

# **Finance and Economic Growth in China**

## **-Unit Root, Trend Shift and Causality**

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It is widely acknowledged that China has succeeded in transforming itself from an economically impoverished country into an economic success, having generated a high rate of growth and maintained brisk economic growth in the 20-plus years since the outset of the economic reform programs of the late 1970s. According to the official statistics, the average real per-capita *GDP* annual growth rate of the Chinese economy was about 9.33% between 1978 and 2003, in contrast to that of 3.98% between 1952 and 1978.

To account for China's achievement of high speed of growth, different aspects of the Chinese economy have been investigated extensively in many papers. A vast number of literatures have explored the sources of economic growth through theoretical and empirical studies at both national and provincial levels and ongoing debate is mainly concerned with which source, factor accumulation or productivity improvement, is the key growth driving factor (e.g. Chow, 1993; Borensztein and Ostry, 1996; Yu, 1998; Chen and Feng, 2000; Chow and Li, 2002). However, only few attempts have so far been made at the role of financial system in the process of economic growth.

This thesis is concerned with several themes related to China's macroeconomic and financial performance in the last 50 years, including the finance and growth nexus as well as the hotly debated unit root and trend shift hypotheses. Specifically, Chapter 1 reviews the economic reform and outlines the evolution of financial system in China. Chapters 2-3 deal with the finance and economic growth nexus. Chapters 4-5 test the unit root and the trend shift hypothesis for China's major macroeconomic and financial series. Chapter 6 concludes the whole essay and presents issues for future studies. We give a brief description of each chapter.

## **Chapter 1: Overall View and Purpose**

The goal of this chapter is first to provide a brief overview of development in both the real sector and the financial sector. We First give a brief overview of the process of economic reforms in China. Then we review the development of financial system in China, focusing especially on the period following 1978, when its first economic reform strategy was initiated. Finally, we address the purpose of this thesis, and outline the organization therein.

## **Chapter 2: Financial Development and Economic Growth Nexus**

In this chapter, we mainly dedicate to exploring the financial development and growth nexus, whose role in the process of economic growth has often till recently been ignored, with a conspicuous lack of studies being made to theoretically examine and empirically determine this.

Since the specification of econometric models depends on the integrated order of each variable, we first test the unit root properties of each variable with the unit root test proposed by Zivot and Andrews (1992). Testing for the constant shift in the trend function and determining the number of breaks of each variable are carried out by utilizing approaches proposed by Vogelsang (1997). Empirical results show that variables are mixed of  $I(1)$  and  $I(0)$ , indicating that the Johansen type Reduced Rank Regression causality test is not applicable. Hence we refer to a more robust approach, namely the multivariate VAR Granger causality tests proposed by Toda and Yamamoto (1995) allowing for the existence of structural breaking. The empirical results suggest that there exists a (weak) unidirectional causality running from economic growth to financial development for the case of China over the period 1952-2001. Besides, we found that three out of six variables are segmented trend stationary, rather than containing a unit root, and most of the breaks are coincided with the episodes occurred in China.

## **Chapter 3: Stock Market, Banking System and Growth**

In recent years, there has been a worldwide surge in the development and growth of stock markets. A great amount of research concerning the financial development and economic growth nexus is now placing an increasing emphasis on stock market performance. The issue has been a theme of popularity in day-to-day discussion for the researchers as well as policymakers since providing evidence on causality has implications for the choice between putting priority on developing stock markets or on developing banking system.

In this chapter, we will explore the relationships between financial development and economic growth with respect to stock market and banking system development. Due to data availability, we confine our analysis to the macroeconomic time series from 1992Q1 to 2004Q4, inclusive. Technically, the empirical analysis is closely related to the framework of Chapter 2.

On one hand, empirical results by way of a simple bivariate Granger (non-)causality analysis provide evidence supporting for the relative advantage of banking sector development in promoting economic growth in China. On the other hand, we find no Granger causality between stock market development and economic growth after controlling for the development of banking sectors, the effect of the liquidities and volatilities of the stock market in a multivariate VAR framework. Therefore, we conclude that, as financial institutions, though both the banks and stock markets are able to promote the economic growth, empirical results support the relative important role of the banking sector playing in the process of economic growth.

## **Chapter 4: Unit Root and Trend Shift in China's Macroeconomic Series**

Since the seminal work of Nelson and Plosser (1982), the unit root hypothesis has attracted numerous works in both the economics and statistics literature since whether the macroeconomic

series is stationary or not has important implications for policy-makers to formulate long-term economic growth strategy and short-run stabilization policies, as well as for academics to carry out cointegration analyses among macroeconomic variables. Firstly, segmented trend stationary view implies that only large shocks, such as policy-initiative reforms aiming to change fundamentals, can result in a change in trend that will last for a relatively long time until a new, large shock occurs. Therefore, there is a role for government policy-making in changing the trend at least semi-permanently (see, also, X.M.Li, 2000). Secondly, it has important implications for analyzing the relationships among macroeconomic variables because not rejecting the unit root hypothesis results in differencing the macro economic time series to achieve stationarity

Until now, however, most of previous studies are questionable on a number of grounds since researchers usually confine their studies with the application of conventional unit root testing approach (e.g. ADF, PP and KPSS test) in which the parameters in the deterministic trend function are assumed to be constant and not to vary over time. These studies are first questioned by Perron (1989) who showed that the power of the conventional unit root test is undermined considerably as the presence of important structural changes is ignored, and as an aftermath by many other theorists (e.g. Zivot and Andrews, 1992; Banerjee et al., 1992; Lumsdaine and Papell, 1997).

X.M.Li(2000) is the one of the pioneer studies concerning the integration order of the China's output variables allowing for the structural change in the economy. Smyth and Inder (2004) extend Li's studies to provincial level. We further extend their studies to ten main macroeconomic and financial series in China. Empirical results suggest that 7 out of 10 series, which are *GDP*, *GDP* per capita, Employment, Bank Credit, Deposit Liabilities and Investment, can be more accurately characterized as a segmented trend stationary process around one or two structural break(s) as opposed to a stochastic unit root process. In addition, we found most of the breaks are around the Great Leap Forward, the outbreak of Culture Revolution and the adoption of Economic Reform policies. Moreover, what has to be noticed of our studies is that, we move away from the arbitrariness in the presupposition that there should be merely one break or two breaks, and the procedure devised by Vogelsang (1997) is advocated to determine the number and identify the location of the breaks. We further refer to the two-break unit root tests proposed by Lumsdaine

and Papell (1997) if necessary. Hence, our studies also answer to a basic inquiry that we have no reasonable foundation to think about that China's time series data have only one or two permanent break(s).

## **Chapter 5: The Stationarity of China's Macroeconomic and Financial Series Revisited**

Lee and Strazicich (2003; 2004) have pointed out, that both the commonly used ZA and LP endogenous break tests assume no break(s) under the unit root null hypothesis, one important issue but often has been ignored. The technical implication lies in that the alternative hypothesis would be "structural breaks are present," which means that a unit root with break(s) would also belong to this class. Thus, in the presence of a break under the null, researchers might incorrectly conclude that rejection of the null indicates evidence of a trend-stationary time series with breaks, when in fact the series is differencing-stationary with breaks. This problem is referred to as "*spurious rejections*" by Lee and Strazicich (2004) as well as some other studies.

In this chapter, in line with the findings derived through Zivot and Andrews's (1992) and Lumsdaine and Papell's (1997) approaches, the unit root hypothesis of these macroeconomic series is reexamined, following another line of investigation, with the endogenous structural break unit root test approaches proposed by Lee and Strazicich (2003; 2004), who assume break(s) under the unit root null hypothesis. Our empirical results of LM unit root tests suggest that only six out of ten series, Employment, Real Wage, Bank Credit, Deposit Liabilities, Final Consumption and Trade, are tested to be trend stationary at significance of 5%, which are usually identified as nonstationary in the conventional unit root test. We found less evidences of stationarity in contrast with those obtained in the ZA test and LP test.

## **Chapter 6: Conclusion and Policies Implications, Future Studies**

In this chapter, before addressing our conclusion, we first give some discussions on the main finding concerning Granger causality tests. Then, we address the policies implications for our studies.

First, we conclude that the failure of financial development Granger-cause economic growth might be ascribed to that the channel of efficient capital allocation was not working well, arguing that if financial system continues to distort the allocation of capital, then economic growth might not be sustained and financial development would remain deficient. Therefore, for a developing economy like China, it is critical to establish well-developed financial systems, particularly with sound financial intermediation and liberalized interest rate, all of which are important for the efficient allocation of credits, which in turn can help to maintain sustainable high economic growth.

Second, our conclusions that most of more than half of the macroeconomic and financial series are segmented trend stationary have important implications for policy-makers to formulate long-term economic growth strategy and short-run stabilization policies, as well as for academics to carry out cointegration analysis among macroeconomic and financial time series for the case of China's economy.

Moreover, we strongly suggest that there is a need to test other important hypotheses such as the Export-led hypothesis and Money-output hypothesis in a similar framework for future studies.