



Do Chinese publicly listed companies adjust their capital structure toward a target level? ☆

Yanmin QIAN ^a, Yao TIAN ^b, Tony S. WIRJANTO ^{c,*}

^a School of Economics, Zhejiang University, Hangzhou, Zhejiang, People's Republic of China

^b School of Business, University of Alberta, Edmonton, Alberta, Canada T6G 2R6

^c School of Accounting & Finance and Department of Statistics & Actuarial Science, University of Waterloo, Waterloo, Ontario, Canada N2L 3G1

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ABSTRACT

We study the determinants of capital structure for 650 Chinese publicly listed companies over the period from 1999 to 2004. We posit that a firm's decision on capital structure is inherently dynamic, and estimate the resulting dynamic capital structure model. The main findings of the paper are as follows: (i) Chinese firms adjust toward an equilibrium level of debt ratio in a given year at a very slow rate; (ii) firm size, tangibility and state shareholdings are positively associated with firm's leverage ratio, while profitability, non-debt tax shields, growth and volatility are negatively related to firm's leverage ratio; (iii) lagged profitability has a negligibly small and positive impact on firm's leverage ratio; (iv) for a firm experiencing a large reduction in its leverage ratio only about 11% of the discrepancy between its desired and actual leverage level is eliminated within a year (compared to more than 18% for full firm sample); (v) extending the basic model to allow for both the target level and the speed of adjustment to be endogenously determined, we find that Chinese firms tend to adjust faster if they are farther away from the equilibrium leverage level; and lastly (vi) extending the sample period to cover the earlier periods starting from 1993, when the Chinese stock markets were first developed, results in a slower speed of adjustment for firms in the below target sample.

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1. Introduction

At the onset of a transitional process from a planned to a market economic system, firms in China operated in an environment in which access to external finance has proven to be very limited. During this period, many so-called state-owned enterprises (SOEs) experienced soft budget constraints as they were granted generous loans from state-owned banks to improve their dismal financial conditions. This environment, coupled with a less-than-ideal legal institution and underdeveloped financial system, has hampered the growth of the capital stock, productivity levels and even the economy in China to some extent. In response to this, major reforms have been launched in China during the past two decades in order to create a more market-oriented financial system. In particular, the economy has been making a transition from a complete reliance on state-owned and collective enterprises (first in late 1980s and then in early 1990s) to a more mixed economy, where privately-owned enterprises assume an increasingly greater role in China (in particular after mid 1990s). This transformation has been accomplished through a dynamic growth of the de novo private sector and more recently through a privatization of the SOEs by reorganizing its equity structure. In the light of this development, it is of interest to inquire whether the reforms have largely succeeded in providing an incentive for firms to behave more rationally in the sense of the neo-classical firms.

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* Corresponding author. Tel.: 1 519 888 4567ext5210.

E-mail addresses: yanminqian_ca@yahoo.com.cn (Y. Qian), yao.tian@ualberta.ca (Y. Tian), twirjant@uwaterloo.ca (T.S. Wirjanto).

This paper does not consider the effects of the reforms on the financial markets in China in general. Rather this paper focuses on Chinese publicly listed companies (PLCs) and investigates whether and to what extent the reforms have enabled these firms to achieve the target levels of their capital structures. Specifically, we wish to determine whether and to what extent the target level of capital structure of the Chinese PLCs is driven by the determinants that have been identified for the PLCs in the developed and developing countries.

There are a few studies on companies listed in countries experiencing a transition from a planned to market economic system. Notably, [Chen \(2004\)](#) studies the determinants of firm-level capital structure in China using a balanced panel of 77 PLCs over the period 1994–2000. Identifying the determinants of capital structure for the Chinese PLCs is important because China is the largest developing and transitional economy in the world with institutional features likely to be quite distinct from both the developed and most other developing countries. In particular, China has a much less developed corporate bond market; Chinese firms face high agency costs, less bankruptcy risk (due either to a serious principal agent problem during the transition period or to the fact that the dominant control of equity owners of non-circulating equity rest primarily with state-owned investors or other influential private investors), and low income tax rate. These features tend to render the trade-off theory less applicable to Chinese firms. In fact, [Chen \(2004\)](#) reports that neither the trade-off theory nor the pecking order theory derived for the western settings provides a satisfactory explanation for the capital choices of the Chinese PLCs.

[Huang and Song \(2006\)](#) use a data set, which contains the market and accounting data from more than 1200 Chinese PLCs from 1994 to 2003, to document the characteristics of these firms in terms of their capital structures. They report that leverage in a Chinese firm increases with firm size, non-debt tax shields and fixed assets, and decreases with profitability and correlates with industries. In addition, they also find that ownership structure affects firm's leverage. However, different from those in other countries, they show that leverages in the Chinese firms increase with volatility and firms tend to have much lower long-term debt. They conclude that the static trade-off model (rather than the pecking order hypothesis) better explain the features of the capital structure for the Chinese PLCs.

[Li, Yue and Zhao \(2007\)](#) use manufacturing firm-level data in thirty 2-digit SIC industries over the years of 2000 and 2003 to study the capital structure and debt maturity choices of Chinese firms. They present evidence that ownership and governance structures exert strong influences on individual firms' financing decisions. Specifically, leverage increases with state and private ownership, and decreases with foreign ownership. They also show that the ownership structures and institutional environments affect large and small firms differently in the sense that small firms are more likely to be squeezed out of the long-term loan market.

More recently, [Qian, Tian and Wirjanto \(2008\)](#) attempt to validate the findings reported in [Chen \(2004\)](#) and [Huang and Song \(2006\)](#) by using a larger panel-data set that covers more recent periods. In particular, they propose an improved model specification and conduct a rigorous testing of the model based on 650 Chinese PLCs and over a more recent time period (i.e., 1999–2004). They find that firm size, tangibility and ownership structure are positively associated with firm's leverage ratio, while profitability, non-debt tax shields, growth and volatility are negatively related to firm's leverage ratio.

All of the aforementioned studies treat the capital structure in a static framework. However, a firm's decision about its capital structure is inherently dynamic. In this paper, we follow [Flannery and Rangan \(2006\)](#) and others, and formulate a dynamic capital structure model which allows an incomplete adjustment of a firm's debt level in a given time period toward a target level. Unlike [Flannery and Rangan \(2006\)](#), however, we estimate this model as a dynamic panel-data regression using dynamic panel-data generalized methods of moments (DPD-GMM).

There are two main theories motivating much of the empirical research on the determinants of firm-level capital structure. According to the pecking order theory, firms have no specific target of capital structure and today's level of debt is the outcome of a process where an uneven stream of new investment opportunities creates the level of debt. The other competing theory, known as the static trade-off theory, portrays the firm as an organization that is balancing the benefits of interest tax shields against costs of financial distress. As pointed out by [Myers \(1984\)](#), subsequent discussions on the importance of tax shields and bankruptcy costs are only variations in themes. However, finance theory also predicts that firms observe investment opportunities and choose projects that have returns according to the firm's cost of capital. If the capital needed to undertake the investment project exceeds the available internal funds, the firm will borrow or raise equity in the capital market. Whenever the firm needs external capital, it will get access to the capital market and raise the funds necessary to undertake the investment. Following this argument, we should observe the debt levels of previous periods to have some influence on the current period's leverage. Realistically, an instantaneously changing debt structure is not feasible to most firms due to the presence of some type of transaction costs. A likely scenario is a re-capitalization of the firm each time the debt ratio reaches an upper or lower boundary. This argument leads us to assume that a firm's decision about its capital structure is inherently dynamic. Therefore, it is important to allow for an incomplete adjustment of the firm's capital structure in a model that supposedly explains how the capital structure of a firm evolves over time.

Initially, we use all firms in the panel irrespective of the firm's current leverage ratio relative to its target level over the sample period of 1999–2004. As [Booth, Aivazian, Demircuc-Kunt, and Maksimovic \(2001\)](#) correctly point out, an ownership structure is likely to have an important influence on capital structure choices of firms as it can affect agency incentives. In particular, in the context of the Chinese PLCs, it would be of interest to assemble evidence on the difference (if any) in the capital structure choices between the companies with differing state shareholdings. In addition we also allow for industry effects to be correlated with the capital structure decisions and include both unobserved cross-sectional effect and time effect into the model. Third and most importantly, we propose a target capital structure model to assess whether and to what extent the Chinese PLCs optimize the level of their capital structures during the transitional period. We estimate this model as a dynamic panel-data regression using dynamic panel-data generalized methods of moments (DPD-GMM) proposed by [Arellano and Bond \(1998\)](#).

Several extensions to the basic model are subsequently considered in this paper. Firstly, firms with leverage ratios at the optimal levels in a given year are unlikely to rebalance their capital structures and adjust them toward the target levels. Ignoring this

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