Capital Account Liberalization, Financial Depth, and Economic Growth

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Abstract

We show a statistically significant and economically relevant effect of open capital accounts on financial deepness and economic growth in a cross-section of countries over the period 1986 to 1995. Countries with open capital accounts over some or all of this period had a significantly greater increase in financial depth than countries with continuing capital account restrictions, and they also enjoyed greater economic growth. These results, however, are largely driven by the developed countries included in the sample. The observed failure of capital account liberalization to promote financial deepness among developing countries suggests potentially important policy implications concerning the desirability of opening up the capital account.

1 Introduction

The 1990s have been marked by a series of crises, which have disrupted both exchange rate arrangements and financial systems. These crises have often occurred in the wake of capital account liberalization, calling into question the advisability of relaxing controls on international capital flows. In addition, a striking characteristic of these crises is their proximate timing across countries, a feature commonly referred to as "contagion." Many have pointed to the capital account as a potentially important channel through which contagion occurs. For these reasons, an increasingly popular policy prescription is to limit capital account convertibility.[1]

A traditional view among economists, however, is that open capital markets, like open markets for goods and services, enhance welfare. The free flow of capital, while limiting policy autonomy, offers increased efficiency through better resource allocation and risk diversification opportunities unavailable in a closed economy. Thus, many economists' first inclination is to favor free trade in assets as well as in goods and services.

Another possible reason for favoring open capital markets is that foreign borrowing and lending may contribute to the development of a country's financial system. A well-functioning financial system provides a set of markets for borrowing and lending, which mitigates problems of asymmetric information and transaction costs, thereby mobilizing savings, efficiently allocating resources, facilitating risk management, exerting corporate control, and easing the trade of goods and services.[2] A country may "import" a financial system through capital inflows; for example, subsidiaries or branches of foreign banks may expand the size of the national banking system and may also introduce financial innovation that increases the scope of financial services. Financial markets have been shown to be an important factor in promoting growth. Thus, opening capital markets, by promoting financial depth, also promotes overall economic growth.

In this paper, we demonstrate a statistically significant and economically relevant effect of open capital accounts on financial deepness and, through this channel, on economic growth. We study a wide cross-section of countries over the period 1986 to 1995. Countries with open capital accounts over some or all of this period enjoyed a significantly greater increase in financial depth than countries with continuing capital account restrictions. This deepening of financial markets is over and above our finding of *finan-*

[1] See, for example, Rodrik (1998, 1999), and Bhagwati (1998).

[2] Levine (1997) provides a thorough review of the literature.

cial convergence, whereby countries initially having lower levels of financial depth caught up, to some extent, to those countries that began the period with greater financial depth. Quantitative estimates indicate an important effect of capital account liberalization on economic growth through the channel of financial deepening. These estimates point to the importance of both the initial level of financial depth and its predicted growth for explaining an economically relevant portion of economic growth.[3]

The policy implication drawn from this result, however, must be tempered by other evidence we present in this paper. The significance of the link between capital account convertibility and financial deepness seems to be driven largely by the industrialized OECD-member countries included in the cross-section. This group of highly developed countries has experienced a significant degree of capital account liberalization over the last twenty years, while only a smaller fraction of developing countries liberalized their capital accounts. But the failure to find a significant effect of capital account liberalization on financial deepness among countries that are not members of the OECD may not be due to the paucity of experience with opening up capital markets among developing countries. Evidence drawn from the set of Latin American countries, a set that includes many cases of capital account liberalization, also largely fails to find a significant effect of capital account liberalization on financial deepness. Therefore, one interpretation of our findings is that countries require a constellation of economic, legal, and social institutions, institutions present in industrial countries but less common among developing countries, in order to have capital account liberalization translate to greater financial depth.[4]

In the next section of this paper we present our measures of financial depth and capital account openness and discuss properties of these measures. The regression results in Section 3 use both OLS and instrumental variables estimation to show that capital account liberalization leads to a significant increase in financial deepness, while subsample stability checks indicate that such an effect in the broad cross-section of countries is mainly driven by the OECD subsample. Section 4 presents growth regressions and offers calculations on the effect of capital account liberalization on economic

[3]These results confirm previous work on the link between the initial level of financial depth and subsequent growth, such as King and Levine (1993). In Section 4 we discuss how financial convergence, which implies a link between the initial level of financial depth and its subsequent growth, affects the estimation of the relationship between financial deepness and economic growth.

[4]The need for the presence of well-functioning economic, social, and legal institutions in order to realize benefits from opening an economy has been stressed by Rodrik (1999).

growth. Section 5 concludes.

2 Indicators of Financial Depth and Capital Account Liberalization

It is difficult to construct a single quantitative measure that captures the extent to which financial markets in a country fulfill their potential roles, a difficulty compounded when studying a widely heterogeneous set of countries. Likewise, there are several ways to gauge the ease with which assets are traded across a country's border. In this section we discuss the measures of financial deepness and capital account liberalization employed in our cross-country study. The construction of these variables follows methods used elsewhere in research on financial depth and in studies of capital account liberalization, although the goals of our paper are distinct from those of previous research. The focus of this section is both to introduce our indicators of financial depth and capital account liberalization, and to characterize some of their key attributes. Descriptive statistics of these data foreshadow some of the themes raised in the regression analysis, including differences across measures of financial deepness, the presence of financial convergence, and patterns of capital account liberalization across groups of countries.

2.1 Financial Depth Across Countries and Across Time

In this section we present data on three indicators of financial deepness that have been used in the literature on the relationship between financial depth and economic growth (King and Levine 1993; Levine, Loayza, and Beck 1999). We show important empirical differences between two of these indicators and the third, differences that presage differences in the relationship between capital account liberalization and financial depth presented in the next section. It is important to note these differences, since previous research has found a common link between each of these three measures and economic growth. The differences across indicators, however, may suggest that the indicators are picking up different channels through which financial markets affect growth.

King and Levine offer different indicators of financial deepness, and we use three of them in our study.[5] Each of these indicators is constructed such

[5]The indicators we use are similar to the ones employed in the recent study by Levine,

that an increase reflects greater financial deepness. The liquid liabilities indicator, LLY, represents the ratio of liquid liabilities to *GDP,* where liquid liabilities consist of currency held outside the banking system plus demand and interest bearing liabilities of banks and nonbank financial intermediaries. Thus, LLY reflects the overall size of the financial intermediary sector. It does not, however, distinguish between the allocation of capital to the private sector and to various governmental and quasi-governmental agencies. In an effort to assess the relative amount of credit going to the private sector, King and Levine propose the indicator $PRIVY$, which equals the ratio of claims on the nonfinancial private sector to *GDP*. This indicator reflects credit issued to the private sector alone and not to governments, government agencies, and public enterprises. A third indicator, called $BANK$, represents the ratio of deposit money bank domestic assets to the sum of deposit money bank domestic assets and central bank domestic assets. This indicator is meant to isolate, at least partially, those financial intermediaries that are more likely to provide financial services such as risk management and information processing. As we will see, a variety of statistics demonstrate that the link is consistently closer between the indicators LLY and $PRIVY$ than between either of these and $BANK$. This holds for the full sample of almost 100 countries as well as for the subsamples of 21 industrial countries and over 70 developing countries.

Our interest is in the evolution of financial depth. Therefore, we first present the average growth rates of these indicators. Panel A of Table 1 (row III) shows that, for the full sample, the average measures of LLY increased by 12.1 percent and the average measure of $PRIVY$ increased by 13.7 percent over the period 1986 to 1995, while the average measure of $BANK$ increased by only 4.0 percent over this period. The biggest percentage increase in LLY and $PRIVY$ occurred among industrial countries, while the biggest percentage increase in $BANK$ was in the developing country subsample. This general increase in the indicators of financial depth is illustrated in Figures 1a, 1b and 1c. These figures plot the 1986 value against the 1995 value of LLY, $PRIVY$ and $BANK$, respectively, along with a 45^o line, with points distinguishing between industrial countries (plotted as circles) and developing countries (plotted as diamonds). About two-thirds of

Loyaza, and Beck. Precise definitions of the financial depth and capital liberalization variables are included in the Appendix. This appendix also lists the countries used in our study, and the financial depth indicators that are available for each. Some countries are not included in our discussion in this section, even though financial deepness indicators are available, because capital account liberalization measures are not available, and therefore these countries are not included in the analysis in Sections 3 and 4.

the points in each figure are above the 45^o line. The figures indicate that relatively more industrial countries than developing countries had an increase in each measure of financial deepness.

The Wilcoxon test can be used to consider whether a significant number of countries experienced an increase in financial depth between 1986 and 1995. The null hypothesis of this test is that there is no systematic change in the indicators across time on a country-by-country basis. (Row IV in each table presents the Wilcoxon test $z-$statistic and row V presents the respective p-value.) Panels A and B of Table 1 show that this hypothesis is rejected at the 99 percent level of confidence for LLY and $PRIVY$ for both the full sample and the sample consisting only of industrial countries. The hypothesis is rejected for $BANK$ at the 97 percent level of confidence for the full sample and at the 99 percent level of confidence for the subsample of industrial countries. Panel C of Table 1 shows, however, that among developing countries the null hypothesis of the Wilcoxon test fails to be rejected for $BANK$ at the 90 percent level of confidence, although it is rejected at the 95 percent level of confidence or higher for both LLY and $PRIVY$.

Another issue related to the evolution over time of these indicators of financial deepness is whether there is significant churning, such that the ordinal ranking of countries by financial deepness changes between the beginning of the sample and the end of the sample. This is addressed using a Spearman rank correlation test. The null hypothesis of this test is that the ranking in 1986 is independent of the ranking in 1995 (row VI in each table presents the value of rho for the Spearman rank correlation test and row VII presents the respective p-value). The statistics show that we can reject this null hypothesis at the 95 percent level of confidence for the full sample and for both subsamples for each of the three indicators. The evidence of churning among industrial countries is a bit stronger, but even in this group there is no significant change in rankings according to standard levels of confidence.

The definitions of LLY and $PRIVY$ suggest that these variables are more closely related to each other than either is to $BANK$. The three panels of Table 2 show that there is, in fact, a higher correlation between $\Delta \ln LLY$ and $\Delta \ln PRIVY$ than between either of these and $\Delta \ln BANK$.[6] Panels B and C of Table 2 show that the correlation between $\Delta \ln LLY$ and $\Delta \ln PRIVY$ is higher among industrial countries than among develop-

[6]King and Levine find a higher correlation between the average decade values of the level of LLY and $PRIVY$ than between either and $BANK$ (see their Table VI, p. 726).

ing countries, while the correlations among $\Delta \ln BANK$ and $\Delta \ln LLY$ and $\Delta \ln BANK$ and $\Delta \ln PRIVY$ are higher among developing countries than among industrial countries.

While correlations among the three indicators of change in financial depth vary widely, the ordinal ranking of the full sample of countries is largely invariant to the choice of measures. We used a Spearman rank correlation test for each of the three pairs, $\Delta \ln BANK$ and $\Delta \ln PRIVY$, $\Delta \ln BANK$ and $\Delta \ln LLY$, and $\Delta \ln LLY$ and $\Delta \ln BANK$. The null hypothesis is that the ranking of countries according to one indicator is independent of the ranking of countries according to the other indicator. Table 2 also reports the results for these tests. As shown in Panel A of that table, we can reject this null hypothesis at the 99 percent level of confidence for each of the three pairwise comparisons for the full sample of countries. Panel C of that table shows that we can also reject the null hypothesis for the sample consisting only of developing countries at the 99 percent level of confidence. In the industrial country sample, however, we reject the independence of the ranking of $\Delta \ln LLY$ and $\Delta \ln PRIVY$ at the 99 percent level of confidence, but the p-values for the tests of the independence of $\Delta \ln BANK$ and $\Delta \ln LLY$, and of the independence of $\Delta \ln BANK$ and $\Delta \ln PRIVY$ are 0.35 and 0.60, respectively, indicating that we cannot reject the independence of the ranking of these pairs of indicators at standard levels of confidence. As was the case with the simple correlations, the Spearman rank correlation tests indicate a greater similarity between $\Delta \ln LLY$ and $\Delta \ln PRIVY$ than between either and $\Delta \ln BANK$. Both the simple correlations and the Spearman rank correlations also show that the differences between $\Delta \ln BANK$ and the other two indicators of the growth in financial depth are more pronounced among industrial countries than among developing countries. As we will see, the closer correspondence between $\Delta \ln LLY$ and $\Delta \ln PRIVY$ than between either of these indicators and $\Delta \ln BANK$ will be evident in the patterns of regression results using these various indicators of the change in financial depth.

2.2 Capital Account Liberalization

Governments can limit the free movement of capital across national borders in a range of ways. Furthermore, restrictions may vary according to the type of capital. While recognizing the diversity in the intensity and scope of capital controls, we wish to obtain a consistent measure across the wide range of countries in our sample. Therefore, we first use information from the yearly issues of the International Monetary Fund's *Exchange Arrangements*

and Exchange Restrictions to generate a simple 0/1 dummy variable for each country for each year.[7] This dummy variable takes the value 1 if the country had no capital controls in place. Then, for each country, we calculate the variable $SHARE$, which represents the proportion of years between 1986 and 1995 in which the country had unrestricted capital mobility.[8]

The histogram in Figure 2*a* presents frequencies of occurrence of $SHARE$ for the full sample of 93 countries in the regression analysis in Section 3. This figure shows that 61 countries restricted capital flows during each year of the period 1986 to 1995 (that is, $SHARE = 0$). Only two of these countries, Iceland and Greece, are in the subsample of 21 industrial countries. There are 13 countries in the full sample for which $SHARE$ equals 1. These 13 countries include the eight industrial countries Australia, Belgium, Canada, Germany, the Netherlands, New Zealand, the United Kingdom, and the United States, as well as the five developing countries Bolivia, Malaysia, Maldives, Panama, and Seychelles.

The histograms in Figures 2*b* and 2*c* reflect the dispersion of values of $SHARE$ for the subsamples of industrial countries and developing countries, respectively. Table 3 lists the countries corresponding to each non-zero value of $SHARE$. This table also includes the years capital accounts were open in each country. These dates reflect a striking property of $SHARE$. The definition of $SHARE$ does not necessarily reflect the timing of capital account liberalization. The dates listed in Table 3, however, show that, $SHARE$ reflects a strong temporal property. For example, all the countries for which $SHARE = 0.1$ had open capital markets in 1995 only, the country for which $SHARE = 0.2$ had open capital markets in 1994 and 1995, the countries for which $SHARE = 0.3$ had open capital markets in 1993 to 1995, and so on. This relationship generally holds across all values of $SHARE$, with only a few cases of on-again, off-again capital account liberalization.

Table 3 also demonstrates clustering of capital account liberalization by income levels and by regions. Only two of the 21 industrial countries had no experience with open capital markets in the period 1986 to 1995. A relatively small proportion of countries that were not members of the OECD had open capital markets in one or more years during that period. Those developing countries for which $SHARE^i$ does not equal zero are concentrated in Latin America. This regional and income-based pattern will prove important when we later address the source of the relationship

[7] The appropriate information is in line E2 in the Summary Table of *Exchange Arrangements and Exchange Restrictions*.

[8] This measure of capital account liberalization has been previously used by Rodrik (1999).

between capital account liberalization and financial deepness and when we consider the extent to which the experience of one set of countries generalizes (or fails to generalize) to other countries.

3 Capital Account Liberalization, Financial Depth, and Financial Convergence

The data presented in the previous section show a general pattern of increasing financial deepness, along with progressive liberalization of capital accounts for a number of countries. The question we address in this section is whether there is an association between financial depth and capital account liberalization. Figures $3a$, $3b$, and $3c$ show that there seems to be a simple unconditional relationship between at least two of our indicators of financial depth and capital account liberalization. Figures $3a$ and $3b$ illustrate that countries that had capital account convertibility for all or part of the period between 1986 and 1995 (as measured by $SHARE$) tended to have a greater increase in financial depth as measured by $\Delta \ln LLY$ or by $\Delta \ln PRIVY$.[9] The respective sample correlations in this case are 0.31 and 0.21 (omitting Bolivia from the sample) and each correlation is significantly different from zero. Figure $3c$ shows that the relationship between $SHARE$ and $\Delta \ln BANK$ is less evident. The sample correlation in this case is 0.08 (again omitting Bolivia from the sample) and it is not significantly different from zero.

Of course, evidence from these simple scatterplots fails to account for a number of important considerations, such as the influence of other factors and joint causality. In this section we explore the possible effect of capital account liberalization on financial depth. We also consider the evidence of overall financial convergence, whereby countries with initially lower levels of measured financial deepness experience greater financial deepening over the period 1986 to 1995 than those countries that begin the period with deeper financial markets.

[9] These figures also illustrate that Bolivia, a country with a value of $SHARE = 1$, is a clear outlier in the sample with extraordinarily high values of the percentage change in each of the three indicators of financial depth. Therefore we omit Bolivia from the sample used in estimation to ensure that our results are not driven by a single outlier. The inclusion of Bolivia in the sample would strengthen the estimated relationship between capital account liberalization and financial depth.

3.1 Specification and Basic Results

Our analysis of the relationship between capital account liberalization and financial deepness is based upon the cross-sectional regression specification:

$$\Delta \ln FD^i \equiv \ln\left(\frac{FD^i_{95}}{FD^i_{86}}\right) = \beta_0 + \beta_1 \ln FD^i_{86} + \beta_2 KALIB^i_{86-95} + \beta_3 \mathbf{X}^i + \varepsilon^i. \tag{1}$$

Here, FD^i_{95} is country i's measure of financial deepness in 1995 (that is, LLY_{95}, $PRIVY_{95}$, or $BANK_{95}$) and FD^i_{86} is the respective 1986 value, $KALIB^i_{86-95}$ indicates country i's stance in terms of capital account liberalization over the period 1986 to 1995, $\mathbf{X}^i$ represents other explanatory variables, including regional dummy variables, and ε^i is an error term.. In the regressions reported in this section, $KALIB^i_{86-95}$ is represented by $SHARE^i$, the proportion of years over the period 1986 to 1995 without restrictions on the capital account for country i.[10]

The inclusion of a country's initial measure of financial deepness among the regressors, FD_{86}, allows us to gauge whether there is evidence of conditional financial convergence across countries. Evidence of financial convergence would be obtained with the finding of significant and negative values of β_1. Financial convergence may be one channel for the convergence of per capita income across countries if, as shown in research by King and Levine, and Levine, Loayza and Beck, economic growth is linked to financial depth. We address the issue of the relationship between the change in financial depth and economic growth in Section 4.

The inclusion of the initial level of financial depth in Equation (1) is also important for obtaining accurate estimates of the effect of capital account liberalization on the change in financial depth if the various measures of FD_{86} are correlated with the indicator of capital account liberalization. We may expect a positive correlation between various measures of FD_{86} and $SHARE^i$ since, as discussed in Section 2.2, capital account liberalization has been most widespread among industrialized countries and, as shown in Table 1, these countries had the highest levels of financial depth in 1986. In fact, the sample correlations of 0.29 for $SHARE$ and LLY_{86}, 0.33 for $SHARE$ and $PRIVY_{86}$, and 0.30 for $SHARE$ and $BANK_{86}$ are all significant at

[10] In the next subsection we also consider ALL^i as a measure of capital account liberalization. ALL^i is a dummy variable equal to 1 if country i had no restrictions on the capital account over the whole period 1986-95 and 0 otherwise, that is, $ALL^i = 1$ if $SHARE^i = 1$ and $ALL^i = 0$ if $SHARE^i \neq 1$. We show that the use of ALL^i rather than $SHARE^i$ does not materially affect our results.

standard confidence levels. Thus, the omission of FD_{86} from equation 1 would cause a downward bias in the estimated coefficient capturing the effect of capital account liberalization on the change in financial depth, β_2, if financial convergence is present.

Another concern in the estimation of equation (1) is the potential for simultaneity bias, since a country's policy towards the capital account may be endogenous and depend, to some extent, upon the deepness of its financial system. Capital account convertibility is often seen as the logical culmination of developing a deep, mature, and efficient financial system. In this case, OLS estimates of β_2 would bias the results toward finding a positive relationship between capital account liberalization and financial deepness, if countries experiencing a deepening of their financial system for reasons other than an open capital account also undertake capital account liberalization. Therefore, it is important to instrument for our measure of capital account liberalization. An additional benefit from using instrumental variables estimation is that it helps us address the potential problem of measurement error in our indicator of capital account liberalization.

Table 4 presents the results of several regressions that could serve to generate an instrumental variable estimate for $KALIB_{86-95}$ as measured by $SHARE^i$.[11] Column 1 shows that a dummy variable indicating whether a country had capital account restrictions in 1985 is a useful predictor of the country's policy concerning capital account liberalization over the next 10 years. This result reflects the fact that a large fraction of the countries maintained the same stance towards the capital account during the 1986-95 period as in the pre-1986 period.[12] The 1985 dummy variable, however, may not be appropriate for addressing the issue of causality, since a country's initial stance towards the capital account may be a leading indicator rather than an underlying cause of financial deepness.

In Section 2.2 we saw that capital account liberalization over the period 1986 to 1995 largely occurred among industrial countries and countries in Latin America. This clustering of capital account convertibility offers us another set of instruments to use for $SHARE^i$. Column 2 of Table 4 shows that regional dummy variables explain a nontrivial fraction of the variation in the degree of capital account liberalization across countries in a regression

[11] A potential problem with these regressions is that the dependent variable is truncated at the values of 0 and 1. The predicted values of the regression, however, all fall within this range.

[12] Similarly, the proportion of years over the period 1976-85 without restrictions on the capital account explains a large fraction of the variability in the same measure over the period 1986-95.

in which the excluded dummy represents countries that were members of the OECD in 1986. This regression indicates that among the sets of developing countries corresponding to the regional groupings Africa, Asia, and Latin America, the latter is closest to the OECD countries (since its coefficient, while still significant, is closest to 0) while the African countries are least like the OECD countries in their stance towards capital account liberalization. This result is not surprising given the information in Table 3 discussed earlier.[13]

Column 3 of Table 4 presents the results of a regression which includes both regional dummy variables and a dummy variable indicating the stance of capital account controls in 1985. The absolute values of all reported coefficients in this regression are lower than those in the respective regressions that include only the 1985 capital account dummy variable (reported in Column 1) or only the regional dummy variables (reported in Column 2). The adjusted R^2 of this regression is 0.76, which is somewhat better than the adjusted R^2 of the regression using only the 1985 capital account control dummy variable of 0.71 and much better than the adjusted R^2 of 0.31 in the regression using only the regional dummy variables. The performance of this regression leads us to use it to generate instrumented values of $SHARE^i$ in the financial depth regressions which follow. But we also report results in which the regression generating estimated values for $SHARE^i$ uses only regional dummy variables, because of our concern about the possible endogeneity of the 1985 capital control dummy variable. As we will see, instrumental variable regression results are very similar using either of these specifications as the first-stage regression.

It is possible that certain regions of the world had systematically more open capital accounts and, independently of this, also experienced greater increases in financial depth over the sample period. We attempt to address this possibility by specifying regional dummy variables as members of $\mathbf{X}$ in Equation (1). The inclusion of a full set dummies for Africa, Latin America, and Asia in $\mathbf{X}$ would, of course, invalidate their use as the only instruments in the IV regressions. Therefore we use a subset of these regional dummy

[13]The results in Column 2 suggest that a country's initial level of its (log) per capita *GDP*, GDP_{86}, provides some information concerning the degree of capital account convertibility over the ten-year period that we consider. This is, in fact, the case. In a bivariate regression of $SHARE^i$ on GDP_{86}, the estimated coefficient is 0.14 (with a $t-$statistic of 6.53) and the R^2 is 0.32. But the variation in $SHARE^i$ captured by a regression using both GDP_{86} and the regional dummy variables, a regression with an R^2 of 0.34, is not significantly greater than the variation captured by the regression in Column 1 of Table 4. In this case, the coefficient on GDP_{86} falls to 0.071 and the associated $t-$statistic is 1.83.

variables for inclusion in $\mathbf{X}$ based upon evidence from OLS regressions. This leads us to select a regional dummy variable representing African countries in the $\Delta \ln LLY$ and $\Delta \ln PRIVY$ regressions and a regional dummy variable representing Asian countries in the $\Delta \ln BANK$ regressions.[14] The $\Delta \ln BANK$ regressions also include in $\mathbf{X}$ the ratio of government spending to *GDP* in 1986, to account for the possibility that high levels of public expenditures are financed by seigniorage revenues.[15]

Estimation results for Equation (1) using each of the three measures of financial deepness are shown in Table 5. The table reports both OLS and IV estimates. Estimates in columns labeled IV^a use first-stage regressions with only regional dummy variables as regressors, while estimates in columns labelled IV^b use first-stage regressions with both regional dummy variables and the stance of capital account convertibility in 1985 as regressors.

The estimates presented in Table 5 provide strong support for conditional financial convergence. All estimates of the coefficients on (the logarithm of) initial financial depth are significant at the 95 percent level of confidence or higher. The magnitude of these coefficients can be put in some context by noting that, for example, the 10th-percentile value of $PRIVY$ in 1986 was 0.262, while the 90th-percentile value was 0.909 in that year. Thus, the estimates in Columns 4 or 5 suggest that, conditional on other factors, financial depth grew 26 percent faster over the sample period for the country at the 10th-percentile value of $PRIVY_{86}$ than for the country at the 90th-percentile value of $PRIVY_{86}$. The corresponding calculations for LLY_{86} and $BANK_{86}$ suggest that the countries at the 10th-percentiles of these two measures grew 14 percent faster and 21 percent faster, respectively, than the countries at the 90th-percentiles.

The results in Table 5 provide strong evidence of a significant effect of capital account liberalization on the growth of financial deepness as measured by $\Delta \ln LLY$ and $\Delta \ln PRIVY$. The OLS estimates are positive and significant at standard confidence levels. Instrumental variables regressions offer coefficients that are a bit larger than OLS estimates. The coefficients

[14] In the next subsection, which is devoted to robustness checks, we show that estimation results do not change significantly when all the regional dummies are included in $\mathbf{X}$ and the set of instruments is augmented by a country's stance towards the capital account in 1985.

[15] While robustness issues will be discussed at more length in the next subsection, it seems important at this stage to note that a country's initial level of per-capita income is not significantly different from zero and does not affect the estimation results when one already controls for regional dummies in $\mathbf{X}$. Regression specifications that exclude regional dummies but include the 1986 value of (the log of) real per-capita *GDP* display a fit that is much worse than the regressions that control for regional differences.

on $SHARE$ for these two measures, using the IV regression with both initial financial stance and regional dummy variables, are significant at better than the 5 percent level (Columns 3 and 6). The coefficients on $SHARE$ for these two measures, using the IV regression with only regional dummy variables, are very close to the other IV specification, although in this case the coefficients are less significant (Columns 2 and 5). Still, the coefficients on $SHARE$ in Columns 2 and 5 are significant at better than the 10 percent level. Thus, augmenting the instrument set by the inclusion of a country's indicator of capital account liberalization in 1985 does not change the estimated impact of $SHARE$ on financial deepness, but it does increase the precision of the estimates. A Hausman test of the hypothesis that $SHARE$ is uncorrelated with the residual, and thus that OLS is unbiased, cannot reject the null that the OLS and IV estimates of capital account liberalization's impact differ only because of sampling error. The fact that IV point estimates of the effect of capital account liberalization are somewhat larger than (though not statistically distinct from) the OLS estimates might imply that measurement error is more important than the potential simultaneity bias discussed at the beginning of this section.

The evidence of the effect of capital account liberalization on the change in financial depth as measured by $\Delta \ln BANK$ is more mixed. The estimate from the OLS estimation (Column 7) is positive and significant at better than the 5 percent level. The coefficient obtained using instrumental variable estimation, however, is measured much less precisely and the choice of instruments appears to matter more than is the case with LLY or $PRIVY$ (Columns 8 and 9). With the smaller set of instruments (Column 8), the effect of capital account liberalization is significant at the 12 per cent level only. The Hausman test of the $BANK$ regressions cannot reject the null that the OLS and IV estimates of capital account liberalization's impact differ only because of sampling error although, in this case, the result is likely due to the lack of precision in the IV estimates.

One way to gauge the magnitude of the effect of capital account liberalization on financial depth is to consider the effect of an increase in $SHARE$ from zero to the sample mean value of 0.22, *ceteris paribus*. The estimates in Table 5 suggest that this would lead to a change in LLY of approximately 6 percentage points over the years 1986 to 1995, a value close to the average growth rate of 6.6 percent for the 92 countries constituting the sample used in the estimation. Similarly, the increase in $PRIVY$ would be close to 9 percentage points, a large value in comparison to the average growth rate of 11 percent for the 89 countries making up the sample used in the estimation. We also note that a change in $SHARE$ from 0 to 1 has roughly the same

effect on the change in financial depth, as measured by these variables, as does a 100 percent decline in the initial value of financial depth. While the IV estimates suggest we may want to interpret the effect of capital account liberalization on $\Delta \ln BANK$ with some caution, the OLS estimate of the coefficient suggests that an increase in the value of $SHARE$ from 0.0 to 0.22 causes an increase of 4 percent in that measure of financial depth. This equals the average growth of $BANK$ for the period 1986-95.

3.2 Robustness of Full Sample Results

We note here the robustness of our results with respect to two issues, the effect of omitted variables and the use of an alternative measure of capital account liberalization. The related issue of subsample stability, which warrants a more complete discussion, will be addressed in the next section.

Any bias in the estimate of the effect of capital account liberalization on financial depth due to the omission of variables would arise only if the omitted variables are correlated with $SHARE$ or with its instruments. One possible relevant omission is an indicator of financial crisis during the 1986-95 period. Research has shown that capital account liberalization increases a country's probability of experiencing a financial crisis. But such a crisis would adversely affect a country's level of financial development and, therefore, the potential bias in our estimated effect of capital account liberalization is *downward*.

It is also possible that the presence of open capital markets is just one of the many conditions required for the development of a deep and mature financial system. One implication of this is that we may expect to find that only countries with stable macroeconomic conditions benefit from an open capital account. We address this issue by augmenting the specification given in Equation (1) with an interaction term consisting of the product of $SHARE$ and an index of macroeconomic mismanagement (computed as the simple average of the inflation rate and the log of (one plus) the black market premium over the years 1985 to 1990). The estimated coefficient for the interaction term is negative, as expected, for LLY and $PRIVY$, meaning that capital account liberalization has a greater impact on financial deepness the better the economy is managed. But the coefficient is significant only in the $\Delta \ln LLY$ regression. More to the point, the estimated coefficients on $SHARE$ increase with the inclusion of the interaction term and the respective $t-$statistics rise, again suggesting a negative bias in the estimates reported in Table 5. For $BANK$, the estimated coefficient for the interaction term has the wrong sign, but it is not significantly different from zero.

The dependence of financial development on a constellation of conditions beyond capital account liberalization may also point toward the necessity of appropriate institutions. To some extent, this is the focus of the exploration of subsample stability of our results in the next section. But here we are interested in whether the estimated effect of capital account liberalization stands up to the inclusion of other potentially relevant variables. In particular, we may ask whether capital account liberalization is serving as a proxy for central bank independence. Accordingly, we create an interaction term that is the product of $SHARE$ and an index of central bank dependence (from Cukierman, Webb and Neyapti 1992). The inclusion of this interactive term gives the same pattern of results as found with the inclusion of the interaction term between macroeconomic stability and capital account liberalization. In this case, however, the interaction term never enters significantly in the regressions.

We also tested whether our results are robust to alternative definitions of capital account liberalization. We set the dummy variable ALL equal to 1 when $SHARE = 1$ and equal to 0 when $SHARE$ does not equal 1. Our results are essentially unchanged when we use ALL rather than $SHARE$ for both the OLS and the IV regressions. In addition, we examined regressions in which the dependent variable represents the difference in levels rather than in log-levels (i.e., ΔFD rather than $\Delta \ln FD$ for $FD = LLY, PRIVY, BANK$). This, too, does not alter our results.

3.3 Subsample Stability

The results reported above suggest a significant and sizable effect of capital account liberalization on financial deepness. The implication of this for policy concerning capital account liberalization depends upon whether this finding reflects the influence of certain sets of countries or if it arises because of a more general tendency among a wide set of countries in our sample. The evidence presented in Table 3 shows that almost all cases of capital account liberalization in our sample are due to OECD-member countries and Latin American countries. Therefore in this section we present regressions of the effect of capital account liberalization on financial depth for these two subsamples.[16]

[16]Of course, it is not possible to include regional dummies as instruments any more. Similarly, a country's initial (log of) per-capita GDP does not perform well as an instrument any more because, as already explained in Section 3.1, per-capita GDP serves essentially the same purpose as regional dummies in explaining the variability of $SHARE$. Therefore, the reported IV estimates use a country's stance toward the capital account

Panel A of Table 6 reports estimates for a subsample of 21 OECD countries. There is a significant effect of capital account liberalization on financial deepness in both the $\Delta \ln LLY$ and $\Delta \ln PRIVY$ regressions, whether the estimation is by OLS or by instrumental variables. The coefficients on $SHARE$ in these regressions are larger than the respective coefficients for the full sample regressions reported in Table 5. In contrast to the full sample results, the coefficient on $SHARE$ is not significant in the $\Delta \ln BANK$ regression estimated with OLS, although the coefficient obtained using IV estimation is significant at the 95 percent level of confidence.[17] The partial scatterplots of the growth in financial deepness against $SHARE$ reported in Figure 4, do not identify any industrial country as a potential outlier that could be largely responsible for these results.

A different picture emerges from the Latin America sub-sample, as shown in Panel B of Table 6. There is no evidence that capital account liberalization has a significant effect on either $\Delta \ln LLY$ or $\Delta \ln PRIVY$ in this subsample of 20 countries. Rather, capital account liberalization appears to have a positive and significant impact only in the $\Delta \ln BANK$ regression. In this regression, the coefficient on government spending as a fraction of GDP at the beginning of the sample period is negative and highly significant. This may imply that these results are mainly driven by the process of fiscal consolidation experienced by some of the Latin American countries during the decade that we examine. Fiscal consolidation was likely accompanied by a reduction in seigniorage revenues in these countries. Recall that $BANK$ represents the ratio of deposit money domestic bank assets to the sum of these assets and the domestic assets of the central bank and, therefore, a reduction in seigniorage revenues would be reflected in a decrease in $BANK$, all else equal. Also recall that the data presented in Table 3 show an increasingly liberal stance toward capital account convertibility among Latin American countries during this decade. Thus, we suggest a cautious interpretation of the results in Columns 5 and 6 of Panel B since fiscal consolidation, a reduction in seigniorage revenues, and capital account liberalization may have been jointly undertaken as part of an overall process of

in 1985 as the only instrument for $SHARE$ for the Latin America subsample, while the instrument for the OECD countries is average inflation over the period 1979 to 1985. Average inflation explains almost 35 percent of the variability of $SHARE$ in the OECD subsample. For such a subsample, the finding that countries with low inflation exhibit higher values of $SHARE$ appears to be very robust. The relationship between inflation and capital account liberalization is a topic that deserves further exploration.

[17] The regressions for $BANK$ for the industrial countries subsample do not include government spending as a ratio of GDP for the year 1986, since this variable does not enter significantly.

liberalization by many of the Latin American countries during this period.

The subsample regression results presented in Table 6 have potentially important policy implications. Overall, the subsample evidence shows that the full-sample results concerning the effect of capital account liberalization on $\Delta \ln LLY$, $\Delta \ln PRIVY$, and, to a lesser extent, $\Delta \ln BANK$, are driven by the highly industrialized countries included in the cross-section.[18] A subsample excluding the OECD countries provides no significant effect of capital account liberalization on financial deepness for two out of three measures of financial development. Thus, capital account liberalization may not provide the same benefits to developing countries as to industrial countries with respect to its promotion of financial deepness.

A possible reason for this is that capital account liberalization may only promote financial deepness when other institutions are in place and well-functioning. If this is the case, capital account liberalization should come at a late stage in the sequencing of policy reforms, once adequate institutions are already in place. While much more analysis is needed to support this claim, it seems important to stress that systematic evidence showing that developing countries with a more open capital account have fared better in terms of our financial indicators remains elusive at this stage. But our results do suggest that once the proper structure exists, as is the case in many OECD countries, capital account liberalization can significantly promote financial deepness.

4 Capital Account Liberalization and Growth

Financial deepness is not an end in itself. But greater financial depth may contribute to the welfare of a country by promoting its overall development. The importance of a deep financial system is stressed by the large body of literature that, starting with Bagehot (1873) and Schumpeter (1912), sees the development of a country's financial sector as having a significant impact on the level and the rate of growth of its per capita income in the long run. In a survey of the literature, Levine (1997) concludes that, despite

[18] One may argue that this conclusion arises because only OECD economies have had a widespread and protracted experience with capital account liberalization and the sample of developing countries with open capital account is too small and not representative enough to draw firm conclusions. But our conclusion is partially based on evidence using the subsample of Latin American countries, not of a subsample of the non-OECD countries. As shown in Table 3, a relatively high proportion of Latin American countries liberalized capital accounts during our sample period. This tilts the playing field towards finding significant results in a non-OECD sample.

some qualifications, most of the theoretical and empirical evidence "suggests a positive, first-order relationship between financial development and economic growth" (p. 688).[19] King and Levine (1993) first studied the relationship between financial development and long-run output growth in the tradition of the cross-country analyses of growth (cf., for example, Barro 1991). In examining the relationship between the level of financial development and future rates of long-run economic growth, they find that the initial level of financial development is a good predictor of long-run growth over the next 10 to 30 years.

In the previous section we have shown that capital account convertibility has a statistically significant effect on financial deepness, at least among a subset of countries. Here, we address the economic relevance of this result by considering the extent to which capital account liberalization contributes to economic growth through its effect on financial deepness.

We begin by re-examining some of the findings of King and Levine for the period 1986 to 1995. We use the same countries studied in Section 3.1 for which data are available, obtaining a sample somewhat larger than the one considered by King and Levine.[20] Following their approach, we run the cross-sectional regression

$$\Delta \ln GDP^i \equiv \ln\left(\frac{GDP^i_{95}}{GDP^i_{86}}\right) = \alpha_0 + \alpha_1 FD^i_{86} + \alpha_2 \mathbf{Z}^i + \eta^i. \qquad (2)$$

where GDP^i_{95} is country i's real per capita *GDP* in 1995, FD^i_{86} is country i's level of financial development in 1986, and $\mathbf{Z}^i$ represents a vector of conditioning information that controls for other factors associated with a country's economic growth. The variables included in $\mathbf{Z}$ are the (log of the) 1986 level of real per capita *GDP*, the 1986 ratio of exports plus imports to *GDP*, the 1986 ratio of investment to *GDP*, and dummies for sub-Saharan Africa and Latin America. Other regressors usually included as initial controls, such as the (log of) initial secondary school enrollment rate, the initial ratio of government spending to *GDP*, and the initial inflation rate, do not enter significantly in the regression, most likely because of the relatively short period of time that we consider.

[19] As Levine notes, however, not all economists agree on the importance of financial development for economic growth. For example, according to Lucas (1988), economists "badly over-stress" the role of finance, while others argue for reverse causation: Economic growth creates a demand for new financial arrangements, and the financial system adapts to these new demands (Robinson 1952).

[20] Cfr. Table VIII, p. 731 in King and Levine. Their cross-section includes 57 countries. Here, data are available for 71 countries.

Estimates of the coefficient α_1 in Equation (2) from regressions using LLY, $PRIVY$, and $BANK$ as measures of financial depth are reported in the columns labeled "eq.(2)" in Table 7. The coefficient for the initial level of financial deepness is positive in all three cases, but the estimates are never significantly different from zero at standard confidence levels. It is somewhat difficult to compare these results with the ones of King and Levine, since the only cross-sectional regression reported in their study is for LLY, and our sample period and cross-section of countries are different.[21]

The finding of financial convergence noted in the previous section leads us to consider the following alternative specification

$$\Delta \ln GDP^i \equiv \ln\left(\frac{GDP^i_{95}}{GDP^i_{86}}\right) = \alpha_0 + \alpha_1 FD^i_{86} + \alpha_2 \Delta \ln FD^i + \alpha_3 \mathbf{Z}^i + \eta^i, \tag{2'}$$

which differs from Equation (2) because of the inclusion of the percentage change in financial deepness among the regressors. The presence of $\Delta \ln FD$ has important implications for the estimate of α_1. Financial convergence implies that smaller initial values of financial depth are associated with larger increases in financial deepness. This negative correlation between FD and $\Delta \ln FD$ would result in a downward bias in the estimate of the effect of the initial value of financial development on economic growth in Equation (2).

Most importantly, Equation (2') enables us to assess the effects of capital account liberalization on economic growth in the light of the framework developed in the previous section. Obviously, the introduction of $\Delta \ln FD$ among the regressors creates the possibility of an endogeneity bias in α_2 when using OLS. To the extent that countries whose income growth is high for reasons other than financial deepening may experience a simultaneous increase in financial depth, the bias is going to be upward. However, it is possible to use the fitted component of the change in financial deepness from Equation (1) as an instrument for $\Delta \ln FD$.[22] Such a procedure allows us to estimate the effect of capital account liberalization on economic growth as the product of the estimated coefficients α_2 in Equation (2') and β_2 in Equation (1), in a two-stage least squares regression of Equation (2').

[21] Note, however, that the short period of time we consider might not be entirely appropriate for running cross-sectional growth regressions.

[22] In such a regression, $KALIB_{86-95}$ in Equation (1), as represented by $SHARE$, is instrumented by a country's stance toward capital account liberalization in 1985, and by regional dummies for the developing countries. See Section 3.1 for more details.

Estimation results for Equation (2') are reported in Table 7, in the columns labeled "eq.(2')". The table reports both simple OLS and two-stage least squares estimates, in order to assess the extent of the endogeneity bias in the estimated effect of $\Delta \ln FD$. Several features are worth noting. Comparison of OLS estimates of Equation (2') with the estimates of Equation (2) shows an improvement of the fit, especially when the measures of financial deepness are given by $BANK$ and by $PRIVY$. In addition, the estimated coefficient α_1 greatly increases with the introduction of $\Delta \ln FD$ among the regressors. The coefficient is now significant at the 1 percent level for $PRIVY$, and at the 7 percent level for $BANK$, but is only significant at the 12 percent level for LLY. Note also that the estimated effect of the change in financial deepness on growth is significant at standard confidence levels for all the three measures of financial deepness. The two-stage least squares estimates show that the simultaneity bias in the OLS regression of Equation (2') is, at best, small: The point estimates of the coefficient α_2 obtained via 2SLS remain very close to their OLS counterparts, although the standard errors now become large.

The point estimates for α_2 suggest a substantial impact of capital account liberalization on output growth via the deepening of a country's financial system. For example, an increase in $SHARE$ from zero to the median value in the sample of the non-zero observations of 0.65 would lead to a change in per capita GDP growth over the years 1986 to 1995 of approximately 3.8 percentage points using LLY to represent financial deepness.[23] Compare this to the sample mean value of per capita GDP growth of 12 percent over the period.

Overall, the results in this section confirm an important link from financial development to economic growth.[24] However, the results of the previous section show that capital account liberalization appears to positively affect financial deepness, and therefore economic growth, only in the subsample of highly industrialized economies. Thus, the estimated economically sizable link from open capital account to increased growth is likely to be shut down for a developing country, at least when such a link is presumed to work through an increase in financial deepness.

[23] For the 70 countries sample here considered, the 2SLS estimate of β_2 is 0.365. Therefore, $\widehat{\beta}_2 \times \widehat{\alpha}_2 \times 0.65 = 0.365 \times 0.16 \times 0.65 \simeq .038$. The figure is approximately the same when using $PRIVY$, while it is 1 percentage point lower when using $BANK$.

[24] Note that this link can be shown to be present for both developed and developing countries included in the sample.

5 Concluding Remarks

In this paper we have shown a statistically significant and economically relevant effect of open capital accounts on financial deepness and economic growth in a cross-section of developed and developing countries over the period 1986 to 1995. Countries with open capital accounts over some or all of the period enjoyed a significantly greater increase in financial depth than countries with continuing capital account restrictions. This deepening of financial markets is over and above our finding of financial convergence, whereby countries initially having lower levels of financial depth caught up, to some extent, with those countries that began the period with greater financial depth.

We have also shown, however, that capital account liberalization may not provide the same benefits to all. In particular, the positive relationship between capital account liberalization and financial depth seems to be concentrated among industrial countries. There is little evidence of capital account liberalization promoting financial depth outside members of the OECD, even in Latin America alone, which represents a subsample of developing countries with a relatively large number of instances of capital account liberalization. This may suggest that policy reforms in developing countries should require capital account liberalization to come at a late stage, when adequate institutions and sound macroeconomic policies are already in place. But this policy prescription requires a better understanding of the manner in which openness alters the performance of an economy.

References

[1] Bagehot, Walter, *Lombard Street*, 1873, Richard D. Irwin, Homewood, Illinois, [1962 edition].

[2] Barro, Robert, "Economic Growth in a Cross Section of Countries," *Quarterly Journal of Economics*, vol. CVI, 1991, pp. 407-43.

[3] Bhagwati, Jagdish, "The Capital Myth: The Difference Between Trade in Widgets and Trade in Dollars", *Foreign Affairs, 77,* 1998, pp. 7-12.

[4] Cukierman, Alex, Steven B. Webb and Bilin Neyapti, "Measuring the Independence of Central Banks and Its Effects on Policy Outcomes," *World Bank Economic Review*, vol. VI, September 1992, pp. 353-98.

[5] King, Robert and Ross Levine, "Finance and Growth: Schumpeter Might be Right," *Quarterly Journal of Economics*, vol. 108, no. 3, August 1993, pp. 717-37

[6] Levine, Ross, "Financial Development and Economic Growth: Views and Agenda," *Journal of Economic Literature*, vol. XXXV, June 1997, pp. 688-726.

[7] Levine, Ross, Norman Loayza and Thorsten Beck, "Financial Intermediation and Growth: Causality and Causes," mimeo, University of Virginia, 1999.

[8] Lucas, Robert, "On the Mechanics of Economic Development," *Journal of Monetary Economics*, vol. XXII, 1988, pp. 3-42.

[9] Robinson, Joan, "The Generalization of the General Theory," in *The Rate of Interest, and Other Essays*, 1952, Macmillan, London, pp. 67-142.

[10] Rodrik, Dani, "Who Needs Capital-Account Convertibility?" mimeo, Harvard University, February 1998.

[11] _____, *Making Openness Work: The New Global Economy and the Developing Countries*, Overseas Development Council, Washington, DC, 1999.

[12] Schumpeter, Joseph A., *The Theory of Economic Development*, 1912, Harvard University Press, Cambridge, MA.

A Appendix

This appendix contains a description of the data used in the paper.

LLY : Ratio of liquid liabilities to *GDP*. Data on liquid liabilities are calculated using line 551 from the IMF's *International Financial Statistics* (IFS), or the sum of line 34 and line 35 when line 551 is not available. As in King and Levine (1993), we use the arithmetic average of this year's end of period and last year's end of period values in order to mitigate the problem of deflating a stock by *GDP* flow. Thus, *LLY* in 1984 is the average of liquid liabilities in 1983 and in 1984, divided by (nominal) *GDP* in 1984. Nominal *GDP* is from IFS.

PRIVY : Ratio of claims on the nonfinancial private sector to *GDP*. Claims on the nonfinancial private sector is given by line 32d in IFS.

BANK : Ratio of deposit money bank domestic assets to the sum of deposit money bank domestic assets and central bank domestic assets. Deposit money bank domestic assets is given by the sum of lines 22a through 22d in IFS, while central bank domestic assets is the sum of lines 12a through 12d in IFS.

SHARE : Proportion of years over the period 1986-1995 without restrictions on the capital account. We first use information from the yearly issues of the IMF's *Exchange Arrangements and Exchange Restrictions,* line E2 in the Summary Table, to generate a simple 0/1 dummy variable for each country for each year. This dummy variable takes the value 1 if the country had no capital controls in place. Then, for each country, we calculate *SHARE* as the proportion of years between 1986 and 1995 in which the country had unrestricted capital mobility.

In addition, the level and growth rate of per capita *GDP* are from the World Bank's *World Saving Database.*[25] Consumer price inflation is from IFS, while black market premium data are from Barro and Jong-Wha Lee's data set.[26] The ratios of investment to *GDP,* exports plus imports to *GDP,* and government spending to *GDP* are from the Penn World Table (mark 5.6), available at *www.nber.org*.

The following is a list of countries (with codes in parentheses) included in the empirical analysis of Sections 3 and 4:

Benin (BEN) Cameroon (CMR), Central African Republic (CAF), Chad (TCD), Comoros (COM), Congo (COG), Egypt (EGY), Equatorial Guinea

[25]Loayza, Norman, Humberto Lopez, Klaus Schmidt-Hebbel, and Luis Serven (1997), "World Saving Database." Washington, DC: The World Bank.

[26]Barro, Robert and Jong-Wha Lee (1994), "Data Set for a Panel of 138 Countries." Cambridge, MA: Harvard University.

(EQG), Ethiopia (ETH), Gabon (GAB), Ghana (GHA), Kenya (KEN), Lesotho (LSO), Madagascar (MDG), Malawi (MWI), Mali (MLI), Mauritania (MRT), Mauritius (MUS), Niger (NER), Rwanda (RWA), Senegal (SEN), Seychelles (SYC), Sierra Leone (SLE), South Africa (ZAF), Sudan (SDN), Swaziland (SWZ), Tanzania (TZA), Togo (TGO), Tunisia (TUN), Uganda (UGA), Zambia (ZMB), Zimbabwe (ZWE);

Bangladesh (BGD), China (CHN), India (IND), Israel (ISR), Jordan (JOR), Korea (KOR), Malaysia (MYS), Maldives (MLV), Nepal (NEP), Pakistan (PAK), Philippines (PHL), Sri Lanka (LKA), Syria (SYR), Thailand (THA);

Argentina (ARG), Bahamas (BHS), Barbados (BRB), Bolivia (BOL), Brazil (BRA), Chile (CHL), Costa Rica (CRI), Dominica (DMA), Dominican Rep. (DOM), Ecuador (ECU), El Salvador (SLV), Grenada (GRN), Guatemala (GTM), Guyana (GUY), Haiti (HTI), Honduras (HND), Jamaica (JAM), Mexico (MEX), Nicaragua (NIC), Panama (PAN), Paraguay (PRY), Peru (PER), St. Lucia (LCA), St. Vincent and Grenadines (VCT), Uruguay (URY);

Australia (AUS), Austria (AUT), Belgium (BEL), Canada (CAN), Denmark (DEN), Finland (FIN), France (FRA), Germany (GER), Greece (GRC), Iceland (ICE), Ireland (IRE), Italy (ITA), Japan (JAP), Netherlands (NDL), New Zealand (NZL), Norway (NOR), Portugal (PRT), Spain (ESP), Sweden (SWE), United Kingdom (UK), United States (USA).

Table 1
Financial Depth: Beginning and End of Period Means
and Test of Change Across Time

Panel A: Full Sample

	LLY	*PRIVY*	*BANK*
I Mean, 1986	.39	.34	.74
II Mean, 1995	.44	.39	.77
III Growth (percent)	12.1	13.7	4.0
IV Wilcoxon Test z stat.	3.25	3.21	2.18
V p-value	.00	.00	.03
VI Spearman Rank Corr. rho statistic	.83	.74	.72
VII p-value	.00	.00	.00
VIII No. of Observations	96	96	103

Panel B: Industrial Countries

	LLY	*PRIVY*	*BANK*
I Mean, 1986	.56	.58	.92
II Mean, 1995	.66	.72	.95
III Growth (percent)	16.4	21.6	3.2
IV Wilcoxon Test z stat.	2.62	2.83	2.78
V p-value	.01	.00	.01
VI Spearman Rank Corr. rho statistic	.44	.49	.65
VII p-value	.04	.02	.00
VIII No. of Observations	21	21	21

Panel C: Developing Countries

	LLY	*PRIVY*	*BANK*
I Mean, 1986	.35	.27	.69
II Mean, 1995	.38	.29	.72
III Growth (percent)	8.2	7.1	4.3
IV Wilcoxon Test z stat.	2.23	2.04	1.60
V p-value	.03	.04	.11
VI Spearman Rank Corr. rho statistic	.81	.64	.63
VII p-value	.00	.00	.00
VIII No. of Observations	75	75	82

Figure 1
Financial Depth, 1986 and 1995

Figure 1a: Liquid Liabilities / GDP, 1986 and 1995

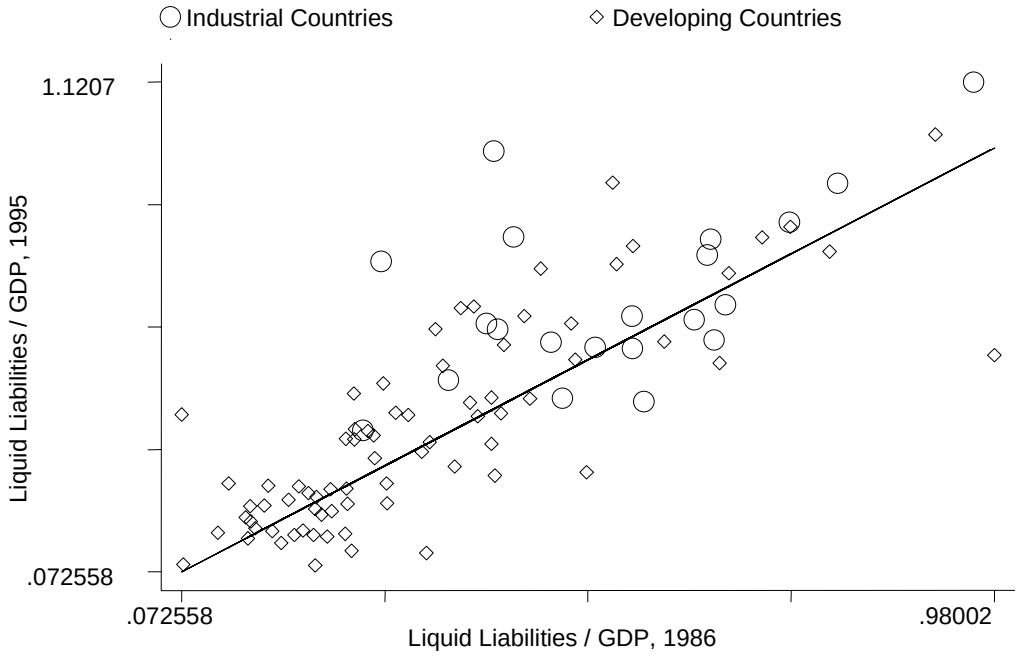


Figure 2a: Domestic Credit / GDP, 1986 and 1995

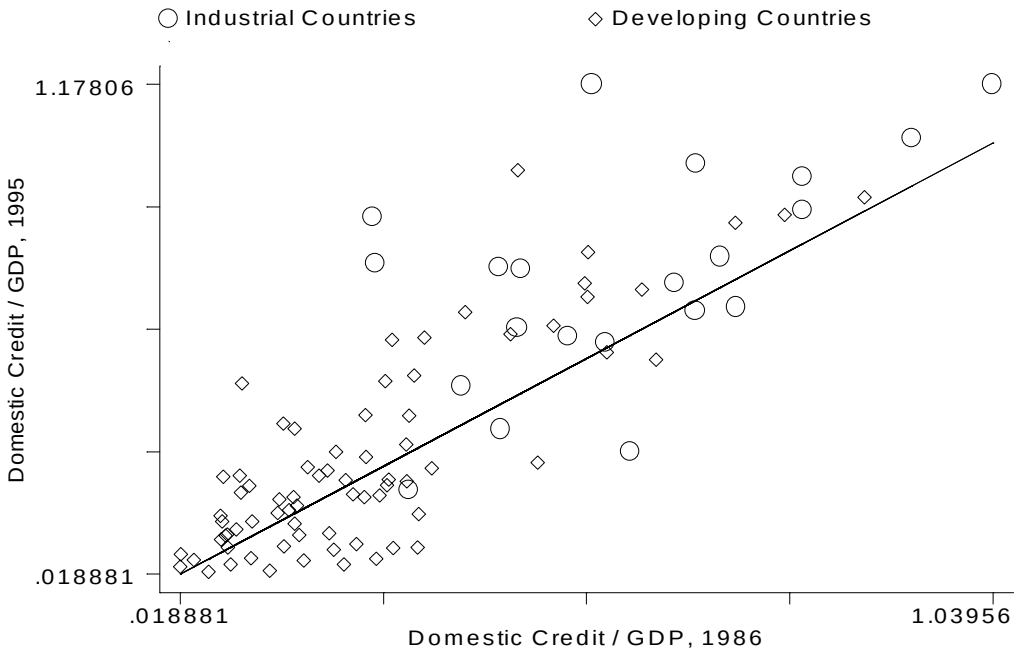


Figure 1 (continued)

Figure 1c: Private Bank Ratio, 1986 and 1995

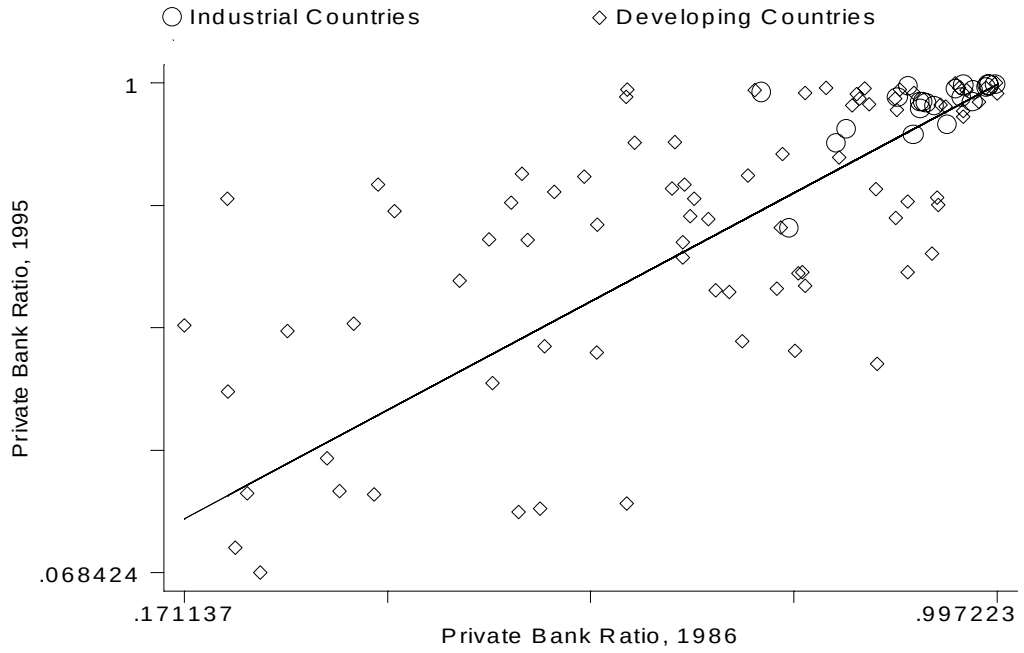


Table 2

Correlation of Changes in Financial Depth
Simple Correlations (ρ) and
Spearman Rank Correlation Test Rho Values (S.R.) with Associated p-values

Panel A: Full Sample

	Δln*LLY*		Δln*PRIVY*	
	ρ	S.R. (p-value)	ρ	S.R. (p-value)
Δln*LLY*	1.0			
Δln*PRIVY*	.68	.64 (.00)	1.0	
Δln*BANK*	.48	.28 (.01)	.46	.31 (.00)

Panel B: Industrial Countries

	Δln*LLY*		Δln*PRIVY*	
	ρ	S.R. (p-value)	ρ	S.R. (p-value)
Δln*LLY*	1.0			
Δln*PRIVY*	.88	.83 (.00)	1.0	
Δln*BANK*	.15	.21 (.35)	.14	.12 (.60)

Panel C: Developing Countries

	Δln*LLY*		Δln*PRIVY*	
	ρ	S.R. (p-value)	ρ	S.R. (p-value)
Δln*LLY*	1.0			
Δln*PRIVY*	.65	.60 (.00)	1.0	
Δln*BANK*	.51	.31 (.01)	.48	.34 (.00)

Figure 2
Proportion of Years with Open Capital Markets, 1986 to 1995

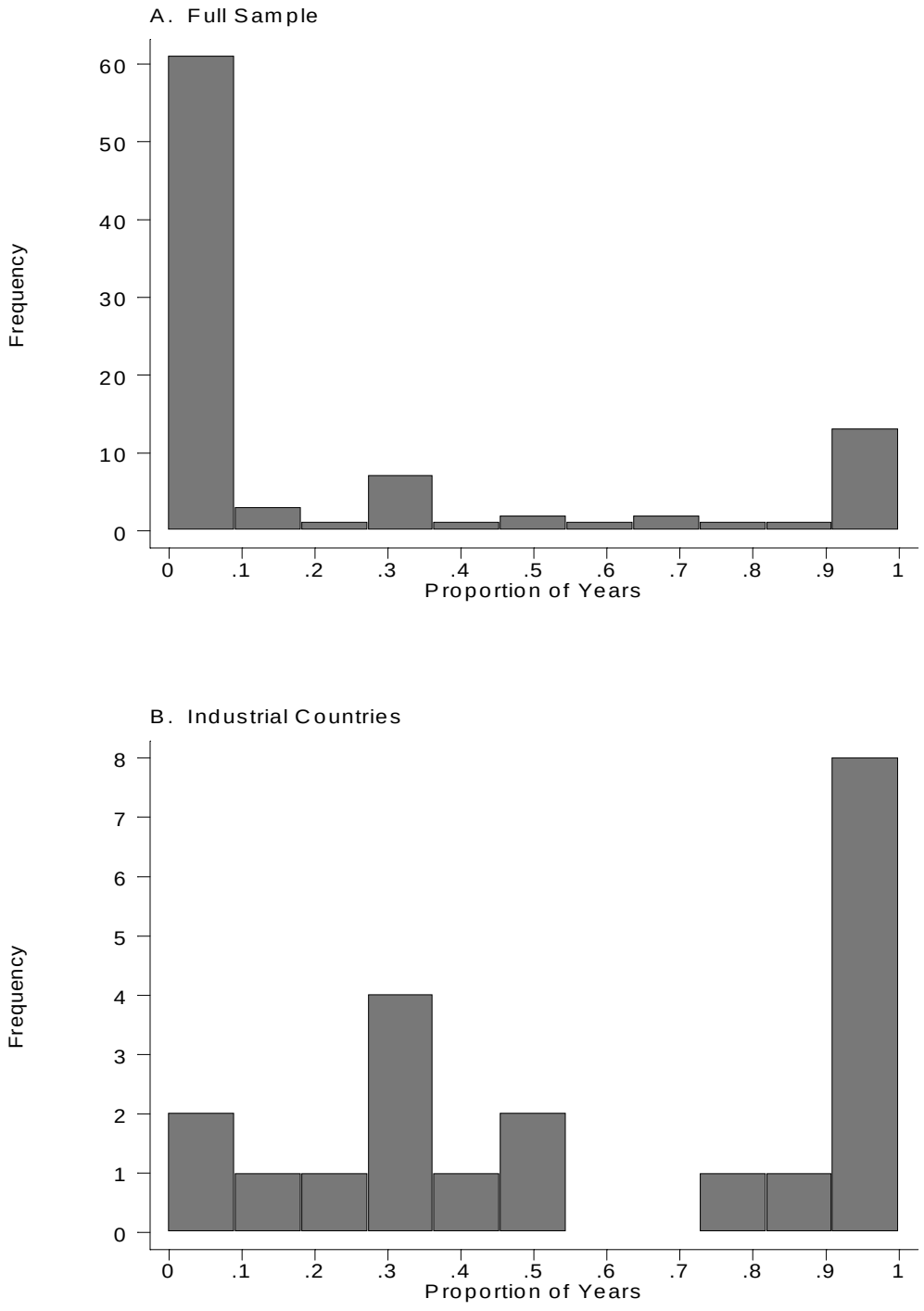


Figure 2 (continued)

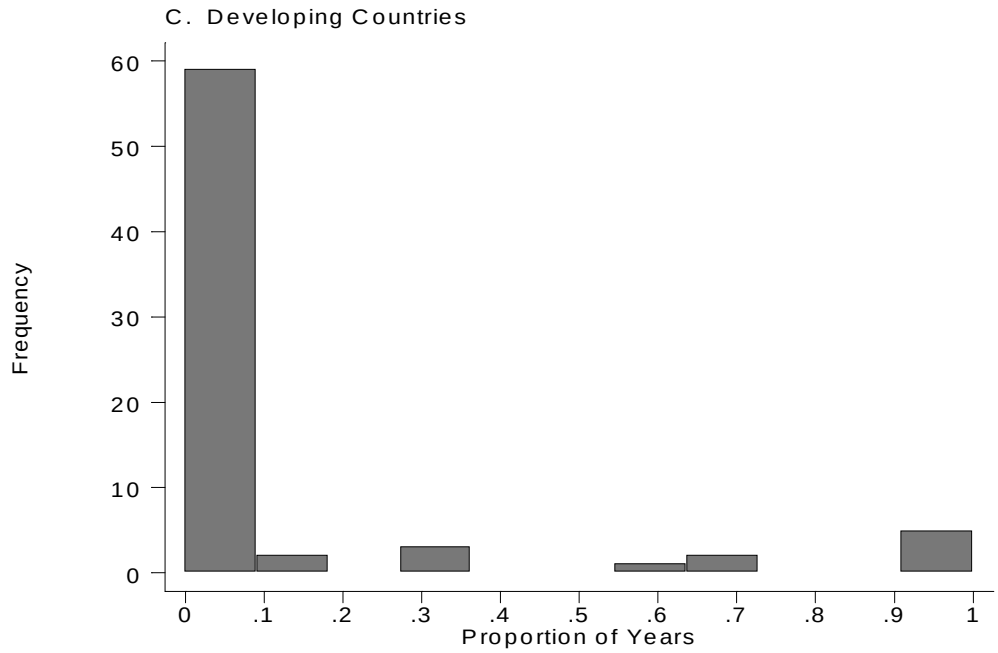
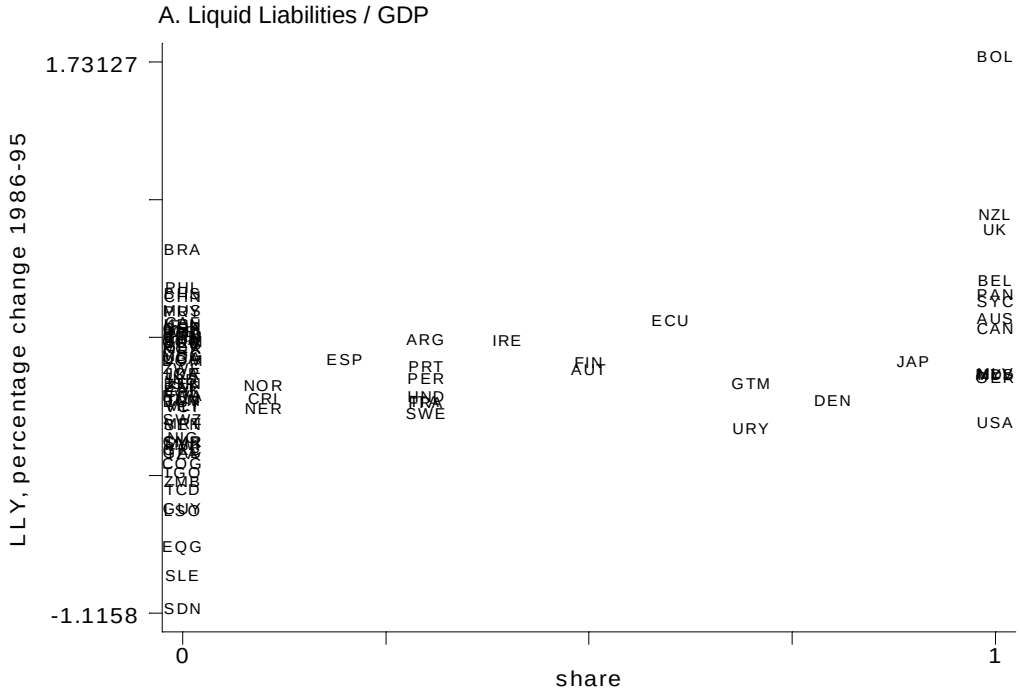


Table 3

SHARE and Years of Open Capital Markets (*SHARE* ≠ 0)

SHARE	Years Open	Industrial Countries	Developing Countries
0.1	1995	Norway	Costa Rica, Niger
0.2	1994-95	Spain	
0.3	1993-95	France, Italy, Portugal, Sweden	Argentina, Honduras, Peru
0.4	1992-95	Ireland	
0.5	1991-95	Finland, Austria	
0.6	1988-92, 1995		Ecuador
0.7	1989-95 1986-92		Guatemala Uruguay
0.8	1988-95	Denmark	
0.9	1986-94	Japan	
1.0	1986-95	Australia, Belgium, Canada, Germany, Netherlands, New Zealand, U.K., U.S.	Bolivia, Malaysia, Maldives, Panama, Seychelles

Figure 3
Association between Capital Account Liberalization and Indicators of Financial Deepening



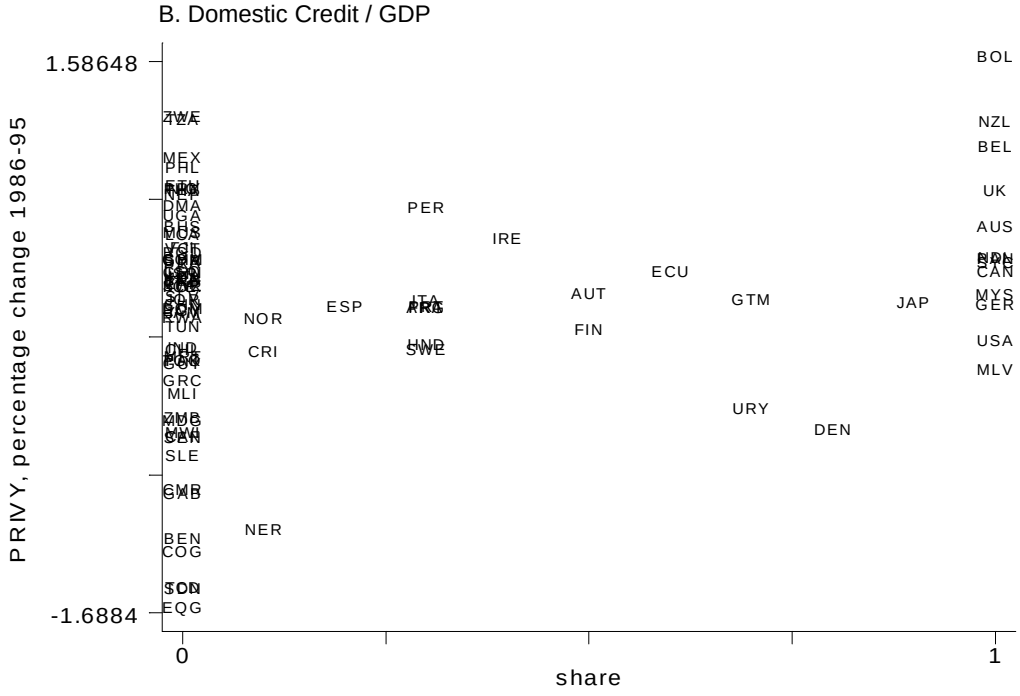


Figure 3 (continued)

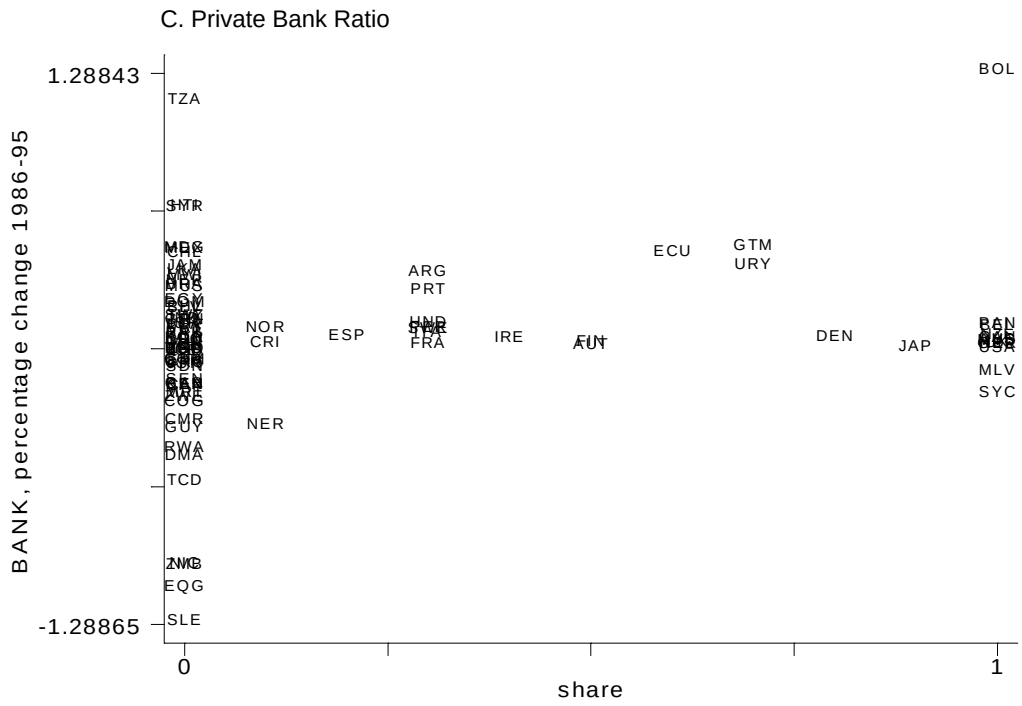


Table 4
Instrument Choice for Capital Account Liberalization
Over the Period 1986 to 1995

The dependent variable is $KALIB_{86\text{-}95}$ as measured by *SHARE*

	(1)	(2)	(3)
Dummy equal to 1 if country had no capital account restrictions in 1985, and zero otherwise	.8257** (.0539)		.7189** (.0550)
Africa		-.5633** (.0869)	-.2449** (.05654)
Latin America		-.40** (.0904)	-.1439** (.05658)
Asia		-.4823** (.0997)	-.2245** (.0617)
No. of Observations	93	93	93
R^2	.71	.31	.76

Note: Standard errors in parentheses. A constant is included in all the regressions. Regional dummies for Africa, Latin America, and Asia refer to non-OECD countries as of 1986.
** indicates significance at the 5 percent level, while * denotes significance at the 10 percent level.

Table 5
Financial Depth and Capital Account Liberalization
Full Sample

	$\Delta\ln LLY$			$\Delta\ln PRIVY$			$\Delta\ln BANK$		
	OLS (1)	IV[a] (2)	IV[b] (3)	OLS (4)	IV[a] (5)	IV[b] (6)	OLS (7)	IV[a] (8)	IV[b] (9)
$\ln FD_{86}$	-.274** (.066)	-.279** (.068)	-.279** (.065)	-.402** (.076)	-.407** (.082)	-.407** (.077)	-.412** (.088)	-.425** (.091)	-.404** (.088)
$KALIB_{86\text{-}95}$	.234** (.091)	.280* (.148)	.282** (.097)	.357** (.123)	.413* (.243)	.415** (.134)	.208** (.097)	.299 (.187)	.146 (.115)
Africa	-.390** (.092)	-.380** (.093)	-.380** (.092)	-.788** (.156)	-.778** (.158)	-.778** (.156)			
Asia							.236** (.088)	.252** (.093)	.225** (.089)
Gov. Spend./GDP in 1986							-.015** (.003)	-.014** (.004)	-.015** (.004)
No. of Observations	92	92	92	89	89	89	87	87	87
R^2	.325			.384			.301		

Note: Robust standard errors in parentheses. A constant is included in all the regressions. $KALIB_{86\text{-}95}$ is measured by *SHARE*. IV[a] denotes instrumental variables regression with developing countries' regional dummies as the only instruments. IV[b] denotes instrumental variables regression with developing countries' regional dummies and an indicator of a country's stance toward capital account liberalization in 1985 as instruments. ** indicates significance at the 5 percent level, while * denotes significance at the 10 percent level.

Table 6
Financial Depth and Capital Account Liberalization

Panel A: Industrial Countries

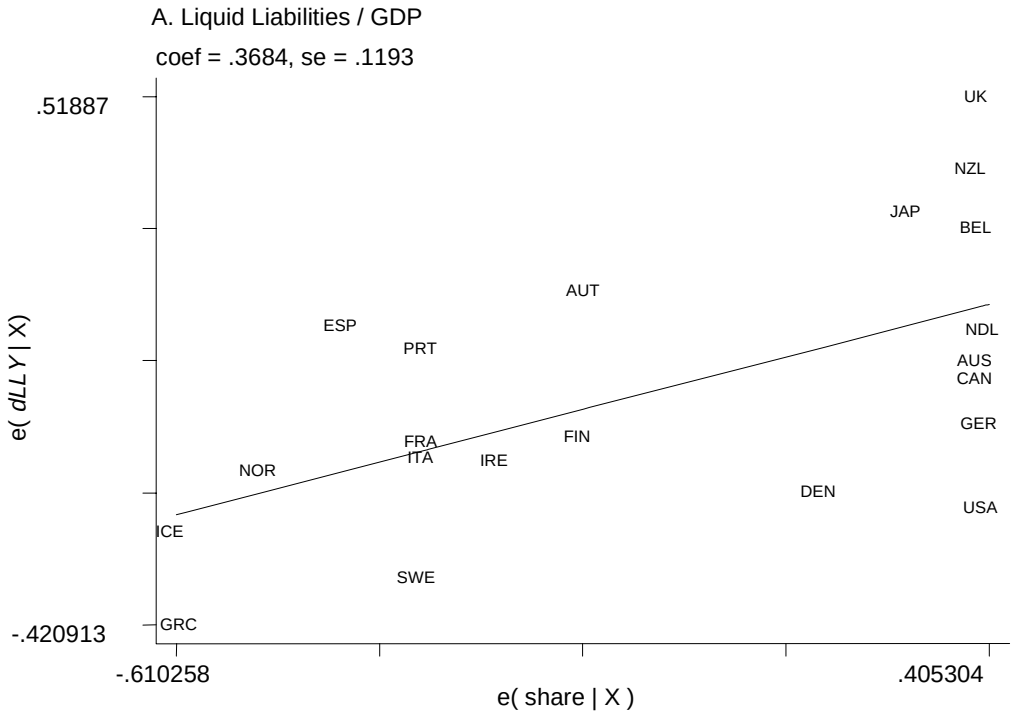
	$\Delta\ln LLY$		$\Delta\ln PRIVY$		$\Delta\ln BANK$	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
$\ln FD_{86}$	-.5750** (.1361)	-.5752** (.1366)	-.5275** (.1776)	-.5217** (.1935)	-.4861** (.3275)	-.5461 (.3275)
$KALIB_{86\text{-}95}$	.3684** (.1193)	.3589** (.1239)	.5441** (.1841)	.4636** (.1629)	.030 (.0378)	.0572** (.0263)
No. of Observations	21	21	21	21	21	21
R^2	.58		.43		.26	

Panel B: Latin American Countries

	$\Delta\ln LLY$		$\Delta\ln PRIVY$		$\Delta\ln BANK$	
	OLS (1)	IV (2)	OLS (3)	IV (4)	OLS (5)	IV (6)
$\ln FD_{86}$	-.2048 (.1448)	-.1726 (.1692)	-.2524* (.1229)	-.2637** (.1237)	-.4088** (.0832)	-.4122** (.0830)
$KALIB_{86\text{-}95}$	.0293 (.2928)	.2296 (.3207)	-.05033 (.3255)	.0864 (.3705)	.2415** (.1044)	.2729** (.1277)
Gov. Spend./GDP in 1986	-.0133 (.0111)	-.0159 (.0116)	-.0150* (.0085)	-.0156* (.0085)	-.0228** (.00935)	-.0230** (.00947)
No. of Observations	20	20	20	20	20	20
R^2	.38		.36		.58	

Note: Robust standard errors in parentheses. A constant is included in all the regressions. $KALIB_{86\text{-}95}$ is measured by *SHARE*. IV denotes instrumental variables regression with an indicator of a country's stance toward capital account liberalization in 1985 as instrument. The regressions in Panel B exclude Bolivia and Nicaragua, which are two outliers. ** indicates significance at the 5 percent level, while * denotes significance at the 10 percent level.

Figure 4
Partial Scatterplots of Indicators of Financial Deepening
against Capital Account Liberalization



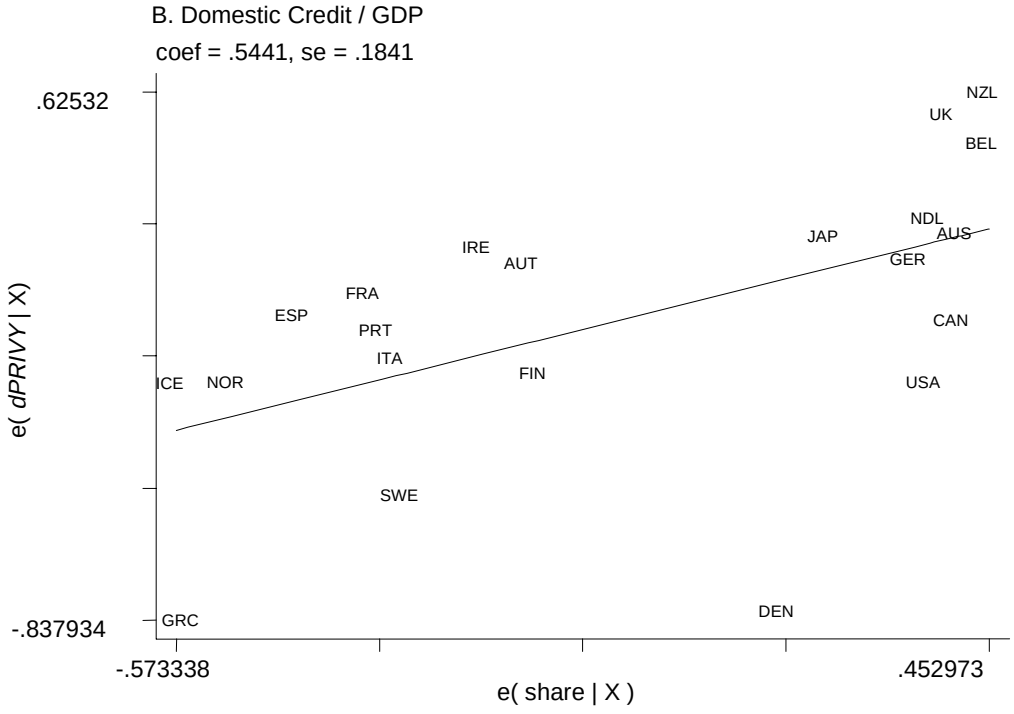


Figure 4 (continued)

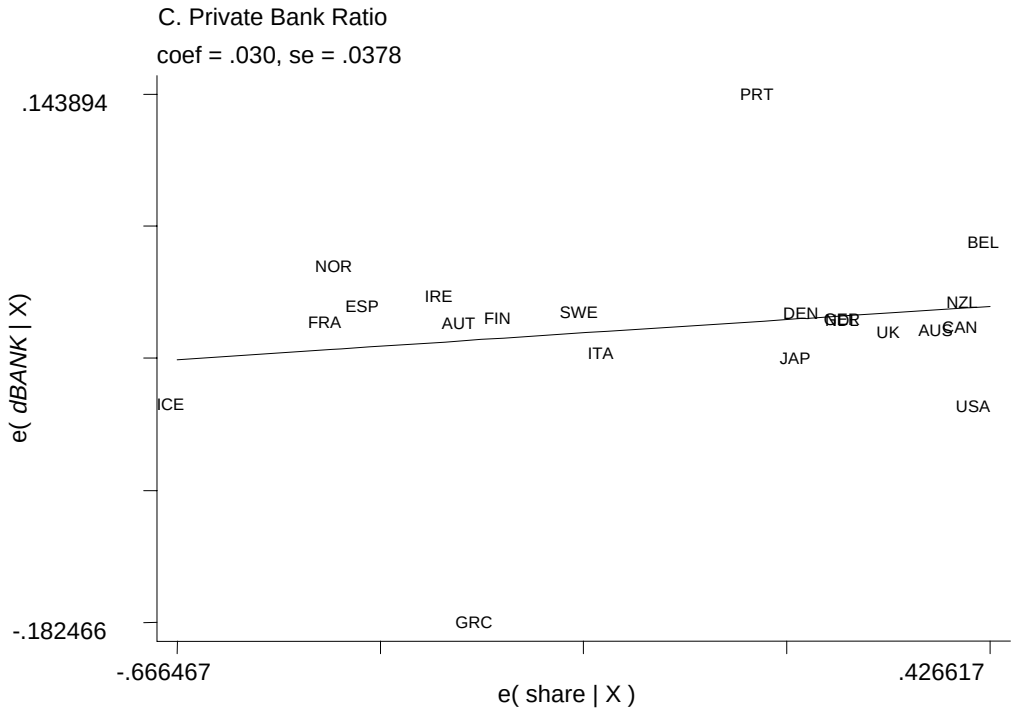


Table 7
Financial Development and *GDP* Growth

The dependent variable is $\Delta \ln GDP$

	FD is given by *LLY*			*FD* is given by *PRIVY*			*FD* is given by *BANK*		
	eq.(2)	*eq.(2')*		*eq.(2)*	*eq.(2')*		*eq.(2)*	*eq.(2')*	
		OLS	*2SLS*		*OLS*	*2SLS*		*OLS*	*2SLS*
FD_{86}	.1482 (.0977)	.2441 (.1510)	.2633 (.2165)	.1027 (.0811)	.2901** (.0975)	.2701 (.2003)	.1409 (.1566)	.3282* (.1767)	.3352** (.1645)
$\Delta \ln FD$		.1406** (.0677)	.1606 (.1632)		.0998** (.0383)	.0892 (.0940)		.2404** (.0656)	.2494* (.1344)
No. of Obs.	70	70	70	71	71	71	71	71	71
R^2	.31	.35		.32	.37		.31	.42	

Note: Robust standard errors in parentheses. A constant is included in all the regressions. Additional explanatory variables are given by regional dummies for sub-Saharan Africa and Latin America, the (log of the) initial level of real per-capita *GDP*, the initial ratio of export plus imports to GDP, and the initial ratio of investment to GDP. $\Delta \ln FD$ is instrumented using eq.(1) in the text, as detailed in sections 3 and 4. ** indicates significance at the 5 percent level, while * denotes significance at the 10 percent level.