DOES FINANCIAL DEVELOPMENT PROMOTE ECONOMIC GROWTH IN EAST ASIA?

Kevin H. Zhang*

ABSTRACT: The recent financial crisis in East and Southeast Asia raises a question of whether or not financial development promotes economic growth. This study attempts to provide further evidence on this issue with the time-series and panel data for eight East and Southeast Asian countries (China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, and Thailand). Contrary to the conclusions reached in some recent studies, the estimating results of this study do not support the view that financial development promotes economic growth, at least for the case of East Asia, although a significantly negative connection between financial development and income growth is not supported either.

JEL Code: E44; O53
Keywords: Financial development; and economic growth.

---

* Department of Economics, Illinois State University, Normal, IL 61790-4200, USA. Phone: (309) 438-8928, Fax: (309) 438-5228, Email: khzhang@ilstu.edu.

1. Introduction

An empirical assessment of the linkage between financial development and economic growth is of obvious importance. Theoretical positions on the finance-growth nexus and the importance of the financial system can, however, be very divergent. One position argues that financial development plays a critical role in igniting industrialization by facilitating the mobilization of capital for immense works; and well-functioning banks spur technological innovation by identifying and funding those entrepreneurs with the best chances of successfully implementing innovative products and production processes (Schumpeter, 1934; Hicks, 1969; McKinnon, 1973; Shaw, 1973).[1] In contrast, the other position suggests that "where enterprise leads finance follows" (Robinson, 1952). According to this view, economic development creates demands for particular types of financial arrangements, and the financial system responds automatically to these demands. Moreover, some economists just do not view the finance-growth link unimportant, pointing out that the role of financial factors in economic growth is badly over-stressed (Lucas, 1988).

In light of these conflicting views, many empirical studies have been conducted to assess the role of financial development in economic growth (for example, King and Levine, 1993; Odedokun, 1996; and Ram, 1999). Most of the recent studies seem to have suggested that financial development would have a substantial positive impact on economic growth (for example, King and Levine, 1993; Odedokun, 1996; and Levine, 1997). This study attempts to provide further evidence on this issue with both time-series and panel data for eight Asian economies (China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, and Thailand)[2].

[1] See a detailed discussion in the survey by Levine (1997)

[2] Hong Kong and Taiwan are not included in this study because of unavailability of data.

Contrary to the conclusions reached in the previous studies, the estimating results of this study do not support the view that financial development promotes economic growth, at least for East and Southeast Asia, although a significantly negative connection between financial development and income growth is not supported either.

2. Models

Many specificational refinements may be considered in a study of the linkage between financial development and economic growth. However, the limited number of available observations for some East Asian countries necessitates the use of simple models that capture the basics of the relationship of interest. Two models are used in this work. One is the conventional specification based on an aggregate production function framework in which the level of financial development enters as an "input" in the production process. This is the form that seems to have been utilized by most researchers (for example, Odedokun, 1996) and can be derived from a general production function of following type

$$Y=f(L,K,X,F) \tag{1}$$

where Y is aggregate real output, L is labor input, K represent stocks of capital, X is exports, and F measures the level of financial development.[3] Taking the total derivative in equation (1), dividing throughout by Y, and slightly manipulating items in the right-hand side yield,

$$\frac{dY}{Y}=\frac{\partial Y/Y}{\partial L/L}\cdot\frac{dL}{L}+\frac{\partial Y/Y}{\partial K/K}\cdot\frac{dK}{K}+\frac{\partial Y/Y}{\partial X/X}\cdot\frac{dX}{X}+\frac{\partial Y/Y}{\partial F/F}\cdot\frac{dF}{F} \tag{2}$$

[3] Many studies on export-growth links in the literature suggest exports as one of important production inputs in the production function (for example, Feder, 1982; Ram, 1987).

Let β_1, β_2, β_3, and β_4 be the output elasticities of *L, K, X,* and *F*. With the addition of a constant term (β_0) and a stochastic component (μ), we obtain the familiar expression

$$\dot{Y}=\beta_0+\beta_1\dot{L}+\beta_2\dot{K}+\beta_3\dot{X}+\beta_4\dot{F}+\mu \quad (3)$$

where a dot over a variable indicates its rate of growth. Two modifications should be made with (3). First, the growth rate of financial development ($\dot{F}$) is likely to be subject to a severe endogeneity problem because the growth rate of population is on the right-hand side, which is almost equivalent to estimating an equation for growth of real GDP per capita. Thus we follow Ram (1999) by replacing $\dot{F}$ with *F/Y*. Second, since growth rates of *K* is usually not known, equation (3) can be reformulated from equation (2) by replacing $\dot{K}$ by the more tractable variable *dK*/*Y*, which approximates ratio of investment to output, as follows:

$$\dot{Y}=\beta_0+\beta_1\dot{L}+\frac{\partial Y}{\partial K}\cdot\frac{dK}{Y}+\beta_3\dot{X}+\beta_4\frac{F}{Y}+\mu \quad (4)$$

or replacing *dK* (changes in capital stock) by *I* (investment)

$$\dot{Y}=\beta_0+\beta_1\dot{L}+\alpha_2\frac{I}{Y}+\beta_3\dot{X}+\beta_4\frac{F}{Y}+\mu \quad (5)$$

where α_2 (defined to be $\partial Y/\partial K$) is the marginal physical product of capitals, respectively. In the following analysis, the estimated coefficient of *F/Y* (β_4) is of particular interest because it will indicate the direction and magnitude of the impact of financial development on economic performance.

The other formulation is adopted from the framework of export-growth linkage proposed by Feder (1982). The following major postulates are made in the model: (a) The economy

consists of two sectors, financial sector (F) and the rest of the economy; (b) the output of the financial sector, measured by the level of financial development, generates an externality effects on the production of the non-financial sector output; (c) labor and capital serve as the conventional inputs in both sectors; and (d) production functions for the two sectors are different, and relative marginal products of the inputs differ across the two sectors. These basic postulates, along with a few other plausible assumptions and addition of constant and stochastic terms, can be shown to lead to the following growth equation,

$$\dot{Y} = a_0 + b_L \dot{L} + a_K \left(\frac{I}{Y}\right) + \left(\frac{\delta}{1+\delta} + MP_F\right)\dot{F}\left(\frac{F}{Y}\right) + v \tag{6}$$

where $\delta/(1+\delta)$ denotes the inter-sectoral relative factor productivity differentials, and MP_F indicates the marginal externality effects of the financial sector output on the rest of the economy. Therefor the sum of the two parts, $[\delta/(1+\delta) + MP_F]$ which is coefficient of $\dot{F}(F/Y)$, is the total effect of financial development on economic growth.

Equations (5) and (6) constitute the basis for the estimates reported for each country and also for the panel data. Equation (5) has the merit of being based on a very simple production model in which the level of financial development enters as an input, and the model can be expanded to include other unconventional inputs such as exports. Its drawback is that it does not indicate the mechanism by which changes in financial development affect economic growth and perhaps captures only a part of the impact of financial development on growth. Equation (6), on the other hand, is based on a somewhat more elaborate framework in which separate production functions are specified for the financial and non-financial sector, the financial sector is explicitly postulated to generate an externality effect on the non-financial output, and relative factor

productivity is modeled to differ between the two sectors. The coefficient of $\dot{F}$ *(F/Y)* in (6) captures the total effect of financial development due to the two mechanisms: externality and productivity differentials. However, it is difficult to adapt the framework to situations in which one wishes to study the impact of other unconventional inputs along with that of financial development. Therefore, it seems useful to obtain estimates of both (5) and (6) for time-series as well as panel data sets.

3. Data and Results from Time-Series and Panel Estimates

All data used in the study are taken from the 1987 and 1999 issues of International Financial Statistics Yearbook (IFSY) by International Monetary Fund (IMF) (1987 and 1999). The sample covers the period around 1960-1999 for 8 countries (China, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, and Thailand). Hong Kong and Taiwan are not included because of unavailability of data.

As done by most other researchers, economic growth is measured as the annual growth rate of the real GDP (line 99b.p of IFSY). Labor force growth is proxied by population growth rate that is calculated as the annual growth rate of population size (line 99z of IFSY). The investment-output ratio (I/Y) is computed as gross nominal fixed capital formation (line 93e) plus the increase/decrease in nominal stocks (line 93i), both divided by the nominal GDP (line 99b). Real export growth is calculated as the annual growth rate of real exports of goods and services, in which the real value is obtained from dividing the nominal exports (line 90c) by the GDP deflator (line 99bip).

Out of several indicators of financial development, DEPTH (or *F/Y*), which is the ratio of liquidity liabilities to GDP, seems most appropriate since it has been used widely as a prime

indicator of financial development and since data for it are relatively more plentiful. The financial depth (DEPTH) is constructed as the ratio of the (end-of-year and beginning-of-year) average of the nominal stock of liquid liabilities (line 55l) to the nominal annual GDP. For example, the number of 1991 is the ratio of the mean value of liquid liabilities for 1990 and 1991 to GDP for 1991. In cases where adequate data on liquid liabilities were not available, money plus quasi-money (line 35l) has been used, as done by King and Levine (1993). The growth of financial development ($\dot{F}$), on the other hand, is computed as the annual growth rate of the end-of-year real stock of liquid liabilities or money plus quasi-money as appropriate, as done by Odedokun (1996). The real stock is obtained by deflating the nominal stock with the GDP deflator.

Equations (5) and (6) are estimated by the OLS technique for individual countries with time-series data. Where the presence of first-order serial correlation was detected by the Durbin-Waston (DW) statistic, a procedure that is equivalent to the Generalized Least Square (GLS) technique, will be used by transforming the original data with the first-order serial correlation coefficient. Given 8 countries and up to twenty-one years (1977-97), the data set provides us with a total of 168 observations, which is the largest panel data for current study. Its panel nature has the important advantage of allowing us to control for country-specific effects when estimating how financial development affect economic growth, along with other growth determinants. In contrast, some previous studies have pooled their data across countries and over time, implicitly assuming that country-specific effects are either absent or uncorrected with the regressors. It is well known that such correlation will bias coefficient estimates. Fixed-effects estimation enables us to focus on relationship within countries over time.

Table 1 contains abridged estimates of equations (5) and (6) for eight individual-country regressions with the time-series data and reports the parameters of financial development along with the corresponding *t*-statistics. Table 2 presents the main estimates of (5) and (6) with the panel data through adopting the fixed-effects approach by including country-specific "intercept dummy variables in the two equations. The following points emerge from Tables 1 and 2.

First, the evidence seems to provide a strong refutation of the view that there is a positive effect of financial development on economic growth or there is a positive association between the two variables in East Asia. The overall picture of the individual-country estimates in Table 1 is very similar to that of the panel estimates in Table 2, and most estimates of the parameters of financial development are negative and statistically insignificant at the conventional levels.

Second, while the overall pattern in Table 1 is favored toward weakly negative link between financial development and economic growth, there are indeed some variations across countries in the estimates. The coefficients of financial development are negative and statistically significant for one country (Malaysia) and negative but not statistically significant for four cases (Indonesia, Korea, Philippines, and Thailand). The coefficients for the remaining three cases (China, Japan, and Singapore) are positive but statistically insignificant. Thus it seems to be safe to conclude from the evidence in Table 1 that the finance-growth connection is trivial.

Third, the fit of regressions of the panel estimates in Table 2 is good in terms of both adjusted-R^2 and *F*-statistic. The coefficients of financial development in the two models are consistently negative and statistically insignificant, which are fairly similar to the broad pattern of estimates in Table 1. More importantly, the panel estimates are much better than individual-country estimates in terms of adjusted-R^2 and its fixed-effects formation. Therefore it is clearly

preferable to the traditional models (e.g., cross-country estimates in the literature) and should constitute the basis for inference whenever multiple observations are available.

4. Concluding Remarks

Much concern has been expressed by some scholars and policy makers about linkage between financial development and economic growth, especially since the Asian financial crisis in 1997. The purpose of this study is to extend the research in this area by investigating the financial-growth link for East Asia. The work is based on the more recent data set that cover longer period of time and on the estimates from panel approach as well as individual-country regressions with time-series data. While using a fairly standard production function framework, the troublesome problem of cross-country heterogeneity is handled by estimating fixed-effects panel data models that include country-specific dummy variables.

The major conclusion is that the pattern observed in the East Asia does not suggest a positive effect of financial development on economic growth. Two points are made to support this conclusion. First, individual-country estimates of basic multiple-regression growth models suggest that the predominant association between financial development and economic growth is negligible or weakly negative. Second, the evidence of the fixed-effect panel estimates also indicates a picture that is consistent with that from the individual-country estimates, suggesting that there is no significant association between financial development and economic growth in East Asia.

Table 1 Estimates of Coefficients of Financial Development from Time-Series Data

Country (period)	Equation (5)			Equation (6)		
	Coefficient of *F/Y*	adj. R^2	DW	Coefficient of $\dot{F}$ *(F/Y)*	adj. R^2	DW
China	0.401	0.698	1.801	0.498	0.706	1.786
(1977-98)	(1.330)			(1.415)		
Indonesia	-0.133	0.287	1.665	-0.127	0.302	1.778
(1965-98)	(-1.398)			(-1.686)		
Japan	0.332	0.502	1.705	0.256	0.540	1.673
(1970-97)	(0.667)			(0.701)		
Korea	-0.057	0.321	2.005	-0.060	0.362	1.987
(1960-98)	(-1.206)			(-1.564)		
Malaysia	-0.235**	0.438	1.755	-0.188*	0.403	1.722
(1970-98)	(-2.346)			(-1.767)		
Philippines	-0.465	0.433	1.698	-0.338	0.502	1.661
(1960-98)	(-1.226)			(-1.350)		
Singapore	0.330	0.358	1.966	0.390	0.584	2.006
(1960-98)	(1.002)			(1.441)		
Thailand	-0.135	0.361	1.722	-0.167	0.294	1.896
(1961-98)	(-1.067)			(-1.255)		

Note: The dependent variable is annual rate of growth of real GDP. Parameter estimates for other independent variables are not reported so as to focus on the variable of financial development, and are available from the author. The figures in parentheses are *t* statistics. Significance: *** = 1%; ** = 5%; and * = 10%.

Table 2 Estimates of the Impact of Financial Development from Panel Data

Independent Variables	Equation (5)	Equation (6)
C	0.776	1.008*
	(0.882)	(1.755)
$\dot{L}$	0.532**	0.665**
	(2.441)	(2.220)
I/*Y*	0.040	0.068
	(0.761)	(1.352)
$\dot{X}$	0.101***	0.132***
	(3.367)	(4.001)
F/*Y*	-0.089	
	(-0.677)	
$\dot{F}(F/Y)$		-0.093
		(-1.004)
Adjusted R^2	0.603	0.678
F-Statistic	28.135	30.550

Note: The number of observations is 168. The dependent variable is annual rate of growth of real GDP. The figures in parentheses are *t* statistics. Significance: *** = 1%; ** = 5%; and * = 10%.

References

Feder, Gershon (1982), "On Exports and Economic Growth," Journal of Development Economics, 12, 59-73.

Glodsmith, R. W. (1969), Financial Structure and Development, New Haven, CT: Yale University Press.

Hicks, John (1969), A Theory of Economic History, Oxford: Clarendon Press.

International Monetary Fund (IMF) (1987 and 1999), International Financial Statistics Yearbook 1987 and 1999, Washington, D.C.: IMF.

King, R. G. and R. Levine (1993), "Finance and growth: Schumpeter might be right", Quarterly Journal of Economics, 108 (3), 717-737.

Levine, R. (1997), "Financial development and Economic Growth: Views and Agenda", Journal of Economic Literature, 35 (2), 688-726.

Lucas, Robert E. (1988), "On the mechanics of economic development", Journal of Monetary Economics, 22 (1), 3-42.

McKinnon, R. I. (1973), Money and Capital in Economic Development, New York NY: Macmillan Publishing Company.

Oldedokun, M. O. (1996), "Alternative econometric approaches for analyzing the role of the financial sector in economic growth: time-series evidence from LDCs", Journal of Development Economics, 50 (1), 119-146.

Ram, Rati (1999), "Financial development and economic growth: additional evidence", The Journal of Development Studies, 35 (4), 164-174.

Robindson, Joan (1952), "The generalization of the general theory", in The Rate of Interest, and Other Essays, London: Macmillan, 67-142.

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

Shaw, E. S. (1973), Financial Deepening in Economic Development, New York: Oxford University Press.