Financial Systems and Economic Performance: A cross country analysis

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This paper empirically examines whether bank-based or market- based financial systems are better at promoting economic performance using a panel data set on 40 countries for the period 1990–2003.   More specifically, we investigate whether financial structure and financial development are significantly correlated with the measures of economic perform ance such as capital accumulation, profit rate of capital and   total factor productivity. Our main findings are that market-based financial system induces capital accumulation more efficiently whereas a bank-based and financially developed economy is more effective in promoting productivity. Further, bank-based system promoted capital accumulation in the past.Overall evidence suggests that financial structure does not matter for real economic performance while financial development does matter for high economic growth.

1. Introduction

There exists a considerable debate in the literature on the relationships between the financial systems and economic performance. The researchers have argued the relative merits of bank-based and market-based financial systems in fostering economic performance for a last few decades. An important element of the debate concerns the relative contributions of banks and financial markets in spurring growth. Beck (2001) use evidence from an assortment of firm-level, industry-level, and country-level data to suggest that, while overall development of the financial system is important, the distinction between bank-based and market-based systems is relatively unimportant in   explaining growth. Rather, elements of a country's legal environment and the quality of its financial services are

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most important for fostering economic growth. In contrast, Tadesse (2000) does find a difference between bank-based and market-based financial systems in a study of 36 countries. For under developed financial sectors, bank-based systems outperform market-based systems, while for developed financial sectors market-based systems outperform bank-based systems. Meanwhile, Levine (2000) reports that financial structure is not a good predictor of growth in a cross-country growth framework: neither bank-based nor market-based financial systems are closely associated with economic growth. Furthermore, Demirgu̧c-Kunt and Maksimovic (1998), Beck and Levine (2002) shows that it is not financial structure but overall financial development and the efficiency of the legal system influence the economic growth.

In the meantime, a growing body of literature finds that the development of the financial sector has a positive effect on economic growth (see Levine 1997 and Levine, Loayza, and Beck 2000). In a pioneering study, Goldsmith (1969) found a relationship between growth and financial development using cross-country data. However, his study was based on limited data and did not control in a satisfactory way for other factors affecting growth. King and Levine (1993) consider data for 80 countries over the period 1960-1989 and carefully control for other factors affecting growth. They use four measures of financial development and three measures of growth (real per capita GDP growth, growth in capital stock per person, and total factor productivity).They report a strong positive relationship between the three measures of growth and the four measures of financial development and also find evidence that the level of financial development is a good predictor of future economic growth, physical capital accumulation and economic efficiency improvements.

Levine and Zervos (1998) use cross country data to evaluate the hypothesis that bank and stock market development have independent effects on economic growth. They report that stock market liquidity and banking development both positively predict growth, capital accumulation, and productivity improvements but their conventional cross-country growth regression methodology is subject to the objection that the unobserved heterogeneity of countries could be correlated with financial development and economic growth. Rajan and Zingales (1998) use data from the US to find which industries rely on external finance and investigate whether these industries grow faster in countries with better developed financial systems. They conclude that financial development has a substantial supportive influence on the rate of economic growth and this works, at least partly, by reducing the cost of external finance to financially dependent firms. Beck et al. (2000) study whether financial development promotes growth through higher saving rates, capital accumulation or technological progress. Using both pure cross-country and dynamic panel analysis, they find that financial markets enhance economic growth mainly through productivity, while its effects on saving and capital investment are rather limited. There are also many studies

that suggest a positive relationship between financial structure and economic growth[1].

In our paper, we empirically examine whether bank-based or market- based financial systems are better at promoting economic performance using a panel data set on 40 countries for the period 1990–2003. More specifically, we investigate whether financial structure and financial development are significantly correlated with the measures of economic performance such as capital accumulation, profit rate of capital and total factor productivity. This investigation provides empirical evidence on the major theoretical debates regarding the linkages between financial systems and economic performance. An important contribution of this paper is the construction of a broad cross-country panel dataset to examine market-based and bank-based financial systems. Our main findings are that at stock level, bank-based and financially developed economy induces more capital stock and therefore less profit ratio, whereas at flow level, a market-based financial systems are more effective in capital accumulation on each profit ratio. These results are inconsistent with the view that either bank-based financial systems or market-based financial systems are better at promoting capital accumulation in the long-run. Overall evidence suggests that financial structure does not matter for stable economic performance while financial development does matter for high capital- labor ratio, profit rate of capital, and productivity.

The remainder of the paper is organized as follows. Section 2 explains the data and financial systems. Section 3 explains the effects of financial systems on capital accumulation. Section 4 presents the impact of financial development on profit rate of capital. Section 5 describes the effects of financial systems on total factor productivity. Section 6 concludes.

2. Financial Systems

Financial systems are classified as being either stock market-based or bank-based. The financial systems of some countries, such as the US and UK, are market-based, whereas the financial systems of other economies, such as Japan and Germany are bank-based[2]. What is the essence of this classification, beyond the fact that it is a description of the institutional features of the respective countries' financial systems and in particular those of their financial sectors? Does it imply that the stock markets and the banks are particularly important in providing capital to the enterprise sector of the countries in question? And if this is an appropriate interpretation, is the implicit statement which it contains, namely that in one hand stock markets and in the other hand banks are the most important providers of capital to non-financial firms, really true?   A large body of empirical literature has attempted to evaluate the debate whether bank-based systems or market-based systems is

better at promoting economic performance (e.g. Allen and Gale, 2000; Arestis et al., 2001; Goldsmith, 1969; Weinstein and Yafeh, 1998;). They rigorously compare and contrast the country-specific financial structure, that is, an assortment of financial markets, instruments and intermediaries in operation, and conclude that financial structure is important for economic growth.

Traditionally, empirical research on the comparison of bank-based and market- based financial systems have focused on Germany and Japan as bank-based systems and the US and the UK as market-based systems. Studies on Germany and Japan have examined the role of banks' involvement in the ownership and management of corporations and specific roles of bank firm relationships in the supply of credit, the efficiency of resource allocation, productivity, and overall economic performance. Studies on the US and the UK have emphasized such special functions of stock markets as collecting information and facilitating takeovers, and their impact on economic performance. Although these studies have produced good insights about the functioning of financial systems, it is difficult to draw broad conclusions about the long-run growth effects of these two systems based on four countries. Recent research has broadened with many countries to study the effects of financial systems on economic growth. In this sequence, we have also selected 40 countries to study the relationship between the economic performance and financial systems, which is explained below.

Data set

We conduct a cross-country analysis using the panel data of EXTENDED   PENN WORLD TABLES (EPWT) Version 2.1 by Adalmir A. Marquetti. This data base includes both developed and developing countries of forty which were selected with availability of the data for our all variables used in the study over the 1990-2003 period. To measure the activity of the stock markets, we use stock market total value traded as a share of GDP, which is defined as total shares traded on the stock market exchange divided by GDP. To measure the activity of Banks, we use private credit by deposit money banks to GDP, which is defined as the private sector by deposit money banks divided by GDP. As these two measures of banks and stock markets have high correlation[3], we used the relative variable of Financial Structure defined as Stock market value traded as a percentage of GDP divided by the sum of credit to the private sector as a percentage of GDP : z= (stock market total value/GDP）/ (private credit by deposit money banks/GDP). Financial structure provides a measure of the comparative role of the banks and stock markets in the economy. The underlying measure of bank development and stock market activity exert a strong influence on economic growth[4]

To measure overall financial development, we combine banks and stock markets into one indicator which is defined as the sum of credit to the private sector as a percentage of GDP and stock market value traded as a percentage of GDP : y=（stock market total value/GDP）＋(private credit by deposit money banks/GDP). While this does not control for the fact that banks and stock markets might impact economic growth through different channels, as found by Levine and Zervos (1998), it helps us distinguish between the effects of overall financial development and financial structure.

To measure economic performance we use three indicators of capital accumulation, Gross profit rate of capital, and Factor productivity. For the capital accumulation, three indicators of capital-labor ratio, investment ratio, and investment per worker are used. For the total factor productivity, it is assumed the Cobb-Douglas production function. We use a panel data methodology to carry out the study. This allows us to eliminate the unobservable heterogeneity that the different countries of our sample could present. The Hausman test allows verifying the presence of correlations between the unobservable heterogeneity and the explanatory variables. This consists of comparing the coefficients of the estimates for fixed effects and the estimates for random effects. The null hypothesis is that the coefficients of both models are similar. If the coefficients differ from each other, the within-groups estimation (fixed effects) is the only consistent.

Table 1: Descriptive statistics, panel data 1990-2003

	Mean	Median	Maximum	Minimum	Standard deviation
Capital-labor ratio	10.44	10.85	12.20	6.70	1.11
Investment per worker	6858	5855	29896	101	5254
Investment ratio	0.134	0.135	0.264	0.028	0.032
Profit rate of capital	48.02	35.24	266.3	17.1	31.68
Labor productivity	10.12	10.31	11.67	7.75	0.805
Bank credit	0.611	0.535	2.17	0.032	0.425
Stock market	0.295	0.105	3.26	0.000	0.453
Financial structure	0.472	0.209	6.65	0.001	0.743
Financial development	0.902	0.726	4.33	0.015	0.739

. Notes: The descriptive statistics are calculated for 560 observations of 40 countries. Capital-labor ratio= Physical capital stock divided by labor, Investment per worker= Investment divided by labor, Investment ratio= Investment per worker divided by Capital-labor ratio, Profit rate of capital= Profit divided by physical capital stock, Labor productivity= log of GDP divided by labor, Bank credit = credit by deposit money banks to the private sector divided by GDP. Stock market = Stock market total value divided by GDP. Financial structure=

Stock market value traded as a percentage of GDP divided by   the sum of credit to the private sector as a percentage of GDP, Financial development= the sum of credit to the private sector as a percentage of GDP and stock market value traded as a percentage of GDP.
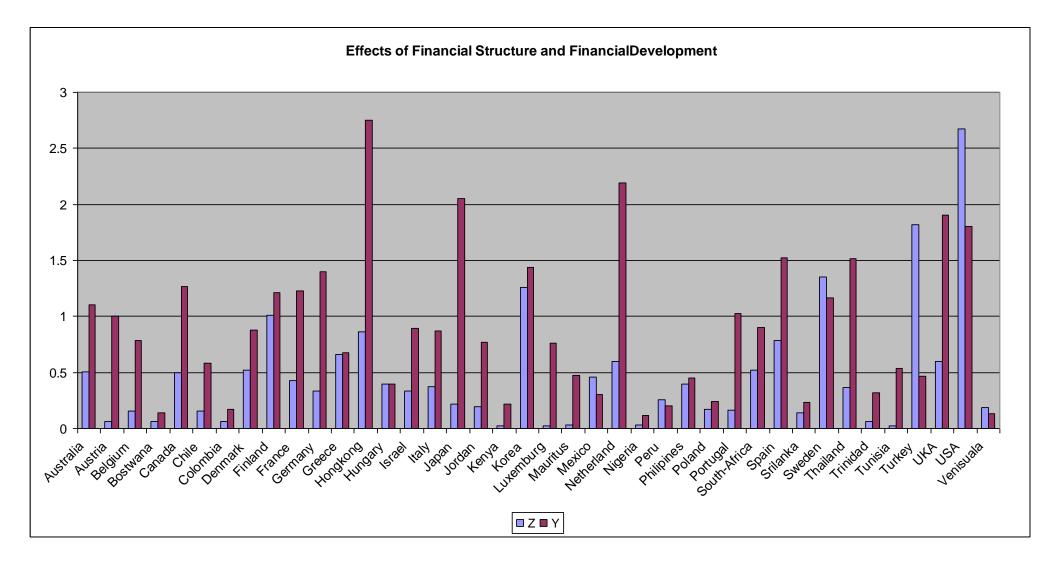
Table 1 presents the descriptive statistics for the economic performance indicators and financial development indicators. In examining the relationships between financial systems and economic performance, it is important to consider both cross-country variations and with country variations to fully capture the dynamics of the interactions. Such an analysis is possible with panel data, which contains both the cross-sectional and time series dimensions. As the statistics in Table 1 show, there are wide variations across countries in both economic performance and financial structure of regression variables.

Table 2 presents correlations among the indicators of economic performance, bank credit, stock market, financial structure, and financial development. We average the data over the 1990-2003 period so that each country has one observation per variable and compute the correlations for all variables across all countries. Specially, when we observe Table 2, bank credit is highly correlated with the stock market variable (0.54). Meanwhile, correlation between financial structure and financial development is (0.33), which is less than the correlation between stock market and bank credit variables.

We have also described our data on financial structure and financial development using bar-chart in the following figure. This clearly shows the relationship between financial structure and financial development of each country used in this study.

Table 2: Correlations, panel data 1990-2003

	Capital Labor	Investment ratio	Invest./ worker	profit rate	Labor produt.	Bank credit	Stock market	Financial structure
Investment ratio	-0.130	1						
Investment/ worker	0.923	0.201	1					
Profit rate of capita	-0.640	0.067	-0.611	1				
Labor productivity	0.925	0.021	0.934	-0.598	1			
Bank credit	0.623	-0.037	0.635	-0.502	0.590	1		
Stock market	0.380	0.171	0.405	-0.274	0.393	0.540	1	
Financial structure	0.205	0.231	0.211	-0.239	0.221	0.027	0.638	1
Financial develop.	0.593	0.578	0.623	-0.475	0.582	0.827	0.850	0.332

Yonezawa & Azeez

Effects of Financial Structure and FinancialDevelopment

3. Capital accumulations and financial systems

The financial system affects capital accumulation either by altering the savings rate or by reallocating savings among different capital producing technologies. Financial systems that are more effective at pooling the savings of individuals can profoundly affect economic development. Besides the direct effect of better savings mobilization on capital accumulation, better savings mobilization can improve resource allocation and boost technological innovation. Thus, by effectively mobilizing resources for projects, the financial system may play a crucial role in permitting the adoption of better technologies and thereby encouraging growth[5].

Research distinguishes the three channels through which "finance can contribute to growth: saving, factor accumulation, and efficiency improvements. Levine et al. (2000) shows that well-functioning stock markets are expected to influence growth through increased capital accumulation and by influencing the efficiency of capital allocation. Research also suggests that well-functioning banks promote growth. When banks efficiently mobilize and allocate funds, this lowers the cost of capital to firms and accelerates capital accumulation and productivity. Furthermore, banks, as major creditors and in some countries as major equity holders, play an important role in governing firms. Thus, if bank managers face sound governance mechanisms, this enhances the likelihood that banks will raise capital inexpensively, allocate society's savings efficiently, and exert sound governance over the firms they fund. According to Beck et al. (2000), "financial development can accelerate economic growth in three ways. First, it can enhance savings. Second, it can channel these savings into real investment and thereby foster capital accumulation. Third, to the extent that the "financiers exercise some control over the investment decisions of the entrepreneurs, "financial development allows capital toward the more productive uses, and thus improves the efficiency of resource allocation. All three channels can in principle have large effects on economic growth.

Therefore, the effects of financial systems on capital accumulation are most important for economic performance[6]. The first indicator is stock level of capital accumulation that is the effect on capital- labor ratio. The second indicator is flow- based one and obtained by macro- investment function. The third indicator is also flow- based one and obtained by macro- saving function. Investment function is assumed that investment ratio depends on gross profit rate and cost of capital. Since we expect that good financial systems lower the cost of capital and encourage investment, it has a positive effect on capital accumulation. Of course investment funds are financed by savings. Unfortunately, as saving rate data are not available, investment data (investment per worker) are used to estimate the savings

function. Savings are determined by GDP. So we formulate saving function per capita. If financial systems encourage savings, it has positive effects on capital accumulation.

So, three indicators of capital-labor ratio, Investment ratio, and investment per worker of the i-th country at year t are used to find the impact of financial systems on capital accumulation. The financial structure and financial development variables are used to test the effect of financial systems on capital accumulation. The following panel data equations are regressed for this purpose.

$$\ln(Capital-labor\ ratio)_{it} = a_0 + a_1 z_{it} + a_2 y_{it} \tag{1}$$

$$Investment\ ratio_{it} = a_0 + a_1 z_{it} + a_2 y_{it} + a_3 (Gross\ profit\ rate)_{it} \tag{2}$$

$$Investment\ per\ wor\ker_{it} = a_0 + a_1 z_{it} + a_2 y_{it} + a_3 (GDP\ per\ wor\ker)_{it} \tag{3}$$

Where, z= Financial structure, y= Financial development. It is well said that bank- based financial structure is more suitable for capital accumulation than the market- based financial structure. On the other hand, market based financial structure is more suitable for stockholder, because profit rate of market based structure is higher than that of bank based structure. These are our hypotheses.

The results of exploring the relationship between capital accumulation and financial structure and financial development are reported in Table 3. The first column of the table shows the panel data analysis of equation 1, which examines the impact of financial structure and financial development on the stock level of capital accumulation. The most important fact of the results is bank-based and financially developed economy encouraged high capital accumulation in the long run. The coefficient on financial development variable is significant and positive which means a percentage point increase in the financial development increases capital-labor ratio by 0.19 percentage point. Financial structure is negative indicating that economies with a high ratio of banks to stock markets tend to have high capital-labor ratio. Equation 2 examines the impact of financial structure, financial development and gross profit rate on recent flow level of capital accumulation. Financial structure and gross profit rate are positive and significant. For instance, a percentage increase in the ratio of stock market activity to the activities of banks increases investment ratio by 0.006. Financial development, however, is negative and insignificant. Column 3 of Table 3 shows the results of equation 3, which examines the effect of financial structure and financial development on macro saving function. Since savings data are not available, we use investment data as proxy. Although GDP per worker and financial structure are positive and highly significant, financial development is not statistically significant. Overall results of three equations provide evidence that (i) historically, bank-based financial systems encouraged capital accumulation more

efficiently in the long run, but (ii) recently, market based financial systems induce capital accumulation more efficiently than the bank-based and over-invested economy.

Table 3: Effects of financial systems on capital accumulations, 1990-2003

Independent variables	Dependent variables		
	capital-labor ratio	Investment ratio	Investment per worker
Constant	10.26** (747.9)	0.084** (11.69)	-1319** (-3.52)
Financial structure	-0.033** (-2.52)	0.006** (2.65)	244.9** (2.81)
Financial development	0.194** (10.70)	-0.006* (-1.71)	-45.69 (-0.35)
Gross profit rate		0.001** (7.97)	
GDP per worker			0.251** (28.85)
Adjusted R2	0.98	0.54	0.68
F-test on equation	1285**	16.70**	404**
Hausman test	16.55**	37.95**	0.984***
Countries	40	40	40
Observations	556	556	556

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*Notes: *significant at the 0.05 level, ** significant at the 0.01 level. *** Since Hasusman test results for the random effects being uncorrelated with the explanatory variables are not rejected, random effects model results are reported in this column. t-values are in the brackets.*

4. Profit rate of capital and financial systems

Since profit rate fundamentally depends on capital-labor ratio negatively, we estimate the effects of financial structure and financial development for a given capital-labor ratio (K/N). Especially, the effects of financial structure stand for the relative governance effect. The following equation is regressed to see the impact of financial systems on the profit rate of capital.

$$Gross\ profit\ rate_{it} = a_0 + a_1 z_{it} + a_2 y_{it} + a_3 \ln(Capital-labor\ ratio)_{it} \qquad (4)$$

Table 4 displays the statistical results from estimating the equation 4 with gross profit rate as dependent variable. The results show that both financial structure and financial development are positively associated with gross profit rate. In particular, a percentage point increase in financial development increases gross profit rate by 2.2 percentage points.

This is also statistically significant at 1 % percent level. However, our hypothesis that market based financial structure is more suitable for stockholder since profit rate of market based structure is higher than that of bank based structure is not rejected. As we expected, capital- labor ratio has a significant negative relationship with gross profit rate. The high capital-labor ratio of bank based financial systems derived from equation 1 causes low profit ratio as in equation 4. This may be due to historical events over investment by over banking. The low profit ratio causes low investment ratio as reported in the second column of table 3[7].

Table 4: Effects of financial systems on profit rate of capital, 1990-2003

Independent variables	Dependent variable (Gross profit rate)
Constant	304.6** (16.7)
Financial structure	1.26* (1.71)
Financial development	2.20** (2.02)
Capital-labor ratio	-24.83** (-14.1)
Adjusted R2	0.27
F-test on equation	71.93**
Hausman test	1.24***
Countries	40
Observations	556

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*Notes: *significant at the 0.05 level, ** significant at the 0.01 level. *** Since Hasusman test results for the random effects being uncorrelated with the explanatory variables are not rejected, random effects model results are reported in this table. .t-values are in the brackets、*

5. Total factor productivity and financial systems

In the previous section, only capital formation is the main measure of performance, which is not wrong. But GDP is produced not only by capital but also by labor. Therefore, for given level of capital stock, the more labor produce more GDP. Even if two factor inputs are given, more efficient production function produces more GDP. Efficiency of production function is measured by Total Factor Productivities (TFP)[8]. Financial systems can affect on GDP through TFP. For example, it is well said that under the bank based financial systems, labor managed firm can perform well with skilled labor. Is this true?. We assume the following Cobb-Douglas production function with time constant TFP which depends on financial development and financial structure;

$$e^{(a_0 + a_1 y + a_2 z)}.$$

So, the Cobb-Douglas production function on GDP is;

$$Y = e^{(a_0 + a_1 y + a_2 z)} K^{\alpha} N^{1-\alpha}.$$

We can estimate total contribution of financial systems as a_1 or a_2. Then,

$$\left(Y/N\right) = e^{(a_0 + a_1 y + a_2 z)} \left(K/N\right)^{\alpha}$$

and, we can get the following estimation equation;

$$\ln\left(Y/N\right)_{it} = a_0 + a_1 y_{it} + a_2 z_{it} + \alpha \ln\left(K/N\right)_{it} \quad\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

where, ln (Y/ N) = log of labor productivity, ln(K/N) = Log of capital-labor ratio. In this estimation procedure, at first, we assume that α of each country is same and constant. This is Case (1) estimation. Since this is severe, we then relax the assumption. Theoretically α must be capital share (=1－labor share), so we should use this capital share of each country and of each year. This is Case (2). That is to make the following variable;

$h_{it} \equiv \left(1 - labor\_share_{it}\right) \times \ln\left(K/N\right)_{it}$. Then the equation to be estimated is;

$$\ln\left(Y/N\right)_{it} - h_{it} = a_0 + a_1 y_{it} + a_2 z_{it} \quad\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

Table 5: Effects of financial systems on total productivity, 1990-2003

Independent variables	Dependent variable: labor productivity	
	Case (1)	Case (2)
Constant	5.34** (21.9)	4.21** (136.6)
Financial structure	0.006 (0.798)	-0.281** (-9.58)
Financial development	0.049** (4.56)	0.264** (6.51)
Capital-labor ratio	0.452** (19.14)	
Adjusted R2	0.64	0.96
F-test on equation	337.6**	332.2**
Hausman test	26.34**	20.48**
Countries	40	40
Observations	556	556

*Notes: *significant at the 0.05 level, ** significant at the 0.01 level. .t-values are in the brackets.*

Table 5 presents the results of the estimation of above two equations. The results of equation (5) are reported as case (1) in the first column. The coefficient on the financial development variable is positive and significant. A percentage point increase in financial development increases labor productivity by 0.264 percentage points. Financial structure is not significant. The results of the estimated equation (6) is shown as case 2 in the second column. It shows the impact of financial structure and financial development on labor productivity after relaxing the assumption of α of each country is same and constant. Although coefficient of financial development is positive and significant, the coefficient of financial structure is negative and significant. It means that more bank-based and financially developed economy encourage production efficiency. Furthermore, capital-labor ratio is positive and significant in both equations of (5) and (6). This means higher labor productivity is supported by higher capital-labor ratio. Therefore, It is not the type of financial system that matter for economic development but overall financial development accelerate economic performance.

6. Concluding Remarks

This paper has examined the role of financial structure and financial development in explaining cross-country diffusion of economic performance for a group of developing and developed countries for the period 1990-2003 using panel data methodology. Our main findings are that at stock level, bank-based and financially developed economy induces more capital stock and therefore less profit ratio, whereas at flow level, a market-based financial systems is more effective in capital accumulation on each profit ratio. These results are inconsistent with the view that either bank-based financial systems or market-based financial systems are better at promoting capital accumulation in the long run. Overall, our findings suggest that It is not the financial structure but financial development matter for capital accumulation and productivity. These results are consistent with the findings of Levine and Zervos (1998) and Beck and Levine (2004). Future research could focus on investigating the structure of country's financial system, corporate governance and legal system, and its impact on economic performance in order to validate our findings further.

Endnotes

[1] For instance, see Cetorelli and Gambera (2001), and Wurgler (2000) for the relationship between financial structure and economic growth.

[2] See Bergl̈of (1990) for a survey of the relevant literature.

[3] See Table 2.

[4] See Levine et al. (2000) who provide evidence on the impact of financial intermediation on growth, while Levine and Zervos (1998) and Rousseau and Wachtel (2000) provide evidence on the impact of stock markets on growth.

[5] For instance see McKinnon (1973, p. 13)

[6] In several East-Asian countries growth has taken the form of factor accumulation rather than productivity growth. See for details, Young (1995).

[7] It is worthwhile to note that the relationship between low investment ratio and high capital ratio is not contradictory since denominator is not same.

[8] Although the earlier literature argued that factor accumulation is the key determinant of economic growth, a consensus is building that TFP growth is far more important than factor accumulation (Hall and Jones, 1999). Bosworth and Collins (2003), by contrast, argue that previous studies over-estimate the importance of TFP growth; they argue that factor accumulation and TFP growth are about equally important, even for long-run growth.

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