INDUSTRIAL DEVELOPMENT, FINANCIAL DEVELOPMENT AND REGIONAL ECONOMIC GROWTH IN CHINA

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ABSTRACT

This study examines the influence of financial development on regional economic growth in China for the period 2003-2010, where industrial development stages are exogenously given and classified as Clark's. Panel analysis of 283 prefectural cities in China for the period shows that financial development is positively associated with regional economic growth in China. Further, the positive association is not found in primary and tertiary sectors while it is found to be strong in secondary or manufacturing sector. Considering China as being in the secondary industrial development stages for the period, the results implies the association of financial development with regional economic growth through the channel of industrial development stages.

INTRODUCTION

This study examines the influence of financial development on regional economic growth in China, where industrial development stages are exogenously given by Clark's classification. China has experienced a rapid economic growth with the financial development. Following the China statistical year book, the real GDP of the Chinese economy grew about 3.1 times from year 2000 to year 2010. Total loans in the financial system grew 3.8 times and total household savings deposited in the financial system grew 4.9 times during the same period. Examining the role of financial development in regional economic growth requires better understanding of the structure of the Chinese economy. Especially manufacturing sector of the Chinese economy has played an important role in the economic growth. While examining China's industry structure, Sasaki and Ueyama (2009) documented that the secondary industry sector composed of about two-thirds of the total output in 2005 and also consisted of almost half of GDP in 2006.

Much attention has been paid in the relationship between economic growth and financial development in recent decades. However, there have been diverse in economic views on the role of financial development in the contribution of economic growth. On the one hand, following Bagehot (1873), Schumpeter (1912), Hicks (1969), Levine (1997) and Miller (1998) argued that financial markets contributed to economic growth. On the other hand, Lucas (1988) shows that the importance of finance in explaining economic growth is "over-stressed."

Levine (1997) suggested five functions of financial systems to accomplish economic growth. These functions are: facilitating risk amelioration, acquiring information about investments and allocating resources, monitoring managers and exerting corporate control, mobilizing savings, and facilitating exchange. These functions facilitate capital accumulation and technological innovation and hence economic growth. Levine (2005) surveyed a large body of empirical studies on the relationship between the financial development and economic growth. A variety of empirical works show that financial development has a positive effect on economic growth. The literature on the finance-growth nexus can be summarized as cross-country, panel, time-series and micro-level analysis.

The cross-country analysis in the early studies shows that financial development enhances economic growth (Goldsmith, 1969; King and Levine, 1993a, 1993b; Levine and Zervos, 1998; La Porta et al., 2002). However, the cross-country regression analysis does not deal with issues of causality and simultaneity bias. Panel analysis mitigates the shortcomings of cross-sectional analysis by taking into account of potential biases from simultaneity, omitted variables and/or country specific effects (Levine, 2005). Still, the results in the panel data studies support a positive effect of financial development on economic growth (Levine, 1998, 1999, 2005; Levine et al., 2000; Beck et al., 2000; Benhabib and Spiegel, 2000; Rousseau and Wachtel, 2000, 2002; Beck and Levine, 2004; Rioja and Valev, 2004a).

Time-series studies that deal with causality issue between finance and growth have in general supported the positive effect of financial development on economic growth (Jung, 1986; King & Levine, 1993a, 1993b; Neusser and Kugler, 1998; Levine et al., 2000; Xu, 2000; Arestis et al., 2001; Khan & Senhadji, 2003; Christopoulos and Tsionas, 2004; Bekaert et al., 2005), even though there are findings of bi-directional causality between finance and growth (Demetriades and Hussein, 1996; Luintel and Khan, 1999; Shan et al., 2001). Micro-level studies with industry level and firm level data, following Rajan and Zingales (1998), also show that financial development is a good indicator to economic growth (Kumar et al., 1999; Wurgler, 2000; Cetorelli and Gambera, 2001; Claessens and Laeven, 2003; Beck et al., 2005).

As an individual country studies, research on the effect of financial development on economic growth in China shows in general its negative association (Boyreau-Debray, 2003; Hasan et al., 2009). However, their analysis uses provincial data for the period before the financial reform in China. Using city-level data focusing on the period after China's financial reforms, especially China's accession to the World Trade Organization WTO in 2001, Zhang et al. (2012) find financial development is positively associated with regional economic growth.

Further decomposing the regional economic growth into Clark's industry classification suggests the role of financial development in facilitating regional economic growth in China be through the channel of industrial development stages. Industries can be classified in diverse ways. A widely known classification of industries into sectors includes primary (extraction of resources such as agriculture, mining, fishing, logging), secondary (production of products from primary industries such as manufacturing, refining, constructing) and tertiary (provision of services) sectors. The patterns of development have some stylized facts in most countries. A country's industrial structure evolves from primary to secondary to tertiary industry sector as its

per capita income grows (Fisher, 1939; Clark, 1940; Kuznets, 1966; Chenery and Syrquin, 1975).

China is in the secondary industrial development stage for the recent decade. As in Table 1, the ratio of secondary industry to GDP in Chana is higher than that in the middle income countries. Thus this paper incorporates China's industry structure into the analysis on the relationship between financial development and the regional economic growth in China. We employ panel data of 283 prefectural cities in China to examine the influence of financial development on regional economic growth and investigate its influence by the Clark's industry classification. Focusing on the period after the recent financial reforms, especially China's entry to World Trade Organization in 2001 and China's establishment of Banking Regulatory Commission in 2003, we use data for the period from 2003 to 2010.

Next section presents empirical analysis and brief conclusions are in section 3.

Table 1 Composition of GDP by Industry (2006) (%)				
	China	Low-income Economies	Middle-income Economies	High-income Economies
Primary Industry	12	20	8	2
Secondary Industry	48	28	37	26
Tertiary Industry	40	52	54	72
Low-income economies are those with a GNI per capita of $905 or less and high-income economies are those with a GNI per capita of $11,116 or more in 2006. Composition of GDP by industry for each income bracket is calculated as a weighted average of the corresponding economies. China's GNI per capita in 2006 is $2,000. *Source: Sasaki and Ueyama (2009);* World Bank *"World Development Indicators."*				

EMPIRICAL ANALYSIS

As in Zhang et al. (2012), we employ a panel of Chinese city data focusing on the period after the recent financial reforms including China's entry to World Trade Organization in 2001 and China's establishment of Banking Regulatory Commission in 2003. The Chinese government classifies cities as three categories such as municipalities, prefecture cities and county cities. The central government directly governs four municipalities (Beijing, Shanghai, Tianjin and Chongqing) and the provincial government directly governs each province that consists of about 10 prefecture cities which governs county cities. To analyze the effects of financial development on the regional economic growth in China, a panel of 286 Chinese prefecture cities is used from the China City Statistical Yearbook for the period 2003-2010. Table 2 shows the descriptive statistics for the data used in this study. On the average, growth rate, which is per capita real GDP growth rate measured by log difference is highest in primary sector and then in secondary sector.

Table 2 Descriptive statistics			
Variable	N	Average	Std
Growth rate			
All sectors	1969	0.129	0.091
Primary sector	1955	0.178	0.441
Secondary sector	1967	0.133	0.168
Tertiary sector	1967	0.120	0.139
FD	2254	1.142	0.507
STE	2256	0.032	0.065
GOV	2254	0.132	0.089
FDI	2168	0.0003	0.0004
SOC	2253	0.005	0.002
Road	2246	0.151	0.362
Growth rate is per capita real GDP growth rate measured by log difference, FD is a financial depth measured by the ratio of total household savings deposited in the financial system to GDP (savings/GDP), STE is a science technology expenditure over government expenditure, FDI is the ratio of real foreign direct investment over real GDP, GOV is the share of government expenditure over GDP, SOC is the ratio of real social overhead capital investment over real GDP, Road is the density of road measured by the total area of road over the total area of land.			

The model employed in this study is an extension of the models in King and Levine (1993) and Zhang et al. (2012). The effects of financial development on the economic growth are estimated by the Clark's industry classification. We include control variables such as year and city dummies, science technology expenditure over government expenditure (STE), the ratio of real foreign direct investment over real GDP (FDI), the share of government expenditure over GDP (GOV), the ratio of real social overhead capital investment over real GDP (SOC), the density of road measured by the total area of road over the total area of land (Road). All the independent variables are used by one year lagged log values to avoid simultaneity bias problems. Thus, our estimation is based on the following econometric model:.

$$y_{ijt} = \beta_{0j} + \beta_{1j}FD_{it-1} + \gamma_j X_{it-1} + \mu_{ij} + \varepsilon_{tj} + \tau_{ijt},$$

where y is the per capita real GDP growth rate in city i at time t for each j sector, FD is a financial depth measured by the ratio of total household savings deposited in the financial system to GDP. Industry sectors are classified as primary, secondary and tertiary sectors and control variables of X vector include STE, FDI, GOV, SOC and Road variables. Finally, μ and ε indicate city-specific and year-specific errors, respectively, and τ is the remaining identically independent error terms.

	Table 3 Results with two-way fixed effects			
	Per capital real GDP growth			
	All sectors	Primary sector	Secondary sector	Tertiary sector
FD	0.0770***	-0.0173	0.142***	0.0418
	(0.0180)	(0.112)	(0.0391)	(0.0270)
STE	0.00386	-0.00804	-0.00472	0.00509
	(0.00364)	(0.0226)	(0.00785)	(0.00542)
FDI	-0.00520**	0.0154	-0.0128**	-0.00918***
	(0.00230)	(0.0142)	(0.00496)	(0.00342)
GOV	0.0939***	0.0761	0.149***	0.0560**
	(0.0182)	(0.113)	(0.0393)	(0.0271)
SOC	0.0633***	0.00201	0.0441*	0.0567***
	(0.0106)	(0.0660)	(0.0230)	(0.0159)
Road	0.00903	-0.0328	0.0148	-0.00038
	(0.00692)	(0.0429)	(0.0149)	(0.0103)
N	1873	1859	1871	1871
R^2	0.314	0.167	0.355	0.340

Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
The estimations are based on two-way fixed effects including time and city dummy variables. FD is a financial depth measured by the ratio of total household savings deposited in the financial system to GDP (savings/GDP), STE is a science technology expenditure over government expenditure, FDI is the ratio of real foreign direct investment over real GDP, GOV is the share of government expenditure over GDP, SOC is the ratio of real social overhead capital investment over real GDP, Road is the density of road measured by the total area of road over the total area of land. All the independent variables except year dummies are used by one year lagged log values.

Table 3 shows empirical results of two-way fixed effect panel estimations where city-specific and time-specific dummy variables are included. The results indicate that financial development in all sectors has a significantly positive impact on regional economic growth. However, estimation by the Clark's industry classification shows interesting results. The effects of financial development on the regional economic growth are not statistically significant in both the primary and the tertiary sectors. The significantly positive role of financial development in explaining the regional economic growth is shown only in the secondary sector at the 5% significance level. Thus financial development is a strong contributor to the regional economic growth in secondary, especially manufacturing sector for the recent decade in China. Considering China as being in the secondary industrial development stages for the period, the results implies the association of financial development with regional economic growth through the channel of industrial development stages. Other contributors to the regional economic growth in China are the share of government expenditure over GDP and the ratio of real social overhead capital investment over real GDP. That is, the larger the government expenditure and the more the real social overhead capital investment, the higher will be the regional economic growth.

CONCLUSION

We examined the effect of financial development on regional economic growth in China for the period 2003-2010, where industrial development stages are exogenously given in a way of Clark's classification. Extending the work by Zhang et al. (2012), we employed a panel of Chinese city data focusing on the period after the recent financial reforms of China's establishment of Banking Regulatory Commission in 2003. Two-way fixed effect panel analysis of 283 prefectural cities in China for the period showed that financial development is positively associated with regional economic growth in China. Further, the positive association was not statistically significant in primary and tertiary sectors while it was strong significant and positive in secondary or manufacturing sector.

The results indicate the positive contribution of financial development to regional economic growth has been played through the channel of industrial development stages, especially the secondary sector in China for the period 2003-2010. Thus the results suggest economic and financial policies in China, of fostering financial development, should be in conjunction with the manufacturing industrial sector, rather than primary and tertiary sectors, to enhance the regional economic growth. Our findings also imply that a theoretical dynamic model of a dual economy, consisting of agricultural and manufacturing sectors in association with financial development, is plausible in Chinese economy. In addition, we found that the government expenditure and the real social overhead capital investment were positively associated with the regional economic growth in China for recent decade.

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