Review

Financial development and economic growth: A review

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The relationship between financial development and economic growth has been subject to the considerable debate in the literature of development and growth. While empirical studies often provide a direct relationship between financial development proxies and growth, much controversy remains about how these results should be interpreted. The study, therefore, discusses four main sources of controversy, namely: the selection and measurement of financial development indicators, the causality direction of the financial development and economic growth, the use of empirical approaches to the finance-growth hypothesis, and the debate concerning the channels by which financial development promotes economic growth.

Key words: Financial development, economic growth.

INTRODUCTION

Cross-country differences in growth have been the central issue of the development economists over the past few decades. The large literature has come up with few explanations in characterizing the cross-country differences in growth, which can be categorized into two aspects, namely internal and external factors. Internal factors refer to the degree of macroeconomic stability, factor endowment of a country, educational attainment, institutional development, legal system effectiveness and factor accumulation while external factors relates to the international trade (exports and imports), exchange rate fluctuations and international capital mobility.

The literature, nevertheless, has neglected the role of financial development in stimulating the growth rate of economic. In their essays collection, "the pioneers of development economics" who included three Nobel laureates have totally excluded the discussion of financial development in growth process (Meier and Seers, 1984). Moreover, Stern (1989) does not discuss the contribution of financial development on growth in his review. The significant role of financial development, however, has begun to receive considerable attention in the growth process. In his work, Schumpeter (1911) contends that

the well-functioning financial system will spur technological innovations through the efficiency of resource allocation from unproductive sector to produc-tive sector. This idea was viewed as the first framework in analyzing the finance-led growth hypothesis. In contrast, Robison (1952) argues that the relationship should be started from growth to finance. According to this thought, a high rate of economic growth leads to a high demand for particular financial agreement or arrangement, and the well-developed financial sector will automatically respond to these types of demand. This view was defined recently as growth-led finance hypo-thesis. Goldsmith (1969), McKinnon (1973) and Shaw (1973) have significantly contributed to the literature of financial development and economic growth relationship in more formalized framework.

Although the original contribution to this literature have different channels of transmission in explaining the link between financial development and growth, the studies all coincide in suggesting that there is a significant and positive relationship between these two variables. Goldsmith (1969), for example, focuses on the relation-ship between financial development and the efficiency of investment. On the other hand, McKinnon (1973) and Shaw (1973) demonstrate the importance of financial liberalization in promoting domestic savings and hence investment. According to the Goldsmith's (1969) frame-work, the evolution of domestic financial markets may enhance and lead to a high level of capital accumulation

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efficiency. In other words, he argues that the positive correlation between financial development and growth (the level of real per capital GNP) is mainly due to the efficient use of the capital stock.

As an extension from earlier studies, McKinnon (1973) and Shaw (1973) admit the significance of financial development in promoting economic growth through high capital productivity. They, nonetheless, enrich the channel by incorporating the role of savings, which will further lead to a high level of investment. According to their model, the finance-growth link through saving and investment is significantly influenced by the public policy, which regarding to the evolution of the domestic financial systems. The public policies that lead to a financial depression (such as credit rationing, high reserve requirement and interest rate ceiling) will reduce the incentives to save. The effect will result in the shortage of investment funds and thereby incur lower rate of economic growth. Therefore, they conclude that financial liberalization is crucial in fostering the growth process as the high rate of interest rate (especially saving or deposit rate) resulting from the liberalized policy encourages households to increase their incentives to save more. This view is different from Goldsmith (1969)'s model, which assumes that both financial intermediation and growth are endogenous variables.

Since the introduction of both finance-led growth and growth-led finance hypotheses, the relationship between financial development and economic growth has been subject to the considerable debate in the literature of development and growth. While empirical studies often provide a direct relationship between financial develop-ment proxies and growth, much controversy remains about how these results should be interpreted. There are, at least, four main sources of controversy. First, the selection and measurement of financial development indicators remains as controversial issues among researchers. In general, the indicator has been measured largely by different type of monetary aggregates, which all of these measures have serious problem in interpre-tation (Gregorio and Guidotti, 1995). Second aspect of controversy involves the causality direction of the financial development and economic growth. While some empirical works find supporting results for finance-led growth and/or growth-led finance, some provide addi-tional evidence for the feedback causality relationship and even others conclude that there is no obvious relationship between financial development indicator and growth.

Third controversy is resulting from the use of empirical approaches to the finance-growth hypothesis. The approaches used can be categorized into two groups. The first group focuses on the cross-country studies to test the relationship, while the second group emphasizes the use of regression application that was usually time series predicated. The second group of studies applies various time series techniques such as unit root tests,

co-integration procedure, Granger causality test as well as pooled regression and panel data analysis. Finally, the debate concerning the channels by which financial development promotes economic growth is far to be settled.

A SELECTION OF FINANCIAL DEVELOPMENT MEASURES

Financial development is generally defined as the improvement in quantity, quality and efficiency of financial intermediary services. Whilst theoretical economists were trying to model the hypothetical relationship between financial development and economic growth, empirical researchers were examining the appropriateness of the different indicators for financial intermediation. As the empirical literature on this issue has evolved, monetary aggregate measures have come to the fore. A number of studies have chosen an alternative set of monetary aggregates to investigate the relationship between financial intermediation and growth. There are few indicators have been suggested as the proxy of financial intermediation, depending on the specific characteristics of the financial system. The chosen variables are relevant to the size, the efficiency and/or the relative significance of different financial intermediaries in the whole financial system.

Initially, the empirical studies focused on the ratio of different types of monetary aggregates (such as M1, M2 and M3) to nominal GDP as the financial sector indicators because the variables are widely available following most of the literature, financial development is measured as the ratio of monetary survey to GDP (Jung, 1986; Liu et al., 1997; Darrat, 1999). The use of the monetary aggregates is based on the McKinnon-Shaw framework, which reveals that a monetized economy reflects a highly developed capital market (World Bank, 1989; Calderon and Liu, 2003). This view of point is consistent with the literature, as usually defines financial development as the improve-ment in quantity, quality and efficiency of financial intermediary services. In other words, a high degree of monetization, therefore, should be positively related to economic performance. Under this assumption, many researchers use this measure as financial depth (Goldsmith, 1969; McKinnon, 1973; King and Levine, 1993a; Ram, 1999; Schich and Pelgrin, 2002).

The monetary indicators, however, have been criticized as they measure the extent of monetization rather than financial deepening. They may not accurately represent the effectiveness of the financial sector in ameliorating informational asymmetries and easing transaction costs as well as the measure takes into account deposits by one financial intermediary in another, which may incur double counting problem (Levine et al., 2000). Demetriades and Luintel (1996b), for example, reveal that the measures are not satisfactory indicators as

financial deepening in Nepal because the monetization of transactions can be increasing without financial development evolution. In their argument, this is particularly true in Nepal as non-monetized sector still play a crucial role in promoting the economic performance.

Fama (1980), for example, argues that financial markets have two significant functions, namely: to channel the excess funds from surplus units to deficit units, which will generate a higher income growth and to provide liquidity services. Resulting from this argument, it is concluded that the ability of financial intermediary to allocate limited funds efficiently is not necessary fully reflected by its level of monetization (that is, act as medium of exchange). More importantly, financial intermediaries are generally viewed as institutions that is efficient in allocating credit, instead represent the ability of the institutions to provide liquidity, or medium of exchange. One can envisage that a high level of monetization indicates underdevelopment of financial markets, while a low level of monetization represents a high degree of financial sophistication of financial markets, which allows individuals to economize on their money holding. The use of monetary aggregates as financial development indicator, such as M1, M2 and in certain cases M3, therefore, is still a controversial issue.

Resulting from the criticisms on monetary aggregate measures as financial development indicator, alternative indictor has been proposed. King and Levine (1993a) construct another three indicators of the level of financial sector development to gauge different functions of financial intermediary in the system. The second indicator is the ratio of deposit money bank domestic assets to deposit money bank domestic assets plus central bank domestic assets (BANK), which indicates the relative significance of particular financial institutions. The indicators, however, does not clearly reflected the proportion of credits allocated to both private and public sectors. Generally, it is believed that public sector, or government has significant role in the economy and this may influence the relationship between banks and central bank. As a consequence, two indicators have been developed to measure the distribution of domestic assets. The third measure is the ratio of proportion of credits channelled to private enterprises to total domestic claims (PRIVATE) and the fourth measure equals to the ratio of claims on the non-financial private sector to GDP (PRIVY). These two proxies are suggested in order to differentiate the role of government in the economic activity because a financial system that simply provide credits to government, or state-owned agencies may not be evaluating managers, selecting investment projects, pooling risk and providing financial services to the same degree as the financial system that allocate credits to the private sector.

King and Levine (1993a), nonetheless, admit that the financial development measures of PRIVATE and PRIVY have problem as they may reflect the overall size of the

public sector and the degree of public sector borrowing. The indicators, therefore, may not fully reflect the level of financial services. In line with these comments, Calderon and Liu (2003) suggest alternative indicator of the financial development, namely the ratio of credits provided by financial intermediaries to the private sector to GDP (CREDIT). They argue that the indicator has an advantage as it takes into account the credits to private sector only and isolates the credits channelled to public sector and credits from central bank. They argue that the measure is even better than indicators used by previous studies such as King and Levine (1993a, 1993b) and Levine (1999). Indeed, De Gregorio and Guidotti (1995) claim that CREDIT is a better measure of financial development than measures of monetary aggregates such as M1, M2 and M3 because it reflects the more accurately on the actual volume of funds channelled into private sector. The ratio, therefore, is more directly linked to the investment and economic growth. Moreover, Calderon and Liu (2003) contend that a higher ratio of CREDIT to GDP indicates more financial services and hence, greater financial intermediary development.

There are, of course, do not mean that the deposit-based financial indicators are less appropriate in the testing of the finance-growth nexus. Arestis and Demetriades (1997) suggest that credit-based indicators are more likely to exhibit a stable long-run relationship with output than deposit-based ones in the case of developed countries. A number of studies used the combination of both deposit-based and credit- based financial indicators to study the relationship between financial development and economic growth. Al-Yousif (2002), for example, uses two measures for financial development indicators. The first measure is the currency ratio and measured as the ratio of currency/narrow money stock (M1). He reveals that a decrease in this ratio represents a higher diversification of financial institutions and a greater availability and use of non currency transaction methods. Indeed, Vogel and Buser (1976) point out that this measure can be used to assess the complexity of domestic financial markets. The second measure is the inverse of the broad-money velocity, that is, the ratio of broad money stock (M2)/nominal GDP. This measure was put forward by McKinnon (1973) and Shaw (1973) and recently used by King and Levine (1993a). This measure, which is often called the monetization variable and used as a proxy for the size of the market. An increase in the ratio implies an expansion in the financial intermediary sector relative to the whole economy.

In conducting their research recently, Levine et al. (2000) have focused on three indicators of financial development. They constructed a new database and focused on three measures of financial intermediation. The first indicator reflects the overall size of the financial market. The second indicator measures whether commercial banking institutions, or the Central Bank, is

conducting the intermediation. The final indicator represents that the extent to which financial intermediaries channeled credit to private sector activities. They are strongly believed that the constructed indicators provide more information about financial intermediary development than past measures and they provide a more accurate picture than if researchers used only a singe measure. Traditionally, financial intermediary balance sheet items are measured at the end of the year, while GDP is measured over the year.

King and Levine (1993a) attempted to overcome this mis-match problem by using an average of financial intermediary balance sheet items in year t and t-1 and dividing GDP measured in year t. The solution, however, does not fully resolve the problem, particularly in the environment of high inflation. Levine et al. (2000) improve the past financial measures by deflating nominal measures of financial intermediary liabilities and assets. They deflate end-of-year financial balance sheet items by end of year consumer price indices (CPI) and deflate the GDP series by the annual CPI. After that, they calculate the average of the real financial balance sheet item in year t and t-1 and divide this average by real GDP measured in year t. In their study, Calderon and Liu (2003) have used the measures suggested by Levine et al. (2000) to test the finance-growth nexus.

It is admitted that, nevertheless, these indicators have two problems. First, the indicators are still imperfect measures of how well financial intermediaries research firms, monitor managers, mobilize savings, pool risk and ease transactions (Levine et al., 2000). Second, although Levine et al. (2000) have constructed the measures carefully, measurement errors undoubtedly remain.

FINANCE-LED GROWTH, GROWTH-LED FINANCE OR FEEDBACK CAUSALITY

Ever since Schumpeter (1911), Robison (1952), McKinnon (1973) and Shaw (1973), the relationship between financial development and growth has been extensively investigated. A fundamental question asked in the earlier empirical studies, nonetheless, is whether there appears crucial causality running from financial development to economic growth? It is now generally admitted that the evolution of domestic financial sector is significant in affecting the pattern of economic growth (Levine, 1997). According to Wachtel (2001), moreover, there are at least four channels in which financial intermediaries promote economic growth through efficient allocation of resources. First, the financial intermediaries act as fund-transferring mechanisms to channel the excess fund from surplus units to deficit units (productive sectors). Second, financial intermediaries will offer more attractive and innovative instruments and incentives to encourage the mobilization of savings, which in turn may promote higher saving rates. Third, financial institutions

lower their costs of project evaluation and origination through economies of scale, and facilitate the monitoring of projects via corporate governance. Finally, as institutions which operating at economies of scale and obtain symmetry information, financial intermediaries provide opportunities to reduce risk management and promote liquidity level by promoting the development of markets and instruments with attractive characteristics that enable risk-sharing.

Over the past three decades, the question of whether financial development preceded economic growth or vice versa has been empirically tested in the literature (Jung, 1986; Spears, 1992; Murinde and Eng, 1994; Demetriades and Hussein, 1996; Thornton, 1996; Luintel and Khan, 1999; Darrat, 1999; Ghali, 1999; Habibullah and Eng, 2006). Empirical investigation of the relationship between financial development and economic growth began with the influential work by King and Levine's (1993a, b) cross-country studies for the post war period and Wachtel and Rousseau's (1995) time series study. These studies concluded that evolution of financial sector development and provision of financial intermediary services are crucial in promoting economic growth and the relationship is highly significant. Levine (1997), however, quotes Goldsmith (1969)'s study as first cross-country investigation. Based on data for 35 countries between 1860 and 1963, Goldsmith (1969) concludes, "a rough parallelism can be observed between economic and financial development if periods of several decades are considered". McKinnon (1973) and Shaw (1973), on the other hand, confirm the tie relationship between financial development and economic growth in the countries under study.

Using four financial development indicators and a cross-section of 119 developed and developing countries between 1960 and 1989, King and Levine (1993a) conclude that financial development indicators significantly predict subsequent values of the growth indicators over the next 10 - 30 years. McKinnon (1973) and Neusser and Kugler (1998) provide supporting evidence for the supply-leading phenomenon. Recently, in testing the finance-led growth hypothesis, Xu (2000) applies a vector-autoregressive approach to examine the effects of permanent financial development on output in 41 countries between 1960 and 1993. He concludes that "the results reject the hypothesis that financial development simply follows economic growth and has very little effect on it". Moreover, Beck et al. (2000), Levine et al. (2000) and Habibullah and Eng (2006) use both cross-country and dynamic GMM panel data techniques to find a causal relationship running from financial development to economic growth.

These studies, however, do not address the causality direction between these two variables. The causality direction is particularly an important issue, as there is lingering controversial argument whether financial development simply reflects economic performance or

rather is directly responsible for the accelerator of growth. In his conclusion, Robinson (1952) claims that "By and large, it seems to be the case that where enterprise leads, finance follows." Gurley and Shaw (1967), Goldsmith (1969), Jung (1986) and Ireland (1994) also support the hypothesis of growth-driven finance. Obviously, the causality direction, therefore, should not be neglected in the empirical testing. Moreover, the direction of causality between these two variables has significant implications on development policies. In case of supply-leading, policy-makers should focus on the liberalization of financial sector; whereas in the case of demand-following, more effort should be emphasized on growth-enhancing policies (Calderon and Liu, 2003).

After formalizing both supply-leading (finance-led growth) and demand-following (growth-led finance) hypothesis, Patrick (1966) suggests another stage of development hypothesis, which links the feedback causality between financial development and growth. According to this framework, supply-leading financial development can stimulate domestic capital accumulation in the early stages of economic development. Innovation and development of new financial arrangements in the financial system opens up new opportunities for investors and households (especially surplus units). Resulting from new innovations in terms of technologies, financial instruments and asset-risk management skills, savers will increase their savings and investors can induce higher level of profitable investment or project at a low cost of borrowing. This inaugurates self-sustained economic growth until the supply-leading characteristics of financial development diminish gradually and then, the process will be dominated by demand-following financial development. Investigation of Demetrides and Hussein (1996) and Greenwood and Smith (1997) provide strong evidence to support this hypothesis.

Demetriades and Hussein (1996), for example, examine a variety of causality tests between financial development and economic growth for 16 developing countries and conclude that "considerable evidence of bidirectionality and some evidence of reverse causation". As a consequence, they argue that accepting the generalization of finance leading growth is dangerous and is not helpful for countries in the developing world. Neusser and Kugler (1998) provide similar criticisms. Their cointegration and causality tests for the 13 OECD countries between 1960 and 1994 find that the causal link between financial development and economic growth is weak, especially for the smaller countries. They find a feedback from manufacturing GDP to financial intermediation activity and argue "It is hard to ascertain the originating direction of causality once the feedback process is under way. It is not possible to make a general statement encompassing the whole sample as to whether financial development is truly an engine of growth or just a sign of the evolution of the whole economy due to independent factors". Among others, Greenwood and

Jovanovic (1990), Berthelemy and Varoudakis (1995) and Ram (1999) provide the same conclusion.

In contrast, Chang (2002) provides neither the demand-following nor the supply-leading hypothesis for Mainland China. In his study, he uses multivariate VAR models for Mainland China over the period 1987:Q1 to 1999:Q4 to test both the demand-following and supply-leading hypotheses. Based on Johansen cointegration test, the findings indicate that there exists one cointegrating vector among GDP, financial development and the degree of openness of three variables. The results from Granger causality tests based on multivariate error-correction models (ECM) suggest independence between financial development and economic growth. Ahmed (2010), Song Zan et al. (2010) and Halkos and Trigoni (2010) find that there is a long-run equilibrium relationship among financial development and economic growth. However, the effect of financial development on economic growth is unstable in the short-run.

The issue of causality direction between financial development and economic growth has been one crucial aspect of discussion among researchers. A number of theoretical and empirical studies have attempted to deepen the understanding of the different aspects of this relationship by exploring the existence of this relationship. There are few explanations have been pointed out to explain the inconclusive and mixed direction of causality. First, according to Al-Yousif (2002), most of the existing studies have emphasized on the correlation between financial development and economic growth. As generally agreed, that the high correlation between two variables do not necessarily demonstrate the presence of causality direction from one to another. Second, much existing studies uses cross-sectional data, which do not resolve the issue of causality (King and Levine, 1993a; 1993b).

Third, Wang (1999) argues that the use of an augmented production function approach would produce misleading conclusions because a measure of financial development is added as another argument in the production function. Under this approach, it is assumed that economic growth is an endogenous (or dependent) variable so that the causality is running from financial development to economic growth. Nevertheless, as discussed above, there is a possibility of growth-led finance relationship. Hence, this will lead to the problem of model mis-specification. In line with argument, Rajan and Zingales (1998) find that financial development facilitates economic growth in a large sample of countries over the 1980s and that '. . . this result is unlikely to be driven by omitted variables, outliers, or reverse causality'. Fourth, the use of different measures of financial development indicators contributes to this inconclusive and debatable causality direction. In the work of Al-Yousif (2002) reports that "… the results are country specific and tend to vary with the kind of proxies used to measure financial development. This can be attributed to the fact

that these countries differ in their level of financial development due to differences in policies and institutions".

Fifth, the causality direction remains unobvious resulting from the various applications of econometric techniques. In particular, the use of inappropriate techniques leads to serious econometric problems such as ignorance of unobserved country specific effects, joint endogeneity of the explanatory variables in lagged dependent-variable models and potential parameter inconsistency arising from simultaneity bias (Levine et al., 2000; Beck et al., 2000; Al-Youif, 2002; Calderon and Liu, 2003). Besides, the segmentation of sample data also incurs the ambiguous relationship between financial development and economic growth. The longer the sampling interval, the larger the effect of financial development on economic growth. This suggests that the impact of financial deepening on the real sector takes time (Calderon and Liu, 2003).

To sum up this controversial causality literature, Levine (1997) postulates that: "the preponderance of theoretical reasoning and empirical evidence suggests a positive, first order relationship between financial development and economic growth. The body of work would push even most skeptics toward the belief that the development of financial markets and institutions is a critical and inextricable part of the growth process and away from the view that the financial system is an inconsequential sideshow, responding passively to economic growth and industrialization".

EMPIRICAL APPROACHES TO THE FINANCE-GROWTH HYPOTHESIS

Since 1960s to mid 1980s, many approaches have been used to test the hypothesis of finance-growth in different models such as correlation analysis and simple ordinary least squares (Gurley and Shaw, 1967; Goldsmith, 1969; McKinnon, 1973; Shaw (1973); Jung, 1986) and temporal systems (Granger, 1969; Sims, 1972; Geweke, 1984).

Although the studies discussed above have demonstrated the tie relationship between financial development and economic growth, these studies were econometrically unsophisticated and did not seem to spur much research interest at that time.

King and Levine (1993a, b), for example, apply the following panel data model to estimate the relationship between financial development and economic growth.

$$Y_{IT} = \alpha F_{IT} + \beta Z_{IT} + \varepsilon_T$$

Y_{IT} is the growth of per capita real GDP, the capital stock or a measure of total factor productivity growth in the Ith country for time period, t. F_{IT} is one of the financial development indicators. Z_{IT} is a set of standard

conditioning variables that usually includes the log initial real GDP per capita (measure convergence effect), the log of the initial secondary school enrolment rate (human capital investment), the ratio of government consumption to GDP (measure private sector activity), inflation rate, ratio of exports plus imports to GDP (a measure of openness of the economy).

This type of regression, nevertheless, has two econometric problems (Wachtel, 2001). First, the model will produce simultaneity biases, as there are possibilities of growth-driven finance and bi-directional causality directions. Second, the specification assumes that any unobserved country specific effects are absorbed by error term. Therefore, error term is highly correlated to explanatory variables, which is likely to produce biased estimation of the regression coefficients. Advanced econometric techniques or models, however, can solve these econometric problems.

Since the formalization of the Granger Representation Theorem by Engle and Granger (1987), there has been considerable concern in testing the causality relationship between financial development and economic growth applying the notion of Granger Representation Theorem (Spears, 1992; Murinde and Eng, 1994; Demetriades and Hussein, 1996; Thornton, 1996; Luintel and Khan, 1999; Darrat, 1999; Ghali, 1999). Arestis and Demetriades (1997), for example, apply Johansen's (1988) cointegration framework for the US and Germany. In the case of Germany, they find that financial development (measured as banking system) has crucial influence on the growth, while there is insufficient evidence to support the presence of the relationship in the US. The findings, however, suggest that the relationship should start from growth, that is, a high level of real GDP (or output) contributes to a positive and significant impact on both banking and stock market. Saci et al. (2009), Ali et al. (2010) and Butt et al. (2010) also find that stock market measures are positively and significantly related to economic growth.

Neusser and Kugler (1998) analyzed the long-run relationship between manufacturing sector GDP and financial sector GDP by using manufacturing data from 13 OECD countries over the period 1970 - 1991. Using both Johansen maximum likelihood and residual-based panel cointegration tests, they concluded that the causality directions are mixed in the countries under study, that is, some countries provide evidence to support finance-led growth hypothesis, some support growth-driven finance hypothesis and a feedback causality exists in the certain countries. Similarly, Demetriades and Hussein (1996) find a little evidence in supporting the hypothesis of finance-led growth, while growth-led finance hypothesis is confirmed in some cases. In addition, they conclude that the bi-directional causality relationship is found in majority of the countries under concerned. Luintel and Khan (1999) provide the same findings in their study by focusing on 10 less developed

countries. They concluded that there exists a bi-directional causality all countries under concerned and argued that a consensus on the role of financial development in the process of economic growth does not so far exist. Ahmed and Hasnu (2009) report the similar results for the case of Pakistan from 1974 to 2007.

Although the finance-growth nexus has been widely investigated and studied by using the recent well-developed econometric techniques, the causality directions are remains mixed and arguable. The ambiguity of finance-growth causality is suspected from the potential biases such as simultaneity, omitted variables, stationarity issue, sample size and unobserved country-specific effect. These issues are often viewed as main concerns in the previous literature. The small sample size, for example, may lead to misguided conclusions although the nature of I(1) variables has been clearly determined and proper estimation techniques (such as unit root and cointegration tests) have been applied. In arguing the different relationship between financial development and growth from the existing studies, Christopoulosa and Tsionas (2004) emphasize the use of the data should be in more efficient manner in drawing sharp inferences. In their argument: " … Although the nature of I(1) variables has been recognized as critical, and proper estimation techniques (organized around unit roots and cointegration) have been used, the small samples typically used may significantly distort the power of standard tests, and lead to misguided conclusions. Thus, all efforts must be made to utilize the data in the most efficient manner in order to draw sharp inferences." Their arguments are true for both unit root and cointegration inferences.

In dealing with these econometric problems, especially small sample bias panel data techniques have been widely used by researchers. According to Holtz-Eakin et al. (1988), panel vector autoregression (VAR) with a large number of cross-country observations and relatively few time series observations can be applied to overcome the sample size problem. Rousseau and Wachtel (2000) conduct the panel VAR techniques introduced by Arrellano and Bond (1991) to test the causality relationship between financial development and economic growth.

Levine et al. (2000), for example, have studied the finance growth nexus in 74 developed and less developed countries over the period of 1960 - 1995. In their study, they applied a GMM dynamic panel estimator and cross-sectional instrumental variables estimators to address few potential biases such as simultaneity, omitted variables and unobserved country-specific effect. In order to avoid the biases, legal right of creditors, the soundness of contract enforcement and corporate according standard levels have been used to extract the exogenous component of financial development. The techniques utilized provide more precise estimates, which provide the strong relationship between financial development and output growth. They concluded that the relationship could be partially attributed by the impact of the exogenous components. These findings are consistent with Levine (1999), which focused on a sample of 49 countries over the period of 1960 - 1989.

Using the similar procedures – GMM and instrumental variable techniques – Beck et al. (2000) have attempted to study not only the relationship between financial development and economic growth, but also the relationship between financial development and the channels of growth such as private savings rate, physical capital accumulation and total factor productivity. Again, the use of the techniques aims to correct the possibility of the simultaneity biases. Their results provide supportive evidence to the finance-led growth hypothesis.

Calderon and Liu (2003) provide additional evidence on the causality of finance-growth by applying innovative econometric technique and new data set. They carry out a panel data analysis on data pooled from 109 industrial and developing countries from 1960 - 1994 and apply the tests of linear dependence and feedback developed by Geweke (1984). There are five important results have been suggested. First, the validity of finance-led growth hypothesis has been confirmed in 109 developing and industrial countries. Second, they provide strong evidence to support feedback causality in 87 developing countries and 22 industrial countries when they split the sample into developing and industrial countries.

This demonstrates that financial deepening promotes economic growth, and simultaneously, economic growth propels financial development. Third, financial deepening contributes more to the causal relationship in the developing countries than in the industrial countries. Fourth, the impact of financial development on growth is larger when the sampling interval is longer. Fifth, both capital accumulation and total factor productivity (TFP) are crucial in determining the causality relationship between these variables. Relatively, the causal relationship from financial development to TFP as well as capital accumulation is stronger in developing, while the converse relationship is stronger in industrial countries.

Although the use of GMM panel data analysis has significantly contributed to the robustness of the finance-growth nexus, Christopoulosa and Tsionas (2004) argue that previous studies (Levine et al., 2000; Beck et al., 2000) may produce spurious results as they ignore the integration and cointegration properties of the data. Without investigation of data properties, they have questioned whether the estimated panel model represents a structural long run equilibrium relationship or a spurious finding. The authors, therefore, re-investigate the long-run relationship between financial evolution and growth by applying panel unit root test, panel cointegration analysis, threshold cointegration test and dynamic panel data estimation for a panel-based vector error correction model. They concluded that there exists a single equilibrium relation between financial depth, economic

growth and selected macroeconomic variables. In addition, their findings provide strong evidence in favour of finance-led growth hypothesis in 10 developing countries under study.

FINANCE AND SOURCES OF GROWTH

Despite the rapidly growing literature on the discussion of the causality direction – finance-led growth, growth-driven finance and bi-directional – between financial development and economic growth, the debate concerning the channels by which financial development promotes to enhancing economic is far from settled. In general, there are two alternative schools of thought in attributing the links between financial sector evolution and economic performance. The first view was proposed by Schumpeter (1911), which emphasizes on the role of the banks in facilitating technological innovation as financial intermediaries. As well-developed institutions in assembling savings from surplus units, evaluating profitable investment projects, monitoring managers and facilitating transactions, banks are able and efficient to collect detailed information about firms at a lower cost. Low information costs provided by the financial intermediaries may affect the allocation of resources and productivity growth (Boyd and Prescott, 1986; Greenwood and Jovanovic, 1990). The institutions, therefore, act as financial intermediaries in the society to allocate savings to productive firms. The Schumpeterian view admits that the evolution of financial intermediaries has a direct influence in promoting technical change and productivity growth, which feeds via to overall output growth. The view, however, states that the development of financial intermediaries does not necessarily influence saving rates, but rather than as channels to allocate the savings.

An alternative view emphasizes on the role of financial development in affecting economic growth through a more rapid capital accumulation or technology changes. This view put forward by Goldsmith (1969), McKinnon (1973) and Shaw (1973). According to this framework, financial intermediary development lowers markets friction, which promotes domestic saving rates and attracts foreign capital or investment. As a consequence, the process will increase both capital accumulation and growth. Obviously, the former channel implies that enhanced financial intermediaries allocate savings more efficiently, while the latter channel claims that enhanced financial intermediaries may attract capitals – both local and foreign – and increase savings, hence, raising both capital accumulation and growth.

A number of studies have tested the relationship between financial development and economic growth however, their empirical findings are sensitive to model selection and specification of the equations. The relationship is particularly well explained by the endogenous growth model. In the endogenous growth model

literature, the positive association between financial development and economic growth is based on the ability of financial intermediaries to correct market failure emanating from informational problems (Greenwood and Jovanovic 1990; Bencivenga et al., 1995; Greenwood and Smith, 1997), production externalities (Bencivenga and Smith, 1991), the role of banking sector policies (Demetriades and Luintel, 1996a, 1996b) and stock market capitalization (Levine, 1991; Atje and Jovanovic, 1993; Levine and Zervos, 1996; Rahman et al., 2009).

Based on the endogenous growth model, for example, Obstfeld (1994); Bencivenga et al. (1995) and Greenwood and Smith (1997) emphasize on the role of financial development on growth. These studies include financial intermediaries, information collection and analysis, and risk sharing in the developed models. In his study, Pagano (1993) utilizes the AK model within a simple endogenous growth model to conclude that economic growth rate is significantly influenced by the saving rates. On the other hand, Berthelemy and Varoudakis (1996) consider a theoretical model, which included banks as Cournot oligopolists, argue that the steady-state growth rate influence directly on the degree of competitiveness of the financial intermediaries in the banking system. Moreover, they suggest that evolution of the domestic financial sector is crucially influenced by the local educational development, namely: the well-developed educational system leads to well functioning financial systems.

Greenwood and Jovanovic (1990) develops a model, which contains an additional variable in testing the relationship between financial structure and economic growth, namely income distribution. Their results suggest that there is a positive impact of financial structure on growth resulting from the more efficient undertaking of investment and more capital allocation. This is because market agents can have better information about the nature of shocks (aggregate and idiosyncratic) that affect particular investment projects through information pooling by financial intermediaries. Most notably, King and Levine (1993a, 1993b) conduct a detailed empirical investigation on the relationship between several indicators of financial depth and growth. They investigate a large cross-section of countries as being all countries are significantly influenced by financial development. Moreover, they conclude that financial development is strongly correlated with subsequent rates of growth, capital accumulation and economic efficiency. In their conclusion, they state that policies that promote the efficiency of financial intermediaries exert a first-order influence on growth. This is a standard implication of endogenous growth model with financial intermediation.

Demetriades and Luintel (1996a) investigate the impact of banking system controls on interest rates in affecting the link between financial development and economic growth in Indian economy. They measure banking sector controls based on interest rate restrictions, reserve and

liquidity requirements, and directed and concessionary lending programmes. These measures are a fixed deposit rate, a ceiling on the deposit rate, a floor on the deposit rate, a fixed lending rate, a ceiling on the lending rate and a floor on the lending rate. They suggest that financial sector policies may influence financial deep-ening through bank behaviour such as the willingness of the banks to adjust deposit rates. Indeed, the authors conclude that real interest rate can be viewed as one of the most important mechanisms to influence the process of financial deepening.

Different from previous studies, which use the aggregated macroeconomic data, Neusser and Kugler (1998) employ disaggregated manufacturing data from 13 OECD countries for the period of 1970 - 1991 to study the presence of a long run relationship between manu-facturing sector GDP and financial sector GDP as well as manufacturing total factor productivity (TFP) and financial sector GDP. In achieving their objectives, various types of tests including Johansen maximum likelihood and residual-based panel cointegration tests have been used. They conclude that most of the countries do not show a presence of long run relationship between financial development, GDP and manufacturing sector GDP. The results, however, show the existence of the long run relationship between financial sector GDP and manufacturing TFP.

In testing the short-run causality relationship, the results obtained are mixed. Some countries support the hypothesis of finance-led growth, some countries provide evidence in favour of growth-driven finance hypothesis, while other demonstrate feedback causality between manufacturing GDP and financial sector. In this line of research, Benhabib and Spiegel (2000) argue that a positive relationship is expected also to exist between financial development and total factor productivity growth and investment. However, their empirical results are very sensitive to model specification. Further, Beck et al. (2000) find that financial development has a large posi-tive impact on total factor productivity (TFP), which feeds through to overall GDP growth.

CONCLUSIONS

Study of finance-growth relationship is important to all countries because the development of domestic financial sector is significant in affecting the pattern of economic growth by promoting economic growth through efficient allocation of resources. Further, financial intermediaries offer more attractive and innovative instruments and incentives to encourage the mobilization of savings, lower the costs of project evaluation and origination through economies of scale obtain symmetry information, as well as provide opportunities to reduce risk management and promote liquidity level. Therefore, it is of interest to all countries to gain insight into the finance-growth relationship.

This review of the literature on the finance-growth relationship addressed the controversial issues of the theoretical and empirical literature over the past few decades and leads to the following conclusions. First, the early studies of finance-growth relationship using finan-cial development measures are based on a theoretically inadequate foundation. Even some satisfactory financial measures were proposed and used by Arestis and Demetriades (1997), Levine et al. (2000), Al-Yousif (2002) and Calderon and Liu (2003) need to be combined with other measures, which represent the performance of financial sector in the economy to permit useful policy inferences to be made.

Second, the development of theoretical models and the use of regressions in the investigation of finance-growth relationship have shown reliably that there is a positive long-run (short-run) relationship (causality) between financial development and economic growth. One of the most confidence inspiring results suggests that financial development is a crucial factor in promoting economic growth not only in developed countries, but also in developing countries.

Third, regression analysis is used most profitably in examining finance-growth nexus from panel data analysis, rather than in estimating a cross-sectional and time series analyses separately. Although the existing results are suggestive, many researchers are skeptical because of the problems that plague cross-country and time series studies. However, it is possible to take a more constructive view of this literature, from which a great deal already has been learned. Recent studies are paying increasing attention to many of die methodological difficulties, and the result is more thorough specification and other tests, more attention to endogeneity and he-terogeneity issues, and more guarded and less cavalier policy conclusions. Admittedly, the finance-growth models are highly stylized, but this frontier research area may well yield stronger conclusions in the future.

Fourth, channels such as efficiency of investment, financial liberalization, capital accumulation, productivity growth and technical change have been widely studied in determining the finance-growth relationship. Nowadays, a more promising area of research between financial development and economic performance has turned to an institutional explanation. Institutional reforms such as degree of urgency attached to legal, regulatory, the enforcement of property rights, social capital (the extent of civic activity and organizations), and social cha-racteristics (differences in income and in ethnic, religious, and historical background) are believed to have a potentially different channel of impact on the relationship between financial development and economic growth.

In conclusion, the lively statistical results of the past few decades have provided much support for the positive relationship between financial development and economic growth. A predominant body of research leans towards answering few key issues of the finance growth nexus in the coming years: the choice of financial development

measures, causality direction of finance and growth, econometric problems arise and the channels in linking both financial development and economic growth. There are challenging tasks for researchers with wide ranges of interest in the theory, measurement and techniques used.

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