Stock Market and Economic Growth in China

Baotai Wang

Department of Economics
University of Northern British Columbia
Prince George, British Columbia, Canada
Tel: (250)960-6489
Fax: (250)960-5545
Email: wangb@unbc.ca

and

D. Ajit

Department of Economics
University of Northern British Columbia
Prince George, British Columbia, Canada
Tel: (250)960-6484
Fax: (250)960-5545
Email: dayanana@unbc.ca

_____

Abstract

This study investigates the impact of stock market development on economic growth in China. To this end, the quarterly data from 1996 to 2011 are used and the empirical investigation is conducted within the unit root and the cointegration framework. The results show that the relationship between the stock market development, proxied by the total market capitalization, and economic growth is negative. This result is consistent with Harris' (1997) finding that the stock market development generally does not contribute positively to economic growth in developing countries if the stock market is mainly an administratively-driven market.

Key Words: Stock Market, Economic Growth, Unit Root, Cointegration

JEL Classification: G10, O1, O4, C22.

1.   Introduction

The impact of the stock market development on economic growth has long been a controversial issue. The theoretical debates generally focus on the increasing intermediation roles and functions of the stock market in promoting liquidity, mobilizing and pooling savings, generating information for potential investments and capital allocation, monitoring firms and exerting corporate control, and providing vehicles for trading, pooling and diversifying risks. It is argued that by altering the quality of these functions, the existence of stock markets can affect the rate of real economic growth, see, for example, Diamond and Dybvig (1983), Levine (1991), Saint-Paul (1992), Holmstrom and Tirole (1993), Obstfeld (1994), Greenwood and Smith (1997), Shleifer and Vishny (1997), Rafael et al. (1998), among others. However, different views also exist. For example, Bencivenga and Smith (1991) argue that by reducing uncertainty, the increase in liquidity may reduce saving rates enough to incur a negative effect on economic growth. Mayer (1988), on the other hand, argues that equity issuance is a relatively minor source of corporate finance. Stiglitz (1994) considers that stock market liquidity will not encourage incentives for expending resources to acquire information; conversely, an adequately functioning stock market will reveal information quickly through price changes and efficient public revelation will reduce incentives of information acquisition. Shleifer and Vishny (1997) show that information asymmetries may keep diffuse shareholders from exerting corporate governance effectively.

In addition to theoretical debates, the recent empirical researches also showed mixed results. Atje and Jovanovic (1993) construct a cross-country panel of 40 countries from 1980 to 1988 and report that the value of stock market trading relative to GDP has a significant influence on economic growth after controlling for lagged investment. Similarly, Levine and Zervos (1998), after examining a sample of 42 countries over the period 1976-1993, demonstrate that numerous measures of stock market development are positively and significantly correlated with measures of real economic activity. However, Harris (1997) argues that the relationship between stock market development and economic growth is at best very weak. Using a sample of 49 countries from 1980 to 1991, Harris concludes that the stock market variable does not seem to affect economic growth in the full sample (which includes both developed and developing countries) and of the subsample of less-developed economies. Meanwhile, the regression results show that in terms of the subsample of developed countries, the level of stock market activity does have some explanatory power but its statistical significance is weak and not robust.

China's stock market was established in the early 1990s[1]. When China first began privatization of its state-owned enterprises in 1990s, it wanted to use capital market pressures to improve the performance of state-owned enterprises (Ahn and Cogman, 2007). To allow companies to raise capital, a two-tier ownership structure was put in place and until 2001, domestic investors could only buy A shares while foreign investors could hold B shares[2]. Despite the capital market segmentation, the stock market has developed quickly and is becoming an indispensable part of China's financial infrastructure.

---

[1] The Shanghai Stock Exchange and the Shenzhen Stock Exchange were established in December 1990 and July 1991 respectively.
[2] The A-share market is open only to local investors and a B-share market is open only to foreign investors. Technically speaking, local investors are not allowed to trade B shares in China.

The limited empirical evidence with regard to China reveals that its stock market development is not positively linked to economic growth. Performing the linear regression analysis through ordinary least squares method with the relevant data over the period 1994-1998, Tan (1999) finds that in China the relationship between financial intermediation and economic growth is significant and positively related, while the effect of stock market development on economic growth is limited. Similarly, using the AK Model and two-stage least squares regression analysis, Wang (2002) concludes that there is no obvious correlation between China's capital market development and economic growth. Researchers have pointed to segmentation of the equity market, illiquidity, herding behavior and inefficient stock market as the reasons for its limited impact on the economy (Wang and Li, 2004; Burdekin and Redfern, 2009; Rezvanian et al, 2011). Since February 17, 2001, the Chinese government has allowed B-shares to be traded to domestic investors. Qualified foreign institutional investors have also been permitted to trade in A-shares. Besides these institutional changes, the Chinese government initiated the 'reform of non-tradable shares' in 2005. Prior to 2005, nearly two-thirds of shares of Chinese listed companies were non-tradable. With the gradual floating of non-tradable shares, the real market value of shares began to be realized and contributed to the rising stock prices since 2005 (Sun and Zhang, 2009). These policy reforms contributed to the rapid growth of the stock market in China. The number of companies listed on the Shanghai and Shenzhen exchanges increased rapidly, from only 10 in 1990 to 2342 (A share and B share) in 2011. Market value also soared enormously. The total capitalization of the Shanghai and Shenzhen markets rose from 353.1 billion RMB[3] in 1993 to 21475.8 billion RMB, approximately 50% of China's GDP, at the year end of 2011. Given these developments, it would be interesting to examine the impact of stock market developments on economic growth in China.

The objective of this study is thus to adopt an aggregate demand model with a modification for China and use the cointegration technique to estimate empirically the impact of the stock market development on real economic growth. Section 2 will discuss the model and the estimation method. Section 3 will discuss the data and present empirical results. Finally, Section 4 concludes this study.

2. The model and the estimation method

A broad-brush picture of the relationship between stock market development and economic growth has been recognized mainly through cross-country growth regressions. While the level of stock market development has been found to explain part of the variation of growth rates across countries and seems to be a good predictor of economic growth, researchers have not reached an agreement on the issue of causality nor do they settle the argument on the endogeneity of the variables used in the analysis (King and Levine 1993a, 1993b, Levine and Zervos 1998). In addition, the relationship between stock market development and economic growth may reasonably be expected to vary considerably across countries, depending on their different institutional characteristics, market size and circumstances. Finally, cross-section

---

[3] RMB denotes renminbi, the currency of the People's Republic of China.

4

studies are criticized[4] and those results derived from cross-country growth regressions are suggested to be viewed with some caution (Bell and Rousseau 2001). Contrary to cross-country studies, time series methods have important econometric advantages in examining the effect of stock market development on economic growth. Being less likely to suffer the limitations of cross-country growth regressions, time series approaches can account for the specificity of individual country and are better able to address the issue of causality, since each country may has its own causality pattern and unique evolution path over time (Rousseau and Wachtel 1998).

Since most macroeconomic time series variables are generally non-stationary so as to make conventional hypothesis-testing procedures based on the t, F, and χ^2 test statistic unreliable, it is not appropriate to apply the conventional regression techniques to investigate their relationships. In order to avoid the possibility of spurious results, our empirical investigation is conducted within the framework of testing for unit roots and testing for co-integration in macroeconomic time series, which started gaining popularity in the early 1980's.

To investigate the impact of the stock market development on economic growth, a multivariate co-integration model is specified as follows:

$$RGDP_t = \beta_0 + \beta_1 RG_t + \beta_2 RM_t + \beta_3 RCAP_t + \varepsilon_t$$

where RGDP, RG, RM, RCAP are, respectively, real GDP, real government spending, real money supply (M1), and real capitalization of stock market, all in logarithm forms. All βs are co-integration coefficients and ε is the error term and satisfies the standard assumptions. This model can be viewed as the aggregate demand model as the level of GDP is determined by the demand-side policy variables under the assumption that the long-run aggregate supply is stable. However, different from the general textbook model, we separate the stock market from the overall financial market (here represented by the money market) in order to examine its impact on GDP growth. Following the practice by Levine and Zervos (1996), we also use the market capitalization as a measure of the stock markets development.

The study adopts three-step empirical procedure. We first test the unit root for each of these variables in the model. In the second stage, we perform the Gregory-Hansen (1996) residual based cointegration procedure to identify the existence of cointegration with structural breaks. In the third stage, we then conduct the maximum likelihood approach of testing the number of co-integrating vectors suggested by Johansen (1988, 1991, 1992) and Johansen and Juselius (1990, 1992, 1994) to estimate the long-run determinants of real GDP in China. The estimated co-integrating coefficients will allow us to examine the impact of the stock market development on economic growth in China.

---

[4] The widespread skepticism derives from the facts that cross-section studies are based on a fragile statistical basis and that the results do not adequately account for the variation across countries with different institutional, legal and political settings.

3. Data and empirical results

Quarterly data from the first quarter of 1996 to the last quarter of 2011 are collected and used for this empirical study. These data come from various sources, including National Bureau of Statistics of China, People's Bank of China, the Database of China Economic Information, and China Securities Regulatory Commission. All nominal data are deflated using the GDP deflator.

With these quarterly data, the ADF unit root test is performed to all time series of real GDP, real government expenditure, real narrow money supply (M1), and real market capitalization. The test results are summarized in Table 1.

Table 1: Results of the ADF Unit Root Tests for Macroeconomic Variables for China: 1996:Q1 to 2011:Q4

Variables	Constant only				Constant and Time Trend			
	Levels		1st Differences		Levels		1st Differences	
Ln RGDP	2.48	[4]	-4.59***	[3]	-1.16	[3]	-5.51***	[3]
Ln RG	-0.95	[4]	-4.98***	[3]	-2.39	[6]	-5.01***	[3]
Ln RM	-1.10	[5]	-3.58***	[4]	-3.14	[4]	-3.69**	[4]
Ln RCAP	-1.94	[1]	-5.63***	[0]	-2.70	[1]	-5.78***	[0]

Note: Ln RGDP, Ln RG, Ln RM, and Ln RCAP denote, respectively logarithms of real GDP, real government spending, real money supply (M1), and real stock market capitalization. The computed t statistics for variables in levels and in first differences are presented in the Table. *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively. The numbers in the brackets [ ] are the optimal lags selected according to the Schwarz selection criterion.

We then carry out the Gregory-Hansen (GH) (1996a, 1996b) residual based cointegration test which explicitly takes into consideration the structural change in the cointegration vector. The GH procedure of testing cointegration with endogenous structural breaks is an extension of unit root tests with structural breaks. In the GH procedure, the null hypothesis of no cointegration with structural breaks is tested against the alternative of cointegration with structural breaks. Table 2 reports the results of the GH procedure with three models and the model with level shift with trend rejects the null hypothesis of no cointegration.

Table 2: Results of Gregory-Hansen (1996) Test for Real GDP Equation for China: 1996:1 to 2011:4

Model	Test Statistic	Break Date	Critical Values		Reject Ho of No cointegration
			1%	5%	
C (Level Shift)	-2.50	2006:1	-5.77	-5.28	No
C/T (Level Shift with trend)	-18.75***	1999:2	-6.05	-5.57	YES
C/S (Regime Shift)	-5.23	1999:2	-6.51	-6.00	No

Note : *, **, and *** indicate significance at the 10%, 5%, and 1% levels respectively.

After satisfying the existence of cointegration even with a level shift with trend and the fact that all variables in the cointegration model are $I(1)$, we proceed to investigate the long-run

and short-run dynamics of real GDP equation for China. The Johansen method views all variables as endogenous and forms a Vector Autoregressive (VAR) equation to test for cointegration. In the VAR framework, it is important to specify the appropriate lag length (k) of the VAR model (Ln RGDP, Ln RG, Ln RM, Ln RCAP). We used Schwarz information criterion to determine the appropriate lag lengths. In this data set, the optimum lag length of $k=4$ was sufficient to make residuals uncorrelated and homoscedastic (the details are not reported to conserve space). Table 3 reports the results of the Johansen-Juselius trace tests of the VAR model with intercepts and seasonal dummies in the cointegration relations. The trace test results reported are for uncorrected and corrected (using the Bartlett small sample correction). Based on the Bartlett-corrected trace tests, we conclude that there is one unique cointegrating vector (equilibrium relationship). Table 3 also reports the normalized (to RGDP) cointegrating vector coefficients. The estimated coefficients for real government expenditure (RG) and real narrow money (RM) show that they have a positive impact on real GDP in China. Judged by the size of the coefficients, real narrow money supply (RM) has a pre-dominant positive impact on real GDP in China during 1996 to 2011. These results are not surprising given the pre-dominant role of banks in the financial system. Households still hold bulk of their financial assets in the form bank deposits which meet multiplicity of needs of households – retirement consumption, purchase of durables, self-insurance against income volatility and health shocks. In comparison to real money supply, the impact of real government expenditure on GDP growth is weaker. One possible explanation to this result is that government expenditure in China may have generated strong crowding-out effects on private and local investments and on the net exports through the real interest rate and the real exchange rate channels as discussed in Liu (2003). Finally, real market capitalization (RCAP) has a negative impact on real GDP in China – a 1% increase in RCAP reduces real GDP by 0.32%. This result is consistent with Harris' (1997) finding that the stock market development generally does not contribute positively to economic growth in developing countries if the stock market is mainly an administratively-driven market.

Table 3: Johansen and Juselius Cointegration for Stationarity of Real GDP equation in China : 1996:1 to 2011:4

Period: 1996:1 to 2011:4; Maximum lag in VAR=4.
Variables included in the cointegrating vector: Ln RGDP, Ln RG, Ln RM, Ln RCAP.
Eigenvalues in descending order 0.54, 0.37, 0.11, 0.04

Cointegrating Vector	Trace Statistic	Trace Statistic*	95% Critical Value
r = 0	83.50	66.16	47.71
r ≤ 1	37.52	26.86	29.80
r ≤ 2	9.64	6.72	15.41
r ≤ 3	2.56	0.66	3.84
Estimated Cointegrated Vectors (Normalized)			
Vector	Ln RGDP	Ln RG	Ln RM	Ln RCAP
1	1.00	0.55	1.00	-0.32

Note: Trace statistic * is the trace test computed using the Bartlett small sample correction.

4.   Conclusions

With the rapid development of China's stock market, studies in the impact of the stock market development on economic growth have stimulated interest among scholars. We empirically examined the impact of the stock market development on economic growth in China. Our empirical results indicate a negative relationship between real stock market development and real GDP growth in China in the long run and the short run. This supports the argument that the stock market development in developing countries generally does not contribute positively to economic growth.

China is still in its transition period towards the market economy. But so far government interventions in the stock market have created a two-tier equity market and led to segmentation of the stock market. This has created substantial price differences between A and B share markets leading to illiquidity of the stock market. This provided fertile ground for speculative behavior and often herding behavior among investors. Thus stock market instead of providing an additional source of financing for state-owned and private enterprises has witnessed irrational and speculative activity undermining its efficiency. Recent reforms in the form of allowing domestic investors to trade in B- shares and initiatives to reduce the illiquidity of the stock market could lead to positive impacts on economic growth in China in the future.

References:

Ahn, J and Cogman, D. (2007) A Quiet Revolution in China's Capital Markets, *McKinsey Quarterly*, Vol. 24: 18-24.

Atje, R. and Jovanovic, B. (1993) Stock Markets and Development, *European Economic Review*, Vol. 37: 632-640.

Bell, C. and Rousseau, P. L. (2001) Post-independence in India: A Case of Finance Led Industrialization?, *Journal of Development Economics*, Vol. 65: 153-175.

Bencivenga, V. R. and Smith, B. D. (1991) Financial Intermediation and Endogenous Growth, *Review of Economic Studies*, Vol. 58: 195-209.

Burdekin, R.C.K. and Redfern, L. (2009) Sentiment Effects on Chinese Share Prices and Savings Deposits: The Post-2003 Experience, *China Economic Review*, Vol. 20: 246-261.

Diamond, D. W. and Dybvig, P. H. (1983) Bank Runs, Deposit Insurance, and Liquidity, *Journal of Political Economy*, Vol. 91: 401–419.

Greenwood, J. and Smith, B. D. (1997) Financial Markets in Development, and the Development of Financial Markets, *Journal of Economic Dynamics and Control*, Vol. 21: 145-181.

Gregory, A.W and Hansen, B.E. (1996a) Residual-based tests for Cointegration in models with Regime Shifts, *Journal of Econometrics*, Vol. 70: 99-126.
_____(1996b) Tests for Cointegration in Models with Regime and Trend Shifts, *Oxford Bulletin of Economics and Statistics*, Vol. 58: 555-559.

Harris, Richard D. F. (1997) Stock Markets and Development: A Re-assessment, *European Economic Review*, Vol. 41: 139-146.

Holmstrom, B. and Tirole, J. (1993) Market Liquidity and Performance Monitoring, *Journal of Political Economy*, Vol. 101: 678-709.

Johansen, S. (1988) Statistical Analysis of Cointegration Vectors, *Journal of Economic Dynamics and Control*, Vol. 12: 231-54.
_____(1991) Estimation and Hypothesis testing of Cointegration Vectors, *Journal of Economic Dynamics and Control*, Vol. 59: 1551-1580.
_____(1992) Determination of the Cointegration Rank in the Presence of a Linear Trend, *Oxford Bulletin of Economics and Statistics*, Vol.54: 383-397.

Johansen, S. and Juselius, K. (1990) Maximum Likelihood Estimation and Influence on Co-integration with Application to the Demand for Money, *Oxford Bulletin of Economics and Statistics*, 52: 169-210.
_____(1992) Testing Structural Hypothesis in a Multivariate cointegration Analysis of the PPP and the UIP for UK, *Journal of Econometrics*, Vol. 53: 211-44.
_____(1994) Identification of the Long-run and Short-run Structure: An Application to the IS-LM Model, *Journal of Econometrics* 63: 7-37.

King, R. G. and Levine, R. (1993a) Finance and Growth: Schumpeter Might Be Right, *The Quarterly Journal of Economics*, Vol. 108: 717-737.

King, R. G. and Levine, R. (1993b) Finance, Entrepreneurship and Growth: Theory and Evidence, *Journal of Monetary Economics*, Vol. 32: 513-542.

Levine, Ross (1991) Stock Markets, Growth, and Tax Policy, *Journal of Finance*, Vol. 46: 1445-1465.

Levine, R. and Zervos, S. (1996) Stock Market Development and Long-Run Growth, *World Bank Economic Review*, Vol. 10: 323-339.

Levine, R. and Zervos, S. (1998) Stock Markets, Banks, and Economic Growth, *American Economic Review*, Vol. 88: 537-558.

Liu, Jinshan (2003) Research Summary of Crowing-out Effects of Active Fiscal Policies, *Economic Review*, Vol. 2. (In Chinese)

Mayer, C (1988) New Issues in Corporate Finance, *European Economic Review*, Vol. 32: 1167-1183.

Obstfeld, Maurice (1994) Risk-Taking, Global Diversification, and Growth, *American Economic Review*, Vol. 84: 1310-1329.

Rafael, L. P., Lopez-de-Silanes, F., Shleifer, A. and Vishny R. W. (1998) Law and Finance, *Journal of Political Economy*, Vol. 106: 1113-1155.

Rezvanian, R., Turk, R. A. and Mehdian, S.M. (2011) Investors Reactions to Sharp Price Changes: Evidence from Equity Markets of the People's Republic of China, *Global Finance Journal*, Vol. 22: 1-18.

Rousseau, P. L. and Wachtel, P. (1998) Financial Intermediation and Economic Performance: Historical Evidence from Five Industrialized Countries, *Journal of Money, Credit and Banking,* Vol. 30: 657-678.

Saint-Paul, Gilles (1992) Technological Choice, Financial Markets and Economic Development, E*uropean Economic Review*, Vol. 36: 763-781.q1

Shleifer, A. and Vishny, R. W. (1997) A Survey of Corporate Governance, *Journal of Finance*, Vol. 52: 737-783.

Stiglitz, Joseph E. (1994) The Role of the State in Financial Markets, in Proceedings of the World Bank Annual Conference on Development Economics 1993, Washington, D.C.: World Bank

Sun, T, and Zhang, X (2009) Spillovers of the U.S. Subprime Financial Turmoil   to Mainland China and Hong Kong SAR: Evidence from Stock Markets. *IMF Working Paper* No. 166.

Tan, Ruyong (1999) An Empirical Research on the Relationship between China's Financial Development and Economic Growth, *Economic Research Journal,* Vol. 10. (In Chinese)

Wang, Jun (2002) The Theoretical and Empirical Analyses on the Relationship between China's Capital Market and Economic Growth, *China Economist*, Vol. 2. (In Chinese).

Wang, S.S. and Li, W. (2004) Information Diffusion, Transaction Costs, and the Performance of Technical Trading Rules in the Emerging Stock Market in China, EFMA 2004 Basle Meetings Paper. Available at SSRN: http://ssrn.com/abstract=487783.