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Do firms have leverage targets? New evidence from mergers and acquisitions in China

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ABSTRACT

We provide new and consistent evidence supporting the trade-off theory using China's mergers and acquisitions (M&A) deals between 2000 and 2015 as a sample. We show that acquirers do have leverage targets and they adjust their leverage ratios toward an optimal level at which the cost and benefit of the debt are equal. In examining the leverage adjustment speed during the post-acquisition period, we find that acquirers partially adjust their leverage ratios to the optimal levels; and the adjustment speed is affected by the adjustment cost proxied by the bankruptcy risk. Finally, we are able to successfully replicate the US evidence which is consistent with the trade-off theory as well using our improved methodology.

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1. Introduction

Do firms have leverage targets? A large number of studies have provided mixed answers to this important question regarding a firm's capital structure. Theoretically, the trade-off theory (Bradley, Jarrell, & Kim, 1984; Myers, 1984; Fischer, Heinkel, & Zechner, 1989) hypothesizes that firms have target leverage ratios and the optimal capital structure level is obtained when firms trade off tax benefits of debt financing against costs of financial distress. Some empirical studies (i.e., Titman & Wessels, 1988; Rajan & Zingales, 1995; Graham, 1996; Hovakimian, Hovakimian, & Tehranian, 2004) find that certain firm characteristics, such as size, growth opportunities, liquidation value of assets, and marginal tax rates are important determinants of leverage ratios. These findings generally support the hypothesis that firms strive to maintain a capital structure target. In contrast, another strand of studies report a negative relation between firm current leverage ratios and past profitability (i.e., Fischer et al., 1989; Shyam-Sunder & Myers, 1999; Strebulaev, 2007), evidence that does not support the trade-off theory. Furthermore, several studies (i.e., Baker & Wurgler, 2002; Welch, 2004) show that changes of leverage ratios are mostly the result of stock performance or firms' attempt to time the stock market.¹

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¹ Other theories to explain firm capital structure include control hypothesis (Jensen, 1986), pecking order hypothesis (Myers, 1984) and market timing theory (Baker & Wurgler, 2002).

As the previous evidence is concentrated on the US market, we turn to another important market – the Chinese market to seek for new insight on this important issue. China has achieved remarkable economic growth since the late 1970s, and it has become the second largest economy in the world. Following [Harford, Klasa, and Walcott \(2009\)](#), we use an important type of corporate event in the Chinese market – mergers and acquisitions (M&A) as a unique setting to investigate whether firms have leverage targets. First, M&A activities in China have grown rapidly driven by the country's economic transformation and development since 2000. The number of domestic deals increases 14-fold from 142 in 2000 to 2226 in 2015 and the total value of domestic deals increases 193 fold from CNY6.98 billion (USD843 million) in 2000 to CNY1358.3 billion (USD210.6 billion) in 2015.² Examining firm capital structure decisions around M&A events can help us obtain important insights. Second, M&A normally involves great changes of a firm's (acquirer) capital structure, which enables us to assess the role of leverage targets in financing decisions ([Harford et al., 2009](#)). Third, the post-acquisition capital structure changes create an ideal setting to analyze whether acquirers adjust their leverage to a certain optimal level, and if they do, the adjustment speed. Fourth, previous studies on China's market have documented several interesting findings that seem to be inconsistent with the traditional capital structure theories. For example, [Liu, Wei, Zhan, and Tai \(2004\)](#) test the pecking order by the sample of Chinese listed firms in Shanghai and Shenzhen Stock Exchanges and report that Chinese firms first choose equity when raising capital, not debt, which is not consistent with the pecking order theory. Therefore, studying the changes of leverage ratios around M&A events in China can shed new light on firms' capital structure decisions.

According to the trade-off theory, firms have leverage targets and they will actively adjust the actual leverage ratios to trend the optimal level. Although there is no direct evidence showing that the main motivation of M&A is to adjust the leverage ratios, previous studies have found that leverage ratio is an important factor when firms make M&A. The null hypothesis of this study is that the acquiring firms take the optimal capital structure into consideration when making M&A decisions. The alternative hypothesis is that firms have no optimal capital structure. If the null hypothesis is true, we expect to observe that when acquiring firms' capital structures deviate from the optimal level before the deals, acquiring firms will use M&A to make an adjustment. When the adjustment is under- or overly corrected subsequent to the M&A, acquirers will continue to change their capital structure during the post-acquisitions until the leverage ratios converge to the optimal level in the long-run. If this hypothesis holds, the results support the trade-off theory. Therefore, the acquiring firms' leverage ratio deviations i.e. the extent to which the actual leverage ratios is different from the optimal leverage ratios, become a key measure to test the trade-off theory in this study.

We measure a firm's leverage ratio deviation as the difference between the predicted leverage and its actual leverage, whereas the predicted leverage is estimated using a tobit regression model as in [Kayhan and Titman \(2007\)](#) and [Harford et al. \(2009\)](#). However, an important improvement of our estimation method is that we separate the "estimation window" from the "event window" when conducting the cross-sectional regression model to predict firm optimal level of leverage. M&A is considered an important corporate event, thus the features of capital structures after M&A are expected to be quite different from those before M&A. As discussed by [MacKinlay \(1997\)](#), the event period itself should not be included in the estimation period to prevent the event from contaminating "the parameter of the normal return model."³ Previous studies (i.e. [Baker & Wurgler, 2002](#); [Harford et al., 2009](#); [Morellec & Zhdanov, 2008](#)) estimate the predicated leverage ratios using in-sample models, which could cause an issue by mixing the "estimation window" and the "event window". In contrast, we use an out-of-sample regression to estimate the optimal leverage ratios. We consider the improvement of the estimation method one of our important contributions to the literature. Such an improvement in the methodology makes our empirical results strong and consistent with the trade-off theory, as we will further discuss below.

We obtain 257 M&A deals from 2000 to 2015 in the Chinese market as our main sample to investigate the effect of M&A on firm capital structure decisions. When constructing our sample, we exclude firms engaging in two or more successive acquisitions in the estimate window for a couple of reasons. First, for these "repeat" acquirers, the effect of an acquisition on their capital structure could be offset by another one. This becomes particularly an important issue when different payment methods are used. Second, as the purpose of our study is to examine the effect of M&A on firm capital structure, not to test how M&A affects firm growth or financial performance, the exclusion of "repeat" acquirers should not bias our sample. In contrast, previous studies (i.e., [Ghosh & Jain, 2000](#); [Morellec & Zhdanov, 2008](#)) do not adopt this filter when constructing the sample, which might cause issues in their results.

We first conduct a cross-sectional regression on the determinants of firm leverage ratios using $[-4, -1]$ (half year for each period, with a total of 2 years) as the estimation window where leverage ratios are defined as total liabilities over total assets, both measured at book value. The regression results are then applied to the event window $[0, +4]$ (half year for each period) to estimate the predicted optimal leverage ratios. The leverage ratio deviation is defined as a firm's actual leverage ratio minus its predicted leverage level. Following [Harford et al. \(2009\)](#), we estimate the M&A-induced leverage change as the leverage deviation change from period -1 to 0 around the acquisition event. Based on whether a firm's M&A-induced

² Counted in number, the top 3 M&A industries in 2015 are information technology, Internet, and finance; while counted in deal value, the top 3 M&A industries become Internet, real estate, and finance. China Securities Regulatory Commission (CSRC), equivalent to the U.S. Securities and Exchange Commission (SEC) has issued several policies and administration procedures on the M&A activities of listed companies in Shanghai Stock Exchange and Shenzhen Stock Exchange. While some of the large M&As will have to undergo a long and in-depth filing and approval process, the CSRC has been making efforts to simplify the process.

³ "Including the event window in the estimation of the normal model parameters could lead to the event returns having a large influence on the normal return measure" ([MacKinlay, 1997](#), p20).

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