Journal of Economic Cooperation and Development, **30**, 1 (2009), 17- 40

FINANCIAL SECTOR DEVELOPMENT AND ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS OF DEVELOPING COUNTRIES

Eatzaz Ahmad and Aisha Malik*

Using a panel data set for 35 developing countries over the period 1970-2003, this study analyzes the role of financial sector development in economic growth and domestic and foreign capital accumulation. A major finding of the study is that financial sector development affects per capita GDP mainly through its role in efficient resource allocation, rather than its effects on capital accumulation. Furthermore, it is the domestic rather than foreign capital accumulation that is instrumental in increasing per worker output and hence promoting economic growth in the long run. Furthermore, foreign capital also does not stimulate domestic capital accumulation, while domestic capital plays a significant role as a complementary factor for attracting foreign capital.

1. Introduction

This paper discusses links between financial sector development, domestic capital, foreign capital and economic growth in a sample of 35 developing countries. In particular, the paper investigates the roles of financial-sector development, domestic capital and foreign capital in economic growth process through capital accumulation and total factor productivity (TFP) growth, and determines domestic capital and foreign capital within the model.

A novel feature of the paper is that it makes domestic capital as opposed to foreign capital a function of financial development; thereby

* The authors are respectively Professor of Economics and PhD student at Quaid-i-Azam University Islamabad.

suggesting that financial sector development is essentially meant for promoting domestic investment.

A large amount of literature shows that financial systems can reduce the costs of acquiring information about firms and managers, and lower the cost of conducting transactions. By providing more accurate information about production technologies and exerting corporate control, financial sector development can enhance resource allocation and accelerate growth. Similarly, by facilitating risk management, improving the liquidity of assets and reducing trading costs, financial development can encourage investment in high-return activities (see Levine, 1997). So the paper examines whether financial sector development influences economic growth through TFP growth and domestic capital in a sample of 35 developing countries.

The paper also focuses on an important aspect of economic activity, namely domestic capital, which plays a substantial role in long-run economic growth. Domestic investment in tangible assets affects economic growth through domestic capital accumulation, while domestic investments in human capital, research and development and infrastructure enhance economic growth through total factor productivity growth. The paper also investigates the effect of financial factor on domestic capital accumulation, controlling for non-financial factors of domestic capital. The premise of the study is that developed financial sector reduces the overall costs and risks of investment, which in turn stimulates capital accumulation.

During 1980s many developing countries eased restrictions on foreign capital and offered tax incentives and subsidies to attract foreign capital (Aitken and Harrison, 1999 and World Bank, 1997a, b). The rationale for increased efforts to attract more foreign direct investment (FDI) stems from the belief that FDI has several positive effects which include productivity gains, technology transfers, the introduction of new processes, managerial skills, and know-how in the domestic market, employee training, international production networks and access to markets. Exploring the impact of foreign capital on economic growth also has important policy implications. Therefore, it is important to identify such factors that have the potential to either impede or induce foreign flows into host countries. So the paper measures the magnitude

and the direction of the determinants of foreign capital as well.

The analysis is based on simultaneous equations model that determines economic growth, domestic capital and foreign capital simultaneously. We also measure the total effect of a change in the predetermined variable on the three variables of interest that are determined jointly, after taking account all the interdependence relationships.

The paper is based on a panel data set over the period 1970-2003 for 35 developing countries. We use a dynamic Generalized-Method-of-Moments (GMM) estimation technique that combines in a system the regression in differences with the regression in levels. This technique controls for the endogeneity of the regressors and for country-specific effects in dynamic lagged-dependent variable models, such as growth regressions.

This paper's findings predict that better functioning financial sector accumulates domestic capital, which in turn spurs economic growth. The results indicate that financial sector development plays an important role in domestic investment activities. It also shows that foreign capital does not exert a positive influence on economic growth. But foreign capital has a complementary relationship with domestic capital. It is to be noted, however, that the paper does not examine any particular country in depth; the results rather provide evidence based on a cross-section of countries.

The rest of the paper is organized as follows. Model is specified in section 2. Section 3 describes the data sources, variables and estimation technique. Estimation results are discussed in section 4 and section 5 concludes the paper.

2. The Model

The model considered below for empirical analysis capitalizes on the role of financial sector development in economic growth through total factor productivity growth and capital accumulation in a system of simultaneous equations determining domestic and foreign capital accumulation along with GDP growth. The econometric framework builds on the growth model based on domestic and foreign capital

presented in Ahmad and Paul (1998) and Ahmad (1999). Since, however, the present study is mainly focused on the empirical side, it does not go much in theoretical details that are essential to ensure a close form solution to the model both in the steady state and transitional phase. Using i and t to denote country and time period (year), the economy-wide production function can be written as:

$$Y_{it} = A_{it}\left(K_{it}^{d}\right)^{\beta}\left(K_{it}^{f}\right)^{\delta}\left(L_{it}\right)^{1-\beta-\delta} \tag{1}$$

where Y_{it}, A_{it}, K_{it}^{d}, K_{it}^{f} and L_{it} denote aggregate output, total factor productivity (TFP), stocks of domestic and foreign capital and labor, while β and δ are parameters of the production function. Dividing both sides of the production function by L_{it}, taking log transformation and denoting logs of output per worker, TFP, domestic capital per worker and foreign capital per worker by y_{it}, a_{it}, k_{it}^{d} and k_{it}^{f} respectively, yields:

$$y_{it} = a_{it} + \beta k_{it}^{d} + \delta k_{it}^{f} \tag{2}$$

Now financial development indicators can influence growth rate of per capita GDP through two channels, namely TFP growth and capital accumulation. Financial sector plays a role in the growth process because it is integral to the provision of funding for capital accumulation and for the diffusion of new technologies. The micro-economic rationale for financial systems is based largely on the existence of frictions in the trading system. In a world in which writing, issuing and enforcing contracts consume resources and in which information is asymmetric and its acquisition is costly, properly functioning financial systems can provide such services that reduce these information and transactions costs (Pagano, 1993 and Levine, 1997). This process brings together savers and investors more efficiently and, ultimately, contributes to economic growth through capital accumulation and TFP growth via efficient resource allocation and diffusion of technology. Levine et al. (2000) used different indicators of financial development and found a positive effect of financial indicators on economic growth.

There are two different approaches for constructing the model further to capture the three channels mentioned above through which financial development can influence economic growth. The first approach is to estimate the effects of the financial development indicators along with other control variable on each of the three variables, namely TFP, domestic capital and foreign capital and then substitute the estimated equations in the growth accounting equation specified above. A drawback of this approach is that it requires separate estimation of the TFP series before regressing it on financial development indicators along with control variables. Thus the estimation errors in the TFP series creep into the second stage estimation. The other approach is to substitute the algebraic expression indicating the relationship of TFP with financial and other variables into the growth accounting equation before estimating the latter. Following the second approach, we specify the following linear relationships to determine TFP.

$$a_{it} = a_0 + a_1 pc_{it} + a_2 ccb_{it} + a_3 k_{it}^d + a_4 k_{it}^f + a_5 al_{it} + a_6 gc_{it} + a_7 p_{it} + a_8 op_{it} + \varepsilon_{it} \quad (3)$$

where pc_{it}, ccb_{it}, al_{it}, gc_{it}, p_{it} and op_{it} are natural logs of private credit to GDP ratio, commercial-central bank, adult literacy rate, government consumption to GDP ratio, CPI, trade openness (ratio of exports plus imports to GDP), while ε_{it} indicates random productivity shock. Thus besides financial development indicators, domestic capital, which includes expenditures on human capital, research and development and infrastructure, is also assumed to influence TFP. Furthermore foreign capital is an important source of TFP growth because it produces externalities in the form of technology transfers and spillovers (see, e.g. Wang, 1990).

The other control variables that are assumed to affect TFP are adult literacy rate, government consumption to GDP ratio, trade openness and CPI. Literacy rate is a human capital indicator and its obvious effect of TFP is through accumulation of knowledge, learning ability and general increase productivity of resources (Romer, 1989). Government consumption indicates size of public sector and its effect is generally regarded negative unless it is specifically meant to improve productivity. Price inflation can adversely affect TFP by creating uncertainty and

short-term distortions in resource allocation. According to Barro and Sala-i-Martin, (1995) these variables indicate macroeconomic stability. Finally, trade openness is expected to raise productivity through increased competition and transmission of technology from rest of the world (Edwards, 1993 and Levine and Zervos, 1998).

Substituting equation (3) into (2), collecting the common terms, rearranging and adding the lagged output term to capture growth inertia yields the following estimable equation.

$$y_{it} = \alpha_0 + \alpha_1 pc_{it} + \alpha_2 ccb_{it} + \alpha_3 k_{it}^d + \alpha_4 k_{it}^f + \alpha_5 al_{it} + \alpha_6 gc_{it} + \alpha_7 p_{it} + \alpha_8 op_{it} + \alpha_9 y_{it-1} + \varepsilon_{it} \quad (4)$$

Now to specify the determinants of domestic and foreign capitals, we propose the following econometric equations.

$$k_{it}^d = \beta_0 + \beta_1 pc_{it} + \beta_2 ccb_{it} + \beta_3 k_{it}^f + \beta_4 y_{it} + \beta_5 gc_{it} + \beta_6 p_{it} + \beta_7 op_{it} + \eta_{it} \quad (5)$$

$$k_{it}^f = \delta_0 + \delta_1 k_{it}^d + \delta_2 y_{it} + \delta_3 \left(y_{it} + l_{it}\right) + \delta_4 al_{it} + \delta_5 op_{it} + \delta_6 rer_{it} + \mu_{it} \quad (6)$$

where rer_{it} and l_{it} are the natural logs of real exchange rate and labor supply.

The financial variables included in the domestic capital equation are the same as in the GDP equation (4). Both the variables are expected to exert favorable influence on capital accumulation by facilitating the channeling of resources from savers to the highest-return investment activities and increasing the quantity of funds available for domestic investment as explained earlier.

Domestic capital is also made a function of the stock of foreign capital in order to determine whether foreign capital is complement or substitute of domestic capital. Per capita GDP is expected to affect capital accumulation through accelerator channel. Empirical evidence is consistent with this accelerator effect and shows that high output growth

is associated with high investment rates (Fielding, 1993, 1997). The ratio of Government consumption to GDP is included in the equation to determine whether government spending is conducive to or crowds out capital accumulation. Inflation rate may have positive or negative impact on domestic investment. High and unstable inflation is likely to affects domestic investment adversely by increasing the degree of uncertainty about the macroeconomic environment (Fischer, 1993). However, moderate inflation may promote capital accumulation by shifting portfolio of assets from financial to real components and by providing signals of rising aggregate demand (see Mundell, 1963 and Tobin, 1965). Finally, trade openness can affect domestic capital both through exports and imports. An increase in exports causes an increase in supply of foreign exchange necessary for the purchase of imported capital goods and also expands the market for domestic products. An increase in imports can accumulate domestic capital if it implies greater access to investment goods. But imports can also negatively affect domestic capital if it predominantly consists of consumer goods, which may discourage domestic production.

Equation (6) states that foreign capital per worker is potentially affected by domestic capital per worker, GDP per worker, adult literacy rate, trade openness, real exchange rate and the level of GDP. Theoretical justification for these relationships is as follows. Domestic capital can affect foreign capital in more than one ways. It can serve as a complement or a substitute for foreign capital depending upon the sectors in which domestic investment and FDI take place. Increase in per capita GDP measures economic performance of a country and can be taken as a positive signal to attract FDI (e.g. Billington, 1999 and Tsai, 1994). Market size is measured by GDP.[1] A large market is important for efficient utilization of resources and exploitation of economies of scale. Therefore market size is expected to have positive effect on the level of FDI (Billington, 1999).

Countries with higher levels of human capital can better exploit technological spillovers associated with FDI (Borensztein et al., 1998). Therefore FDI is attracted in those countries where the labor force has

[1] In equation (6) Log of GDP is set equal to log of GDP per worker plus log of labor force.

higher human capital content. This factor is captured by adult literacy rate in our equation. According to Edward (1990) trade openness is positively associated with FDI. MNEs acquire benefits of export expansion policies and import machinery from home country. Froot and Stein (1991) link FDI decisions with real exchange rate variations where, for example, a depreciation of the domestic currency increases the relative wealth of foreign firms, which leads them to increase their investment abroad.

The above simultaneous equations model (equations 4, 5 and 6) provides an integrated framework for understanding how financial systems, domestic capital and foreign capital influence long-run rates of economic growth through TFP and capital accumulation. This framework captures Schumpeter's (1934) view of finance and development that highlights the impact of financial systems on productivity growth and technological change. Foreign capital produces externalities in the form of technology transfers and spillovers. The framework also incorporates a vast development economics literature arguing that capital accumulation is the key factor underlying economic growth.[2] This completes our model.

3. Data, Variables and Estimation Technique

This section describes data sources, financial development indicator, other explanatory variables and estimation technique.

3.1. The Data

The study is based on a panel data set over the period 1970-2003 for 35 developing countries. This study recognizes developing countries as countries that fall into the categories of 'low-income', 'lower-middle income' and 'upper-middle income' nations of the 2005 *World Development Indicators*. An important advantage of using panel data is that these capture both time-series and cross-section variations in variables. The data were sourced from the World Bank's *World Development Indicators* (2005) henceforth *WDI* and updated version of *Financial Structure Database* (Beck *et al*., 2000). The

[2] See King and Levine (1994), Fry (1995), and Easterly and Levine (1999).

countries, listed in Appendix 1, are selected on the basis of data availability.[3] *Economic growth* is based on the annual growth rate of the real GDP per worker and the data on GDP and labor force are obtained from *WDI*. The capital stock series is constructed from real gross capital formation using the perpetual inventory assumption with depreciation rate set equal to 5% and setting the growth rate of capital stock in the initial period equal to the compound growth rate of real GDP. The *Per Capita Capital Stock* series is then obtained by dividing the capital stock series by labor force. The data on gross capital formation are obtained from *WDI* and given in percentage of GDP. It is converted into levels. *Foreign Capital Per Capita* is calculated from gross foreign direct investment in the same manner as *Per Capita Capital Stock* series.

The study uses *Private Credit* and *Commercial-Central Bank* as indicators of financial sector development. Both the series are obtained from updated version of *Financial Structure Database* (Beck *et al*., 2000).. *Private credit* equals the value of credits by financial intermediaries to the private sector as a ratio of GDP. This measure of financial development is a measure of financial sector activity. Private credit isolates credit issued to the private sector, as opposed to credit issued to governments, government agencies, and public enterprises. Furthermore, it excludes credits issued by the central bank. *Commercial-Central Bank* equals commercial bank assets divided by commercial bank plus central bank assets. It measures the degree to which commercial banks versus the central bank allocate society's savings. The intuition underlying this measure is that banks are more likely to identify profitable investments, monitor managers, facilitate risk management, and mobilize savings than central banks.

The *Government consumption* data come from *WDI* and is the real general government consumption as a ratio of real GDP. *Inflation (P)* is measured as the log first difference of GDP deflator. *Openness to trade (OP)* is the sum of real exports and real imports as a ratio of real GDP. Human capital is approximated by *Adult Literacy Rate*. These data are taken from *WDI*. *Real exchange rate (RER)* is obtained by dividing the

[3] All developing countries are potential candidates for the sample. Countries with key data series missing, or with too many missing observations in key series, are eliminated from the sample.

nominal exchange rate by local price index. Official exchange rate data are obtained from *WDI*.

3.3. Estimation Technique

We use the *Generalized Method of Moments (GMM)* estimation technique developed for dynamic panel data that were introduced by Holtz-Eakin *et al*. (1990), Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1997). GMM accounts for unobserved country-specific effects, allows for the inclusion of lagged dependent variables as regressors and controls for endogeneity of all the explanatory variables. We estimate in a system that combines the regression in differences with the regression in levels. The regressions in levels are given by equations 4, 5 and 6, while the regressions in differences are obtained by expressing the three equations in first differences form to yield growth rates of GDP per worker, capital per worker and foreign capital per worker. Note that in taking the first differences the intercepts of the three equations are dropped, while the slope coefficients remain the same as in the equations in levels.

For the GMM estimation sufficient instruments are required. Following the standard convention, the equations in levels are estimated by using lagged first differences as instruments, while the equations in first differences are estimated by using lagged levels as instruments. To test for the statistical significance of various sets of parameters of interest, Wald tests of parameteric restrictions are applied. Once the model is estimated, reduced form parameters are obtained by solving the three equations for the three endogenous variables. These coefficients measure the total effect of a change in the predetermined variables on the endogenous variable, after taking account of the interdependences among the jointly dependent endogenous variables.

4. Results and Discussion

This section presents the results of the system panel regressions of the three equations in levels for real GDP, domestic capital and foreign capital all in per worker terms (4, 5 and 6) and the same three equations in first difference form.

4.1. Estimates of Structural Parameters

The parameter estimates of the equation for GDP per worker (both in level and first difference form) are presented in Table 1. The results support the idea that the accumulation of domestic capital is important for economic growth. The elasticity of output with respect to capital in almost equal to 0.3 as could be expected. The effect of foreign capital on economic growth is negative. This result is consistent with the results found in Carkovic and Levine (2002). It appears that in the sample of countries considered in this study the benefits of FDI in the form of its spillover through superior technology and management and supplement of domestic savings are not enough to offset the long run cost of FDI in the form of profit repatriation, crowding out of domestic investment. In other words FDI does not channel sufficiently into such the industries that generate economy-wide positive externalities.

Table 1: Parameter Estimates of GDP Equation

Variable	Parameter Estimate
Intercept	-0.639** (-2.93)
Domestic capital	0.302** (11.97)
Foreign capital	-0.003 (-0.73)
Government consumption	-0.114** (-3.05)
Inflation	-0.007* (-1.67)
Openness to trade	0.113** (2.78)
Literacy rate	-0.039 (-1.03)
Private credit	0.003* (1.61)
Commercial-central bank	0.069** (2.60)
Lagged growth rate of real per capita GDP	0.730** (19.38)
Number of countries	35
Number of observations	1120

Note: The t-statistics are given in parentheses. (**) and (*) indicate statistical significance at the 5 and 10 percent levels respectively.

The coefficient on government consumption is negative and significant. The argument is that the taxes necessary to support government spending could distort incentives, result in inefficient allocation of resources and hence reduce the growth of output. The regression results suggest that inflation has negative and significant influence on economic

growth. This is because increase in inflation is generally accompanied by greater changes in relative prices as not all sectors of an economy experience equal degree of price flexibility in the short run. This sends unwarranted signals to producers and result in temporary resource reallocation. The associated adjustment costs and temporary nature of reallocation result in efficiency losses and hence curtail output growth.

As expected, openness to trade has positive and significant effect on economic growth. So trade openness is an important stimulus to rapid economic growth. The coefficient on literacy rate is negative and insignificant.

The coefficients on private credit and commercial-central bank are positive and significant. Thus financial sector development is conducive to economic growth. Further note that the GDP equation contains both the domestic and foreign capitals as separate explanatory variables. Therefore the role of financial sector development in GDP growth captured in the estimated equation is independent of the investment channel, which is often associated with financial sector development. The regression results, therefore, confirm the presence of other channels (technical innovation and resource allocation) that affect GDP though its effect on total factor productivity.

Finally, the coefficient on lagged growth rate of real per capita GDP is positive significantly greater than zero and less than one. This suggests that, GDP tracks it past trends and on annual basis there are no strong divergences in GDP from its long run path.

Table 2 presents the estimation output of the domestic capital equation (in level and first difference form). The coefficient estimate for economic growth is positive and highly significant. This implies that real GDP is the main driving force to business investment and, hence, capital accumulation. This result is typical representation of acceleration principle whereby changes in aggregate demand, hence output growth encourages accumulation of domestic capital.

Table 2: Parameter Estimates of Domestic Capital Equation

Variable	Parameter Estimate
Constant	1.113** (3.08)
GDP	1.025** (24.90)
Foreign capital	-0.007 (-0.898)
Government consumption	0.263** (3.33)
Inflation	0.014* (1.99)
Trade openness	-0.162** (-2.05)
Private credit	-0.003 (-1.10)
Commercial-central bank	0.069 (1.28)
Number of countries	35
Number of observations	1120

Note: The t-statistics are given in parentheses. (**) and (*) indicate statistical significance at the 5 and 10 percent levels respectively.

The results show that foreign capital exerts negative but insignificant effect on domestic capital, suggesting that capital accumulation process by multinational enterprises does not significantly pre-empt domestic investment opportunities, though some erosions does take place.

Contrary to the general perception, government consumption has positive and significant impact on domestic capital. A plausible interpretation is as follows. Government consumption consists of recurring expenditure in the public sector, which is essential to supports and complement the services associated with public infrastructure. It is often observed in developing countries that valuable assets in public sector are rendered useless due to

lack of recurring support facilities. Thus, in a way government expenditure improves quality of services provided in public sector, especially those associated with infrastructure and this provision attracts more investment from the private sector.

The coefficient on inflation is positive and significant. This is so because inflation results in a higher cost of holding money and a portfolio shift from money and other financial assets to physical capital, thereby leading to an increase in investment (Mundell, 1963 and Tobin, 1965).

The results show that trade openness has a negative and significant effect on domestic capital accumulation. A possible explanation of this result is that international trade in developing countries provides excess to a greater variety and quality of consumer goods, which leaves less room for domestic production and, hence domestic capital accumulation. Obviously this interpretation can hold when trade openness corresponds to increase in imports more than the increase4 in exports. Another interpretation could be that international trade and foreign direct investment complement each other and, therefore, trade openness leads to increase in foreign investments, which in turn crowd-out domestic investment. This result is also supported by positive regression coefficient of trade openness in foreign capital equation discussed below.

The coefficients on financial indicators are insignificant with one of them being positive and the other being negative. The results in Table 1, on the other hand, provide evidence that financial development directly enhances economic growth, for the given levels of domestic and foreign capital. It follows, therefore, that, on average, the effect of financial development on economic growth is captured through efficient allocation of financial resources but not through accumulation of capital.

Parameter estimates of the foreign capital equation (again in level and first difference) are shown in Table 3. The results indicate that the coefficient on per capita GDP is negative and statistically significant, whereas the domestic capital has positive effect on FDI. Two important implications follow from this result. First, the level of per capita GDP does not attract foreign investment, whereas domestic capital

accumulation is taken as a positive signal for foreign investment. Thus foreign investors are impressed by the activities of domestic business sector, they rather take the decision of domestic investors to enhance productive capacity through capital accumulation as the more reliable signal. Second, domestic investment does not block entry of foreign investors; it rather acts as a complementary factor.

Table 3: Parameter Estimates of Foreign Capital Equation

Variable	Parameter Estimate
Constant	15.18 (0.69)
GDP	-11.19** (-7.73)
Domestic capital	9.58** (8.95)
Market size	-0.081 (-0.09)
Openness to trade	1.45 (1.89)
Real exchange rate	-2.48** (-6.36)
Literacy rate	6.87** (3.85)
Number of countries	35
Number of observations	1120

Note: The t-statistics are given in parentheses. (**) and (*) indicate statistical significance at the 5 and 10 percent levels respectively.

When the above result is considered in the light of the negative and insignificant regression coefficient on foreign capital in the domestic capital equation in table 2, it appears that FDI does not affect domestic capital accumulation, but the latter is conducive for the former. This is so because domestic investment not only indicates presence of good profit masking opportunities in future, it also indicates that domestic

investors are willing to develop complementary industries that are required for successful long term business ventures for foreign investors such as the development of parts industries to assist foreign automobile companies.

Market size has insignificant effect on foreign capital, while the effect of trade openness is positive and somewhat significant. One can, therefore, conclude that a small but open economy is more conducive to foreign investment, especially from multinational enterprises, than a large but relatively closed economy.

The coefficient on real exchange rate is negative and statistically significant, implying that real depreciation of the host country's currency has adverse effect on FDI. The reason is that real depreciation reduces the relative prices of goods in the host country and makes it more economical for the multinational enterprises to make the country a production base rather than an export target. This explains, for example, the large diversion of foreign capital in the Asian countries, especially China and India. Finally, the coefficient on literacy rate is positive and statistically significant. Thus a high level of human capital is a key ingredient for attracting FDI.

4.2. Results of Wald Tests

We apply Wald tests on the various null hypotheses involving sets of regression coefficients. The results are shown in Table 4. The p-value indicates that we reject the null hypothesis that regression coefficients of all the variables in the simultaneous equations model are equal to zero. The null hypothesis that regression coefficient in each equation are equal to zero is also rejected as shown by the p-values. We do the same exercise for financial variables in the GDP and domestic capital equations. The test results confirm joint significance of financial variables in the GDP equation, while the null hypothesis that financial variables do not affect domestic capital cannot be rejected. However, the null hypothesis that the financial variables have no effect in the system stands rejected.

Table 4: The Results of Wald Tests on Parametric Restrictions

Null Hypothesis	Chi-Square statistic	Computed rejection probability
Regression coefficients of all the variables in the three equations are equal to zero	19064740	0.000
Regression coefficients of all the variables in the GDP equation are equal to zero	739849.3	0.000
Regression coefficients of all the variables in the domestic capital equation are equal to zero	129300.9	0.000
Regression coefficients of all the variables in the foreign capital equation are equal to zero	427.43	0.000
Regression coefficients of the financial variable in the two equations are equal to zero	10.42	0.033
Regression coefficients of the financial variable in the GDP equation are equal to zero	9.67	0.007
Regression coefficient of the financial variable in the domestic capital equation are equal to zero	3.21	0.200

5. Conclusion

The paper examined the effects of financial sector development, domestic capital and foreign capital on economic growth. The role of financial sector development is analyzed through its effects on domestic and foreign capital accumulation and total factor productivity. The study uses a panel; data set for 35 developing countries over the period 1970-2003. The analysis is based on simultaneous equations econometric model for panel data in which GDP, domestic capital, and foreign capital, all expressed in per worker form, are determined simultaneously. A dynamic GMM estimation technique is used that controls for country-specific effects and accounts for the endogeneity of the explanatory variables. The system is estimated by combines the regression in first differences with the regression in levels.

The first major conclusion of the study is that financial sector development affects per capita GDP, mainly through its role in efficient resource allocation and, hence, in total factor productivity. The role of financial sector development in capital accumulation is not much significant. The study also finds that it is the domestic rather than foreign capital accumulation that is instrumental in increasing per worker output and hence promoting economic growth in the long run. Furthermore, foreign capital also does not stimulate domestic capital accumulation, while domestic capital plays a significant role as a complementary factor for attracting foreign capital. The study finds that trade openness results in slow down of domestic capital accumulation but it encourages foreign capital accumulation. The effect of trade openness on GDP per worker is significantly positive. On net basis trade openness is found to promote economic growth through its favorable effects on efficient resource allocation, which more than offsets the detrimental effect on domestic capital accumulation.

Increase in government consumption expenditure induces more rapid accumulation of domestic capital through the provision of recurring expenditures that are essential to support the quality of public sector infrastructure. However, the role of government consumption expenditure in economic growth remains adverse due to its detrimental effects on resource allocation efficiency.

References

Ahmad, E. and S. Paul (1998), "Foreign Capital and the Neoclassical Growth Model", with S. Paul, chapter 6: 90-100, in *Trade and Growth: New Theory and the Australian Experience*, edited by S. Paul, Allen & Unwin, Sydney.

Ahmad, E. (1999), *The Role of Capital Inflows and the Neoclassical Growth Model*, Proceedings of: Regional Workshop on Return Migration and Long-Term Development Economics in South Asia, Islamabad, may 26-28.

Aitken, B. and A. Harrison (1999), "Do Domestic Firms Benefit from Foreign Direct Investment? Evidence from Venezuela", *American Economic Review*, 89(3): 605-618.

Arellano, M. and S. Bond (1991), "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, 58(2): 277-297.

Arellano, M. and O. Bover (1995), "Another Look at the Instrumental-Variable Estimation of Error-Components Models", *Journal of Econometrics*, 68(1): 29-52.

Barro, R. and X. Sala-i-Martin (1995), *Economic growth*, New York: McGraw-Hill.

Beck, Thorsten, Asli Demirgüç-Kunt and Ross Levine, (2000), "A New Database on Financial Development and Structure", *World Bank Economic Review*, 14: 597-605.

Billington, N. (1999), "The Location of Foreign Direct Investment: An Empirical Analysis", *Applied Economics*, 31: 65-76.

Blundell, R. and S. Bond (1997), *Initial Conditions and Moment Restrictions in Dynamic Panel Data Models*, University College London, Discussion Paper in Economics: 97-107.

Borensztein, E., De Gregorio, J., and J.W. Lee (1998), "How Does Foreign Direct Investment Affect Growth?", *Journal of International Economics*,

45 (1): 115-135.

Carkovic, M., and R. Levine (2002). 'Does Foreign Direct Investment Accelerate Economic Growth'. Working Paper. City: University of Minnesota Department of Finance. Available at: www//ssrn.com/abstract=314924.

Edwards, S. (1990), *Capital Flows, Foreign Direct Investment, and Debt-Equity Swaps in Developing Countries*, NBER Working Paper No. 3497

Edwards, S. (1993), *Trade Policy, Exchange Rates and Growth*, NBER Working Paper No. 4511.

Fielding, D. (1993), "Determinants of Investment in Kenya and CÔte d'Ivoire", *Journal of African Economies*, 2 (3): 299-328.

Fielding, D. (1997), "Adjustment, Trade Policy and Investment Slumps: Evidence from Africa", *Journal of Development Economics*, 52: 121-137.

Fischer, S. (1993), "The Role of Macroeconomic Factors in Growth", *Journal of Monetary Economics*, 32: 485-512.

Froot, K. and J. Stein (1991), "Exchange Rates and Foreign Direct Investment: An Imperfect Capital Market Approach", *Quarterly Journal of Economics*, 106: 1191-1217.

Fry, M. (1995), *Money, Interest, and Banking in Economic Development*, Johns Hopkins University, Baltimore, MD.

Holtz-Eakin, D., W. Newey and H. Rosen (1990), "Estimating Vector Autoregressions with Panel Data", *Econometrica*, 56: 1371-1395.

King, R. and R. Levine (1994), *Capital Fundamentalism, Economic Development And Economic Growth*, Carnegie-Rochester Conference Series on Public Policy, 40: 259-292.

Levine, R. (1997), "Financial Development and Economic Growth: Views And Agendas", *Journal of Economic Literatur*e, 32(2): 688-726.

Levine, R. and S. Zervos (1998), "Stock Markets, Banks and Economic

Growth", *American Economic Review*, 88 (3): 537-558.

Levine, R., N. Loayza and T. Beck (2000), "Financial Intermediation and Growth: Causality and Causes", *Journal of Monetary Economics*, 46: 31-77.

Mundell, R. (1963), "Inflation and Real Interest", *Journal of Political Economy*, 71: 280-283.

Ndikumana, L. (2000), "Financial Determinants of Domestic Investment in Sub-Saharan Africa: Evidence from Panel Data", *World Development*, 28 (2): 381-400

Pagano, M. (1993), "Financial Markets and Growth: An Overview", *European Economic Review*, 37: 613-622.

Romer, P. (1989), *Human Capital and Growth*, Presented at the Carnegie-Rochester Conference on Economic Policy, Rochester, New York.

Schumpeter, Joseph A. (1934), *The Theory of Economic Development*, Cambridge Harvard University Press.

Tobin, J. (1965), "Money and Economic Growth", *Econometrica*, 33: 671-684.

Tsai, P. (1994), "Determinants of Foreign Direct Investment and Its Impact on Economic Growth", *Journal of Economic Development*, 19: 137-163.

Wang, J-Y. (1990), "Growth, Technology Transfer, and the Long-Run Theory of International Capital Movements", *Journal of International Economics*, 29(3-4): 255-271.

World Bank (1997a), *Private Capital Flows to Developing Countries: The Road to Financial Integration*, Washington, DC.

World Bank (1997b), *Global Development Finance*, Washington, DC.

World Bank (2002, 2005), *World Development Indicators*, Washington, DC.

Appendix 1: Sample of Countries Considered in Analysis

Appendix Table: List of Countries

Low income	Lower-middle income	Upper-middles income
Bangladesh	Bolivia	Argentina
Cameroon	Brazil	Chile
Ghana	Colombia	Costa Rica
India	Dominican Republic	Malaysia
Kenya	Ecuador	Mexico
Nicaragua	El Salvador	Trinidad and Tobago
Pakistan	Guatemala	Uruguay
Rwanda	Haiti	Venezuela, RB
Senegal	Honduras	
Togo	Indonesia	
Zimbabwe	Jamaica	
	Paraguay	
	Peru	
	Philippines	
	Sri Lanka	
	Thailand	