is the error term.

We estimate Eq(1) by introducing each variable in a separate specification and at the aggregate level (considering all the countries in our sample) and also at the regional level (Asia, Latin America and Transition Economies - Even though our dataset included 10 African and Middle Eastern countries, we could not perform regional estimations for these groups of countries due to the low number of observations available).

Model 2

The only paper in literature that has investigated the impact of dollarization on financial deepening is by De Nicolo et al. (2005). We have also decided to follow their empirical methodology in checking the consistency of our results. Their main equation takes the following form:

$$\ln d_{it} = \alpha + \beta_1 \ln y_{it} + \beta_2 I_{it} + \beta_3 \ln GDP_{it} + \beta_4 D_{it} + \beta_5 I_{it} \times D_{it} + \beta_6 \ln \pi_{it} + \beta_7 \ln y_{it} + \epsilon_{it} \quad (2)$$

where $\ln d_{it}$ is the domestic credit for country i in year t , $\ln GDP_{it}$ represents the nominal GDP in country i in year t ; D_{it} represents dollarization; $I_{it} \times D_{it}$ represents the interaction between dollarization and inflation; $\ln \pi_{it}$ represents the natural logarithm of the inflation and $\ln y_{it}$ is the logarithm of per capita income. As mentioned by De Nicolo et al. (2005), this specification presents potential endogeneity problems as some factors influencing financial deepening can also be influencing deposit dollarization. That is why to correctly estimate Equation (2), we use an instrumental variable method (the 2SLS) and use as instruments macroeconomic, institutional and regulatory variables that are correlated with deposit dollarization and that are uncorrelated with the errors.

We use the same set of instrumental variables as in De Nicolo et al. (2005), including IQ_{it} , that stands for institutional quality, MVP_{it} the Minimum Variance Portfolio coefficient, which has been shown in literature to play a significant role in determination of financial dollarization;⁸ RC_{it} which is an index of restrictions on the holdings of foreign currency deposits and $\ln GDP_{it}$ which is the natural log of the real GDP per capita.

As a final robustness check we use two different specifications of the Minimum Variance Portfolio (MVP and MVP2). The main drawback of using the MVP coefficient as estimated by De Nicolo et al. (2005) is that it considerably reduces the number of observations in our sample. This is due to the fact that in order to compute the MVP we need to use the real effective exchange rate, which in many cases is not available from the IMF IFS database for all of the countries in our sample. To overcome this problem, we use a new specification of our instrumental variable MVP (that we name MVP2) to estimate Equation (2). We follow the recent work of Neanidis and Savva (2009) who estimate the MVP as the ratio of the conditional variance of inflation to the conditional covariance between inflation and depreciation of the nominal exchange rate. This variable enables us to increase our data size significantly (from 23

countries and only 107 observations in Table 3 to 40 countries and to 180 observations as reported in Table 4).

Estimation Results

In this section we provide the results of our estimations using the two models that have been presented in the methodology section.

Results of Model 1

Results of our estimations for our first model (Eq. (1)) are listed in Table 2. As expected in all specifications, our institutional quality variables namely, CRI, PB and INST have a positive and significant effect on financial deepening. The coefficient of CRI is around 0.1 suggesting that a one-step increase in the value of this variable increases the credit to gdp ratio by 10%, while a similar one step increase in the average institutional quality of the country leads to a 13-15% increase. The availability of a private credit monitoring bureau (PB) increases the credit ratio by almost 25%. Consistently, the influence of PB(the availability of a private credit monitoring bureau) is the largest one, followed by INST(the equally-weighted average of the six institutional quality measures). This points out to the importance of private credit bureaus and of strong institutions in the development of financial systems. The existence of a private credit bureau in the country along with strong institutional quality is highly correlated with a more established credit market. In general, our finding reaffirms those of Dehesa et al. (2007). Finally, the per capita income (CGDP), which can be thought of an economic development proxy, has almost no effect once we control for the other variables.

[Table 2]

We can also observe that the effect of deposit dollarization (DDOLL) is statistically significant and negative (-0.514) as shown in specification (1.5) in the Table 2. It suggests that a 10% increase in the ratio of foreign currency deposit accounts to the M2 level in the economy, lowers domestic credit extended by the banking system to the GDP ratio by 5%. This result partially contradicts the conclusions of De Nicolo et al. (2005) who found that dollarization exerts little influence in financial deepening. However, our results are consistent with the authors in the sense that we also observe that the influence of deposit dollarization on high inflation countries () has a moderating effect on the adverse effects of inflation on financial depth (the interaction term has a positive coefficient of 0.487). The high inflation dummy (), as expected, is negative and its effect is significant meaning that the higher the inflation the shallower the financial system is. The coefficient of this variable is -0.29 suggesting that in economies where the inflation rate is over 20%, the credit-to-GDP ratio is reduced by almost 30%.

The regional results of Eq(2) also produce similar results. We find that the coefficient of the Creditor Rights Index ranges from 0.178 to 0.2 for the Asian economies, from 0.135 to 0.193 for Latin American countries and from -0.06 to 0.04 for transition economies under different specifications. The relatively low value of this variable for the Transition Economies sample is striking. It suggests that the protection of creditor rights has the least impact on financial depth in these economies. The regional results also suggest that the availability of a private credit bureau in the country has a significant and positive impact on financial deepening with the average coefficient of this variable averaging 0.196, 0.22, and 0.18 for the Asian, Latin American and Transition economies. The coefficient of the dollarization variable for the three

groups ranges from -0.281 in the case of the Latin American sample to -0.368 for Asian economies, suggesting that deposit dollarization has the most negative impact on the extension of domestic credit in the case of Asian economies.

Results of Model 2

We follow De Nicolo et al. (2005) in setting up our specification for our model 2 to verify our results from model 1. We report these results in Tables 3, 4 and 5. The regional results are also available upon request.

Table 3 provides the results of our estimation using Eq.(2) under different specifications. Table 4 provides the results of the same specifications by using MVP2 (as computed by following the methodology of Neanidis and Savva (2009)) as an instrument as opposed to MVP. As mentioned before, the reason we estimate the same specifications by using two different versions of the MVP variable is we want to see if our results are consistent under different definitions of the same variables. The summary results of specifications 2.9 and 2.10 from Tables 3 and 4 are presented in Table 5. We concentrate on these two equations in Table 5 because they contain all the variables of interest and because they are computed using the 2SLS to control for endogeneity. These two equations correspond to two equations of De Nicolo et al. (2005) (Eqs. (2.12) and (2.13)).

[Table 3]

[Table 4]

[Table 5]

In all the reported specifications, we can see that consistently dollarization (DDOLL) has a negative and significant coefficient. The value of this coefficient is higher (in absolute value) for the case of MVP2. In all cases one can also appreciate that this coefficient is the largest of all. The coefficient of the dollarization variable ranges from -0.412 to -0.936 suggesting that a 10% increase in the deposit dollarization ratio can reduce the credit-to-gdp ratio by almost 4 to 9 percent in the countries studied.

These results support our previous findings and allow us to state that dollarization has a negative, significant and strong effect on financial deepening of the countries, once inflation has been controlled. In the event that inflation is present (), our results suggests that dollarization plays a moderating effect on the adverse effects of inflation on financial depth of an economy. Note however, that the coefficient values in this case are smaller than those of DDOLL. Again, these results are consistent with our previous results presented in Table 2.

Finally and as expected, inflation (INF) has a negative and significant coefficient and the variable that accounts for institutional quality (INST) has a positive and significant coefficient. The coefficient of INF varies between -0.03 and -0.16. This means that a one percent increase in the inflation rate lowers the credit-to-gdp ratio in the countries studied between 0.03 and 0.16 percent. For the institutional quality variable the coefficient is around 0.15 suggesting that a one-step increase in the value of this variable increases credit-to-gdp ratio by 15%. The results at the regional level also support this view. This result is not surprising given that previous literature (such as Graff(2003) among others) have demonstrated that institutional quality and culture are important in the financial development of transition and emerging market economies.

In economies with controlled inflation it appears that dollarization of deposits in a banking system, slows financial development by limiting domestic credit. The cause of such restriction of credit in a dollarized economy we believe can be attributed to the currency mismatch and loan default risks that banking systems face in a dollarized environment. We can also link this result with the findings of Kutan et al. (2010) who show that dollarization exerts a negative impact on banks' profitability, and at the same time can contribute to the shallowness of the financial system. The more foreign currency depositors want to keep in their bank accounts, the higher risk banks face in terms of currency mismatch or loan defaults. In an effort to minimize their exposure to such risks, banks may find it in their best interests to be more careful in selecting their loan portfolio. Banks may scrutinize their credit applications more vigorously to make sure their borrowers have the ability to repay their loans independent of fluctuations in the value of the local currency and sometimes will not be willing to provide capital to good projects based on this exchange rate exposition. This effect is reduced (but not completely eliminated) when an economy has high inflation. In this last case, as many authors have found, dollarization acts as an alternative investment mechanism that helps to stop capital flight by providing incentives to savers to keep their assets in their countries (Feige (2003)).

Our findings seem contrary to some of the previous research on the issue (mainly by De Nicolo et al. (2005)) but reinforce the notion that the whole dollarization phenomenon has still many unknowns and should be the topic of future research. We believe the field will benefit from further studies on the topic especially regarding the mechanics of such relationship between the two variables (financial deepening and deposit dollarization).

Conclusion

Existing literature has shown that high inflation, weak institutions and financial instability contribute to shallowness of financial systems. It has also been shown that dollarization is common in economies that have the conditions mentioned above. By providing an alternative method for savings besides the local currency which is constantly eroding in value, foreign currency savings in an inflationary economy can actually promote financial deepening. However, proponents of the currency mismatch theory have argued that enabling foreign currency denominated or indexed accounts in the banking system could increase vulnerability of the banking system to outside shocks by creating mismatches on balance sheets. In either case, dollarization should have an effect on financial deepening of an economy. Empirically there have been limited studies that investigate the link between the two: dollarization and currency mismatches and their effect on financial deepening. Our aim in this paper has been to contribute to the literature in that regard.

By using a sample of 44 dollarized banking systems, we have tested the effect of deposit dollarization on the financial deepening of these economies by using a battery of models. Our findings suggest that dollarization has a consistent and significant negative effect on the financial deepening of economies in our sample. Our results also suggest that in high inflationary economies dollarization has a moderating effect on inflation. These findings are also consistent at the regional level.

There are important implications of our findings: they show that any evaluation of partial dollarization should take into account inflation. The benefits and costs of dollarization are more clearly understood with inflation in the background. While dollarization may have a positive effect on the financial depth of an economy with high inflation by providing an alternative avenue of savings for local agents and thus preventing capital flight, it seems to undermine the extension of credit in an economy by increasing currency or default risks through currency mismatches when inflation has already been controlled. Policy makers in dollarized economies should consider these two separate effects of dollarization in setting up policy regarding foreign currency deposits in their banking systems.

Moreover, our findings show that the institutional variables are crucial for financial deepening of an economy. The strong creditor rights, the availability of private credit bureaus and institutional quality have all positive and significant effects on financial deepening. Consistently across all our specifications, the influence of private credit bureau availability is the largest one, followed by institutional quality and creditor rights. This points out to the importance of private credit bureaus and the need for strong institutions in the development of financial systems.

Notes

1. We use the term "dollarization" to refer to use of foreign currency, mostly the US Dollar, in addition to a country's local currency by residents in an economy. We exclude from our analysis the cases of full-dollarization where the country gives up its monetary sovereignty and adopts another country's currency in exchange of their own. Our analysis is focused on countries where local currency is still the legal tender but where savers and borrowers choose foreign currencies for their transactions.
2. For more on Currency Substitution hypothesis, see the surveys by Calvo and Vegh (1997), Savastano (1996) and by Giovannini and Turtelboom (1994).
3. Dornbusch (2001) shows that full dollarization positively affects growth by resulting in lower interest rates, higher investment and faster growth. Rose (2000) emphasizes the effect of dollarization on economic growth through increased trade due to the use of a common currency.
4. De Nicolo et al. (2005) also point out the lack of a theoretical framework or empirical literature on this issue
5. We cannot analyze Africa and Middle East due to the small number of countries in our dataset.
6. The advantage of this coefficient is that it is computed using the nominal inflation rate (as opposed to the real effective inflation rate) that is available for more countries, considerably increasing our sample size.
7. Results are available upon request.
8. See Levy-Yeyati (2006) and Ize and Levy-Yeyati (2003) for an explanation of how MVP plays an important role in financial dollarization.

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