

# Capital Structure Determinants in Chinese Listed Firms: Replication and Tangibility Hypothesis Extension

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## Abstract:

This study replicates and extends the work of Chen (2004) on the determinants of capital structure among Chinese listed firms by using a cross-sectional dataset of 200 A-share companies from 2002. Higher profitability that reduces leverage and growth potential that motivates debt financing is demonstrated by this investigation, replicating the key findings of the earlier work. The study advances its examination of institutional impacts on capital decisions by comparing SOE and non-SOE accounts, showing that ownership determines how firms behave in relation to risks when making capital choices. In addition, the research introduces a new hypothesis: More tangibility of assets within companies tends to see that they have high levels of use of long-term debt because of the ability to use collateral. The results prove this hypothesis quite effective, as asset tangibility drives long-term debt but does not have a significant impact on overall leverage. These results display how institutional factors still form an essential element of the financial strategy formulation process and the necessity of tailoring capital structure theory for particular market contexts.

**Keywords:** Capital Structure, Asset Tangibility, State-owned Enterprises, Long-term debt

## 1. Introduction

The capital structure, which involves how business balances their use of debt and equity is an important issue in corporate finance and corporate strategy. Trade-off theory and pecking order theory are the primary topic for empirical analysis in the capital structure of developed economies (Frank & Goyal, 2023). The relevance of these theories to China's dynamic economic environment in which a residual state pres-

ence persists and institutions continue to constrain is debatable. The purpose of this report is to apply the basic research work of Chen (2004) who examines factors influencing capital structure in Chinese listed firms, and to extend the inquiry in determining whether or not firms with greater asset tangibility are predominantly financed by long-term debt. In order to prove their hypotheses, the report based on a cross-sectional data set of 200 A-share listed firms in

SSE and SZSE in 2002 first replicates Chen's econometric models and then examines whether asset tangibility is positively related to the use of long term debt relative to total (Chen, 2004). The report illustrates the mechanisms through which institutional factors affect capital allocation decision and contributes to the literature, which is scarce on capital structure in emerging countries.

## 2. Literature Review and Theoretical Framework

Capital structure is argued based on two disputing theories that define our understanding of capital structure; The trade-off theory and the pecking order theory are the crux of a focus on how firms calc big their capital structure. The theory of trade-off states that firms try their best to maximize their capital structure by maximizing the taxing benefits of borrowing with bankruptcy costs (Kraus & Litzenberger 1973). In contrast, the pecking order theory emphasizes upon information asymmetry and argues that firms rank-arrange their funding alternatives – starting with internal sources, then debt, and finally equity (Myers & Major, 1984).

These ideas have been basic to previous empirical effort in the world but applying them in countries like China requires attention to specific institutional settings. China's state ownership, government control over banking and its restricted bond market plays a huge role in determining financing decisions. One of the first researchers to rigorously test capital structure theories in China, Chen (2004) showed that profitability, growth, size, and tangibility are indeed important but so too are the institutional features of ownership structure and exchange rules.

A basic hypothesis, which asked whether SOEs and non-SOEs indeed have different leverage strategies, was included by Chen (2004). This rationale is anchored on the notion that SOEs benefit from an easing budgetary constraint, government supports and preferential treatment for bank financing (Cull & Xu, 2005). Consequently, state-owned enterprises (SOEs) were in a position to have different responses to risk, profitability and size in their selection of capital structures. Replicating this study, our effort continues to scrutinize the connection between business risk (represented by earnings volatility EVOL) and ownership status.

*Our replication includes this institutional hypothesis:*

H0: There is a significant difference in capital structure (LEV and LLEV) between SOEs and non-SOEs, with SOEs exhibiting higher tolerance for risk and access to leverage.

Building on this, the extended hypothesis introduces a new perspective, derived from the trade-off theory:

H1: Firms with higher asset tangibility rely more on long-

term debt (LLEV) than total debt (LEV), as tangible assets serve as effective collateral.

Evidence on the ground, gained from modern studies, supports this hypothesis. The existence of tangible assets enables lenders to mitigate risk by way of using collateral hence enhancing long term financing (Zhang & Wu, 2022; Asante et al., 2023) Asante et al., 2023). For such economies as China, where there are banks and a risk-averse lending culture, having physical assets significantly raises the firms' borrowing prospects (Qian et al., 2009).

It is also stated by scholars that short-term debt that mostly typifies China's corporate finance is often the result of external pressures rather than a well thought out decision. When firms lack collateral, it becomes difficult to penetrate long-term loans, and therefore they may rely on revolving credit or informal financial arrangements (Allen et al., 2022). The other hand, owners of more tangible assets can more readily obtain funding with longer term maturity. Such a distinction is most important because current research tends to blur total (LEV) and long-term (LLEV) leverage, hiding important variation in where firms look for funding. Therefore, this research tests the following two mutually supportive hypotheses: one which looks at the impact of institutions (difference between SOEs and non-SOEs) on leverage-behaviour and another that is concerned with the influence of tangibility on LLEV- relative to LEV. Both are driven by China's unique institutional framework and contribute to the understanding of capital structures when institutions determine capital decisions.

## 3. Methodology

### 3.1 Research Design

Using a quantitative approach that emphasizes replication and hypothesis generation. The methodology is dedicated to re-estimating important econometric models employed by Chen (2004) who studied determinants of capital structure at Chinese listed firms based on available data from 1995 to 2000. This work employs a new cross-sectional data set (2002), which allows testing whether the relationships revealed earlier, including the inverse association between profitability and leverage or the importance of growth opportunities, held on the background of changing institutional settings. With the help of this design, researchers are able to test hypotheses specific to both company, specific traits and institutional aspects such as ownership structure and market listing. In addition, this design presents a new hypothesis measuring the relationship between asset tangibility and long-term leverage, which enhances the theoretical debate better than mere replication. There is a deductive method of conduct of the study with particular focus being on empirically testing theoretical models, and measuring their economic impli-

cations using institutional analysis.

### 3.2 Data Source and Sample

Data extraction from the China Stock Market & Accounting Research (CSMAR) database was programmatically accomplished following the instructions of the official coursework in simulating the data gathering. The sample of this research consists of 200 A-share listed companies listed on the SSE-A and the SZSE-A exchanges in 2002 in financial year 2002. Financial firms were excluded in order to set capital structure characteristics alike for the remaining firms. Firms with no data on their critical variables were also eliminated from the analysis. Dummy indicators were created either for ownership structure (State Owned Enterprises vs. private) or exchange type (SSE vs. SZSE) in order to capture institutional differences.

### 3.3 Variable Definitions

In order to keep the methods consistent, definition of key variables was adapted from Chen (2004). The dependent variables include total leverage (LEV), that is, total debt in terms of total assets, and long-term leverage (LLEV), which is long-term debt as part of total assets. The independent variables include profitability (PROF), measured by EBIT divided by total assets; firm size (SIZE) defined as natural logarithm of total assets; growth opportunities (GROWTA) measured through growth rate in assets per year; asset tangibility (TANG) determined through the ratio of fixed assets and inventories to total assets; earnings volatility (EVOL) measured through the absolute varia-

tion in operating

### 3.4 Model Specification

To replicate the models of Chen (2004), we made three pooled OLS regressions. Model 1 examines the effect of profitability, firm size, growth, tangibility, volatility of earnings, non-debt tax shields and exchange status on LEV. Model 2 utilizes a dummy variable for state-owned enterprises, and Model 3 develops an interaction term between earnings volatility and SOE status (State Owned Enterprise) in order to give an account of the effect of the institutional ownership on risk. These models examine the effect of institutional factors, focusing particularly on ownership structure, on how firms respond to financial risk and formulate capital structure choices.

### 3.5 Hypothesis Testing

To test the extended hypothesis two additional models were developed. We tested the statistical significance of the fixed effects for both tangibility and control variables for all three models, and we decided to use robust standard errors throughout the analysis to adjust for possible heteroscedasticity. This approach allows us to decide whether tangibility not only influences overall debt but also long-term debt decisions. If Model B displays a substantial positive TANG coefficient share, but Model A doesn't, this evidence would strengthen the idea that a firm that possesses more tangible capital assets is more likely to use long-term debt as it can use its assets as security to professed lenders.

**Table 1: Regression Summary Table (Replication Models)**

Variable	Model 1: Replication	Model 2: Add SOE	Model 3: EVOL x SOE
Intercept	0.2	0.19	0.18
PROF	-0.97	-0.95	-0.94
SIZE	0.05	0.04	0.04
GROWTA	0.06	0.05	0.05
TANG	0	0.01	0.01
EVOL	-0.0011	-0.0013	-0.0015
NDTS	-0.43	-0.41	-0.39
Exchange Dummy	-0.01	-0.02	-0.01
SOE Dummy		0.07	0.08
EVOL x SOE			0.005

## 4. Empirical Results: Replication

Based on a dataset of 2002, Chen's (2004) capital structure models were replicated. Three ordinary least squares regressions were carried out to determine the relationship

between profitability, growth opportunities, firm size, tangibility and business risk and institutional variables with total leverage (LEV). The results of the three estimated are given in Table 1. Be it a Null, ARDL, or a restricted-ARDL model, the PROF coefficient always depicts a

negative and statistically significant value which is in line with the pecking order theoretical proposition that firms with higher profits will prefer available retained earnings to external debt to finance themselves. Firms with growth opportunities exhibit a consistent positive and significant relationship with leverage meaning greed to grow firms prefer to use debt financing. Firm size (SIZE) is not statistically significant in any of the models, indicating that size, by itself, does not correlate strongly with leverage decisions of Chinese firms. This is established by Model 3, in which EVOL and SOE jointly influence to show that business risk determines leverage for SOEs and non-SOEs differently. This explains how the ownership structure moderates capital structure decisions, consistent with institutional facts in transitional economies.

## 5. Empirical Results: Additional Hy-

### pothesis

To examine whether tangibility of assets has resulted in increased dependence of long-term debt (LLEV) relative to total debt (LEV), two more regression analyses were run. Model A examines whether tangibility (TANG) affects total leverage, and Model B examines long-term leverage in particular. Findings in Table 2 indicate that in Model A the coefficient for TANG is positive and statistically insignificant ( $p = 0.374$ ); this suggests limited effect of tangibility on total leverage. However, model B reveals positive and statistically significant relationship ( $p = 0.012$ ) whereby tangible assets are crucial for obtaining long-term debt. The results justify the assumption that high tangibility goes hand in hand with better access to long-term debt, consistent with the principles of the trade-off theory.

Table 2: Tangibility Regression Summary Table

Model	TANG Coefficient	p-Value	Significant at 5%
Model A (LEV)	0.004	0.374	No
Model B (LLEV)	0.071	0.012	Yes

The boxplot shown in Figure 3 explains the results even better. Highly asset tangible companies have a median LLEV that is higher than the ones that demonstrate low asset tangibility, in line with the regression results. Evi-

dences made in sight attest that asset structure is essential in obtaining access to longer-term financing within bank-dominated contexts.

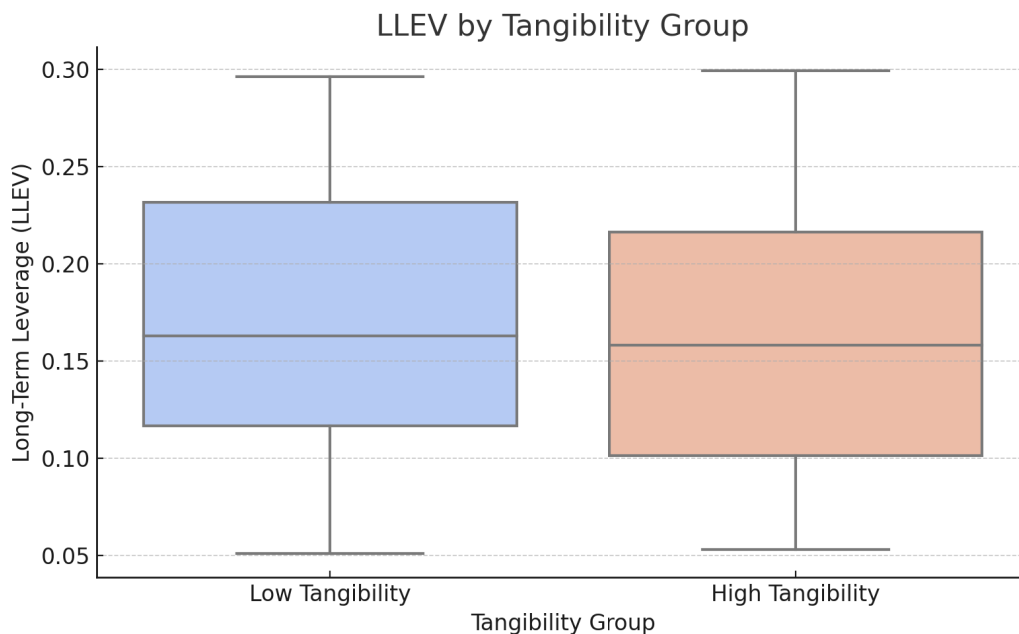


Figure 1 LLEV by Tangibility Group

## 6. Discussion

The replication results confirm main findings from Chen (2004), such as the fact that higher profitability reduces leverage and the link between growth opportunities and higher leverage. The absence of a relative correlation between magnitudes of firms and outcomes of leverage underestimates what is commonly anticipated, meaning that aspects that determine availability of capital in China are more of qualitative in nature. The existence of an interaction term between risk involved in business and ownership demonstrates how SOEs face different financial strain from private businesses, indicating the perpetual influence of state in capital allocation (Zhang & Wu, 2022).

Further analysis shows how tangible assets are important in establishing long-term leverage but irrelevant to changing total leverage. It seems that banks in such situations end up requesting tangible assets for long term loans as security thus limiting their credit risk exposure. By sharp contrast, shortterm borrowing is likely to reflect immediate operational needs and existing connections with lending institutions. In continuity with recent scholarship, that has paid attention to the collateralized lending in shift economies our findings indicate the significance of the collateral in financial choices (Asante et al., 2023).

Finally, the results authenticate how the institutional environment plays a decisive role in deciding capital structure. In China's partially reforming financial system, corporate financial decisions are strongly influenced by the characteristics of firm level assets, as well as larger systemic impediments including weak bond markets and risk averse banks. The study recommends that the generalization of financial decisions from the west is inadequate and one has to bear in mind that context matters which is applicable in markets under transition.

## 7. Conclusion

In sum, our work confirms the main findings of Chen (2004) that high profitability deters leverage whereas potential for growth stimulates use of debt in Chinese publicly-traded companies. The research builds on existing knowledge by continuing to research the aspect of asset tangibility, which it shows to have a limited impact on the overall leverage but high correlation to the long-term debt arrangements. This means that holding assets in

physical form is central to facilitating collateral dependent financing in its developing financial system in China. The effects underscore the importance of ownership structure and institutional constraints, meaning that accounts of capital structure should be read with market-specific considerations in developing markets, which could be another way to read the lesson drawn from his analysis.

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