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THE CHOICE BETWEEN THE FORMAL AND RELATIONAL FINANCING IN CHINESE FAMILY FIRMS

***Abstract:** This paper mainly discusses the owner-managers' choice between the formal and relational financing in Chinese family firms. In order to seek some kind of rent resulting from moral hazard and limited liability, the owner-managers of family firms have the incentive to adopt appropriate financing mode. Our theoretical analyses show that under some conditions it is indifferent for the owner-manager to choose the formal financing contract or the relational financing contract, while under other conditions it is optimal for the owner-manager to choose the formal financing contract or to choose the relational financing contract.*

***Key words:** Formal Financing, Relational Financing, Moral Hazard, Family firm.*

JEL Classification: G32, L20, M21

1. Introduction

China's private-owned enterprises, especially family firms, play an important role in promoting China's economic performance (Whyte, 1995; Anderson et al., 2003; Allen et al., 2005). But during China's transition from the planning track to the market track, there exist a lot of inevitable institutional problems, such as a lack of effective capital market, which constitute great obstacles to the further development of family firms. Family firms eagerly need financial support when they grow big, while the formal financing is limited to them. So, there are many family firms which have to resort to informal finance, especially seek the relation-based family circle for help, which is called the relational financing in this paper. Therefore, the family firms' owner-managers (also called "insiders" or

“borrowers”) faces the choice between the formal and relational financing provided by different types of investors (also called “outsiders” or “lenders”). How to make this choice is an important question that should be answered for family firms. In order to seek some kind of rent resulting from moral hazard and limited liability, the owner-managers will try their best to adopt appropriate financing mode.

According to Tirole (2006), there are several strands of theoretical literature on the microeconomics of corporate finance. Only the first strand in Tirole’s (2006) sense is related to our paper. This strand focuses on the incentives of the owner-managers. The investors (also called “outsiders” or “lenders”) are in a principal-agent relationship with the owner-managers (also called “insiders” or “borrowers”). Informational asymmetries in this relationship can lead to many kinds of agency problems, such as the well-known adverse selection and moral hazard. Just as Tirole (2006, p.2) points out, “Financial contracting in this stream of literature is then the design of an incentive scheme for the insiders that best aligns the two parties. The outsiders are viewed as passive cash collectors, who only check that the financial contract will allow them to recoup on average an adequate rate of return on their initial investment. Because outsiders do not interfere in management, the split of returns among them (the outsiders’ return is defined as a residual, once insiders’ compensation is subtracted from profit) is irrelevant.”

In order to reduce the degree of the owner-manager’s moral hazard, there are many instrumental schemes that have been designed in the existing literature. Innes (1990) examines the single-period financing model, in which the borrower exerts hidden effort after he receives financing from the investor. Bolton and Scharfstein (1990) and Hart and Moore (1998) consider the financing model where the borrower’s effort is observable but profits are unobservable and non-verifiable. Lawarree and Van Audenrode (1996) study the financing model with hidden effort, unobservable output, and some kind of adverse selection. Holmstrom and Tirole (1997) explore the financing model where both the borrower and the investor are capital-constrained. Povel and Raith (2004) examine the financing model where investments are unobservable and profits are non-contractible. Dang (2010) focuses on the two-period financing model with hidden effort, unobservable profits and endogenous costs of effort. However, to the best of my knowledge, all the literature neglects the borrower’s the choice between the formal and relational financing. In this paper, we aim to fill this gap in the literature by studying the financing model through an improved principal-agent framework.

As a developing country, China has different national conditions compared to developed countries. For example, in China, smaller firms tend to choose relational

contracts while larger firms tend to adopt formal contracts in the course of their producing, buying and selling, and there are many factors that affect firms' contracting decisions (Hu and Qiu, 2010). If we extend this thinking from the real economy to the fictitious economy, then what conclusion can draw from our analyses? We find a number of variables which are important for Chinese family firms' financing decisions, and some of them are greatly neglected by the existing literature. This constitutes one of this paper's contributions.

The rest of the paper is organized as follows. Section 2 is the basic setup. Section 3 provides the model of the formal financing contract. Section 4 offers the model of the relational financing contract. Section 5 conducts a comparative analysis of the two different models. Some concluding remarks are made in Section 6.

2. The Basic Setup

In this section, we follow Innes (1990) and Laffont and Martimort's (2002) analytical framework. A credit-constrained family firm needs a amount of I to finance its project. The project is subject to moral hazard. If the owner-manager exerts effort level $e \in \{0,1\}$, the firm's added-value will be \bar{V} with probability $\pi(e)$, and \underline{V} with probability $1-\pi(e)$, where $0 \leq \pi(e) \leq 1$. $\pi(e)$ and $1-\pi(e)$ can be seen as success and failure probabilities, respectively. When the family firm's performance is good, the investor can get a compensation \bar{z} ; however, when the family firm's performance is bad, the investor can only get a compensation \underline{z} . The owner-manager is protected by limited liability. That is to say, $\bar{V} - \bar{z} \geq 0$, $\underline{V} - \underline{z} \geq 0$. It is Sappington (1983) and Innes (1990) who introduce the concept of limited liability into financing models. When the owner-manager "exerts effort" ("behaves" or "works"), his effort cost is $\Psi_1 = \Psi > 0$. When the owner-manager "exerts no effort" ("misbehaves" or "shirks"), his effort cost is Ψ_0 , where $0 \leq \Psi_0 < \Psi$. The following mathematical definitions should be noted, $\pi(1) = \pi_1$, $\pi(0) = \pi_0$, $\Delta\pi = \pi_1 - \pi_0 > 0$, $\Delta V = \bar{V} - \underline{V} > 0$.

There are two types of financing modes that the owner of the family firm can choose from, either the formal or relational financing. When the formal financing is adopted, the owner-manager borrows from a legitimate intermediary (e.g., a bank) which is seen as the formal investor in this paper. We use the superscript F to denote the formal financing. Because the financial market environment in China is imperfect, the owner-manager has to endure a institutional cost c^F when he adopts formal financing, where $c^F > 0$. In this case, $\Psi_1 = \Psi_1^F = \Psi > 0$, and $\Psi_0 = \Psi_0^F = 0$, which is similar to the assumptions of the traditional literature.

When the relational financing is adopted, the owner-manager borrows from a informal intermediary (e.g., a family circle) which is seen as the relational investor. We use the superscript R to denote the relational financing. In this case, $\Psi_1 = \Psi_1^R = \Psi > 0$, and $\Psi_0 = \Psi_0^R \geq 0$. The reason why we set $\Psi_0^R \geq 0$ is that there is some kind of spiritual and psychological cost when the relation-based owner-manager shirks. Throughout the paper, for the sake of narrative simplicity, we call Ψ_0^R the uneasiness cost and Ψ the exertion cost.

It is assumed that both the owner-manager of the family firm and the investor are risk-neutral. For both the formal and relational investors, there are many potential borrowers who are credit-constrained. That is to say, we should have in mind that several prospective borrowers compete for borrowing from the formal investor or the relational investor, which can be supported by real-life evidences in China. Empirical findings show that private Chinese firms (including family firms) are seriously credit-constrained while state-owned and firms and foreign-owned firms in China are not (Poncet et al., 2010).

The timing of the principal-agent game is as follows.

- (1) At $t=1$, the formal investor or the relational investor offers a take-it-or-leave-it financing contract $\{(I; \underline{z}, \bar{z})\}$ to the owner-manager.
- (2) At $t=2$, the owner-manager chooses between the formal financing contract and the relational financing contract.
- (3) At $t=3$, the investor chooses whether to incentive the owner-manager or not.
- (4) At $t=4$, the owner-manager chooses an effort, which is 1 or 0.
- (5) At $t=5$, the firm's added-value is realized.

(6) At $t=6$, the signed contract is enforced.

3. Formal Financing Contract

When it is under the formal financing contract, the formal investor's programming problem will be:

$$\max_{\{\underline{z}, \bar{z}\}} \pi_1 \bar{z} + (1 - \pi_1) \underline{z} - I$$

$$\begin{aligned} s.t. \quad & \pi_1 (\bar{V} - \bar{z}) + (1 - \pi_1) (\underline{V} - \underline{z}) - \Psi - c^F \\ & \geq \pi_0 (\bar{V} - \bar{z}) + (1 - \pi_0) (\underline{V} - \underline{z}) - c^F \end{aligned} \quad (1)$$

$$\pi_1 (\bar{V} - \bar{z}) + (1 - \pi_1) (\underline{V} - \underline{z}) - \Psi - c^F \geq 0 \quad (2)$$

$$\underline{V} - \underline{z} \geq 0 \quad (3)$$

(1), (2), and (3) are the owner-manager's incentive compatibility, participation, and limited liability constraints under the formal financing contract, respectively.

According to the standard incentive theory, it is easy for us to find that constraint

(3) is binding and that constraint (1) is binding when $\Psi \geq \frac{\Delta \pi c^F}{\pi_0}$, and that

constraint (2) is binding when $\Psi < \frac{\Delta \pi c^F}{\pi_0}$.

Solving this programming problem, we obtain:

$$\text{If } \Psi \geq \frac{\Delta \pi c^F}{\pi_0}, \text{ then}$$

$$\underline{z}^{F*} = \underline{V} \quad (4)$$

$$\bar{z}^{F*} = \bar{V} - \frac{\Psi}{\Delta \pi} \quad (5)$$

$$\text{If } \Psi < \frac{\Delta \pi c^F}{\pi_0}, \text{ then}$$

$$\underline{z}^{F*} = \underline{V} \tag{6}$$

$$\bar{z}^{F*} = \bar{V} - \frac{\Psi + c^F}{\pi_1} \tag{7}$$

The superscript F^* stands for second-best state under the formal financing contract. Throughout the paper, we use the “second-best” in the sense that there is informational asymmetry between the investor and the the owner-manager, which hence can not produce the so-called “first best” outcomes under symmetric information.

(4), (5), (6), and (7) show that there is no rent to the owner-manager when the family firm’s performance is bad, and that there is some kind of rent resulting from moral hazard and limited liability to the owner-manager when the family firm’s performance is good.

If $\Psi \geq \frac{\Delta\pi c^F}{\pi_0}$, then the owner-manager’s equilibrium utility will be:

$$U_o^{F*} = \frac{\pi_1 \Psi}{\Delta\pi} - \Psi - c^F \tag{8}$$

If $\Psi < \frac{\Delta\pi c^F}{\pi_0}$, then the owner-manager’s equilibrium utility will be:

$$U_o^{F*} = 0 \tag{9}$$

The subscript O stands for the owner-manager of the family firm throughout the paper.

For the sake of simplicity, we assume that $\Delta\pi\Delta V \geq \max\{\frac{\pi_1\Psi}{\Delta\pi} - c^F, \Psi\}$, which can ensure that the formal investor chooses to incentivize the owner-manager.

Through comparative statics, we can obtain Proposition 1.

Proposition 1: When it is under the formal financing contract,

$$\frac{\partial U_o^{F*}}{\partial \bar{V}} = 0, \quad \frac{\partial U_o^{F*}}{\partial \underline{V}} = 0, \quad \frac{\partial U_o^{F*}}{\partial \pi_1} \leq 0, \quad \frac{\partial U_o^{F*}}{\partial \pi_0} \geq 0, \quad \frac{\partial U_o^{F*}}{\partial c^F} \leq 0, \quad \frac{\partial U_o^{F*}}{\partial \Psi} \leq 0,$$

whether $\Psi \geq \frac{\Delta\pi c^F}{\pi_0}$ or $\Psi < \frac{\Delta\pi c^F}{\pi_0}$.

Proof: When $\Psi \geq \frac{\Delta\pi c^F}{\pi_0}$, then from (8), we obtain:

$$\frac{\partial U_o^{F*}}{\partial \bar{V}} = \frac{\partial U_o^{F*}}{\partial \underline{V}} = 0, \quad \frac{\partial U_o^{F*}}{\partial \pi_1} = -\frac{\pi_0 \Psi}{(\Delta\pi)^2} \leq 0,$$

$$\frac{\partial U_o^{F*}}{\partial \pi_0} = \frac{\pi_0 \pi_1 \Psi}{(\Delta\pi)^2} \geq 0, \quad \frac{\partial U_o^{E*}}{\partial c^F} = -1 < 0, \quad \frac{\partial U_o^{F*}}{\partial \Psi} = -1 < 0.$$

When $\Psi < \frac{\Delta\pi c^F}{\pi_0}$, then from (9), we obtain:

$$\frac{\partial U_o^{F*}}{\partial \bar{V}} = \frac{\partial U_o^{F*}}{\partial \underline{V}} = \frac{\partial U_o^{F*}}{\partial \pi_1} = \frac{\partial U_o^{F*}}{\partial \pi_0} = \frac{\partial U_o^{F*}}{\partial c^F} = \frac{\partial U_o^{F*}}{\partial \Psi} = 0.$$

There are two points about Proposition 1 that should be noted. Firstly, the owner-manager's equilibrium utility is weakly decreasing or non-increasing in the institutional cost under the formal financing contract. Secondly, the owner-manager's equilibrium utility is weakly decreasing or non-increasing in the exertion cost under the formal financing contract.

4. Relational Financing Contract

When it is under the relational financing contract, the relational investor's programming problem will be:

$$\max_{\{(z, \bar{z})\}} \pi_1 \bar{z} + (1 - \pi_1) \underline{z} - I$$

$$s.t. \quad \pi_1 (\bar{V} - \bar{z}) + (1 - \pi_1) (\underline{V} - \underline{z}) - \Psi$$

$$\geq \pi_0 (\bar{V} - \bar{z}) + (1 - \pi_0) (\underline{V} - \underline{z}) - \Psi_0^R \quad (10)$$

$$\pi_1 (\bar{V} - \bar{z}) + (1 - \pi_1) (\underline{V} - \underline{z}) - \Psi \geq 0 \quad (11)$$

$$\underline{V} - \underline{z} \geq 0 \quad (12)$$

(10), (11), and (12) are the owner-manager's incentive compatibility,

participation, and limited liability constraints under the relational financing contract, respectively.

According to the standard incentive theory, it is easy for us to find that constraint (12) is binding and that constraint (10) is binding when $\Psi \geq \frac{\pi_1 \Psi_0^R}{\pi_0}$, and that

constraint (11) is binding when $\Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$.

Solving this programming problem, we obtain:

If $\Psi \geq \frac{\pi_1 \Psi_0^R}{\pi_0}$, then

$$\underline{z}^{R*} = \underline{V} \quad (13)$$

$$\bar{z}^{R*} = \bar{V} - \frac{\Psi - \Psi_0^R}{\Delta\pi} \quad (14)$$

If $\Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$, then

$$\underline{z}^{R*} = \underline{V} \quad (15)$$

$$\bar{z}^{R*} = \bar{V} - \frac{\Psi}{\pi_1} \quad (16)$$

The superscript R^* stands for second-best state under the relational financing contract.

Similar to the case under the formal financing contract, (13), (14), (15), and (16) show that there is no rent to the owner-manager when the family firm's performance is bad, and that there is some kind of rent resulting from moral hazard and limited liability to the owner-manager when the family firm's performance is good.

If $\Psi \geq \frac{\pi_1 \Psi_0^R}{\pi_0}$, then the owner-manager's equilibrium utility will be:

$$U_o^{R*} = \frac{\pi_0 \Psi - \pi_1 \Psi_0^R}{\Delta \pi} \quad (17)$$

If $\Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$, then the owner-manager's equilibrium utility will be:

$$U_o^{R*} = 0 \quad (18)$$

For the sake of simplicity, we assume that $\Delta \pi \Delta V \geq \max\{\Psi - \Psi_0^R, \frac{\Delta \pi \Psi}{\pi_1}\}$,

which can ensure that the relational investor chooses to incentivize the owner-manager.

Through comparative statics, we can obtain Proposition 2.

Proposition 2: When it is under the relational financing contract,

$$\frac{\partial U_o^{R*}}{\partial \bar{V}} = 0, \frac{\partial U_o^{R*}}{\partial \underline{V}} = 0, \frac{\partial U_o^{R*}}{\partial \pi_1} \leq 0, \frac{\partial U_o^{R*}}{\partial \pi_0} \geq 0, \frac{\partial U_o^{R*}}{\partial \Psi} \geq 0, \frac{\partial U_o^{R*}}{\partial \Psi_0^R} < 0, \text{ whether}$$

$$\Psi \geq \frac{\pi_1 \Psi_0^R}{\pi_0} \text{ or } \Psi \leq \frac{\pi_1 \Psi_0^R}{\pi_0}.$$

Proof: When $\Psi \geq \frac{\pi_1 \Psi_0^R}{\pi_0}$, then from (17), we obtain:

$$\frac{\partial U_P^{R*}}{\partial \bar{V}} = \frac{\partial U_P^{R*}}{\partial \underline{V}} = 0, \frac{\partial U_P^{R*}}{\partial \pi_1} = -\frac{\pi_0(\Psi + \Psi_0^R)}{(\Delta \pi)^2} \leq 0,$$

$$\frac{\partial U_o^{R*}}{\partial \pi_0} = \frac{\pi_1(\Psi - \Psi_0^R)}{(\Delta \pi)^2} \geq 0, \frac{\partial U_o^{R*}}{\partial \Psi} = \frac{\pi_0}{\Delta \pi} \geq 0, \frac{\partial U_o^{R*}}{\partial \Psi_0^R} = -\frac{\pi_1}{\Delta \pi} < 0.$$

When $\Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$, then from (18), we obtain:

$$\frac{\partial U_o^{R*}}{\partial \bar{V}} = \frac{\partial U_o^{R*}}{\partial \underline{V}} = \frac{\partial U_o^{R*}}{\partial \pi_1} = \frac{\partial U_o^{R*}}{\partial \pi_0} = \frac{\partial U_o^{R*}}{\partial \Psi} = \frac{\partial U_o^{R*}}{\partial \Psi_0^R} = 0.$$

There are two points about Proposition 2 that should be noted. Firstly, the owner-manager's equilibrium utility is strictly decreasing in the relational cost under the relational financing contract. Secondly, the owner-manager's equilibrium utility is weakly increasing or non-decreasing in the exertion cost under the relational financing contract, which is contrary to the case under the formal financing contract.

5. A Comparative Analysis

In this section, we will conduct a comparative analysis between the outcomes under the formal and relational financing contracts.

By comparison, it is easy for us to obtain the following three propositions.

Proposition 3: When $c^F \geq \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$, then it is indifferent for the

owner-manager to choose the formal financing contract or the relational financing contract; if $\frac{\pi_1 \Psi_0^R}{\pi_0} \leq \Psi < \frac{\Delta \pi c^F}{\pi_0}$ or $\Psi \geq \frac{\Delta \pi c^F}{\pi_0}$, then it is optimal for the

owner-manager to choose the relational financing contract.

Proof: When $c^F \geq \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$, then from (9) and (18), we obtain:

$$U_O^{F*} - U_O^{R*} = 0.$$

When $c^F \geq \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\frac{\pi_1 \Psi_0^R}{\pi_0} \leq \Psi < \frac{\Delta \pi c^F}{\pi_0}$, then from (9) and (17), we

obtain:

$$U_O^{F*} - U_O^{R*} = -\frac{\pi_0 \Psi - \pi_1 \Psi_0^R}{\Delta \pi} \leq 0.$$

When $c^F \geq \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\Psi \geq \frac{\Delta \pi c^F}{\pi_0}$, then from (8) and (17), we obtain:

$$U_o^{F*} - U_o^{R*} = \frac{\pi_1 \Psi}{\Delta \pi} - \Psi - c^F - \frac{\pi_0 \Psi - \pi_1 \Psi_0^R}{\Delta \pi} = -(c^F - \frac{\pi_1 \Psi_0^R}{\Delta \pi}) \leq 0.$$

Throughout the paper, we use the “optimal” in the sense that the owner-manager seeks to maximize his rent resulting from moral hazard and limited liability.

From Proposition 3, we know that when the institutional cost is big enough relative to the uneasiness cost, if the exertion cost is small enough relative to the uneasiness cost, then the owner-manager’s choice is indifferent; and that if the exertion cost is moderate or big enough relative to the uneasiness cost, then the owner-manager tends to choose the relational financing contract.

Proposition 4: When $c^F < \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\Psi < \frac{\Delta \pi c^F}{\pi_0}$, then it is indifferent for the

owner-manager to choose the formal financing contract or the relational financing

contract; if $\frac{\Delta \pi c^F}{\pi_0} \leq \Psi < \frac{\pi_1 \Psi_0^R}{\pi_0}$ or $\Psi \geq \frac{\Delta \pi c^F}{\pi_0}$, then it is optimal for the

owner-manager to choose the formal financing contract.

Proof: When $c^F < \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\Psi < \frac{\Delta \pi c^F}{\pi_0}$, then from (9) and (18), we obtain:

$$U_o^{F*} - U_o^{R*} = 0.$$

When $c^F < \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\frac{\pi_1 \Psi_0^R}{\pi_0} \leq \Psi < \frac{\Delta \pi c^F}{\pi_0}$, then from (8) and (18), we

obtain:

$$U_o^{F*} - U_o^{R*} = \frac{\pi_1 \Psi}{\Delta \pi} - \Psi - c^F \geq 0.$$

When $c^F < \frac{\pi_1 \Psi_0^R}{\Delta \pi}$, if $\Psi \geq \frac{\pi_1 \Psi_0^R}{\pi_0}$, then from (8) and (17), we obtain:

$$U_o^{F*} - U_o^{R*} = \frac{\pi_1 \Psi}{\Delta \pi} - \Psi - c^F - \frac{\pi_0 \Psi - \pi_1 \Psi_0^R}{\Delta \pi} = \frac{\pi_1 \Psi_0^R}{\Delta \pi} - c^F > 0.$$

From Proposition 4, we know that when the institutional cost is small enough

relative to the uneasiness cost, if the exertion cost is also small enough relative to the uneasiness cost, then the owner-manager's choice is indifferent; and that if the exertion cost is moderate or big enough relative to the uneasiness cost, then the owner-manager tends to choose the formal financing contract.

6. Concluding Remarks

In this paper, we mainly discuss the owner-managers' choice between the formal and relational financing in Chinese family firms through an improved principal-agent framework. In order to seek some kind of rent resulting from moral hazard and limited liability, the owner-managers of family firms will try their best to adopt suitable financing mode. Our theoretical analyses show that under some conditions it is indifferent for the owner-manager to choose the formal financing contract or the relational financing contract, while under other conditions it is optimal for the owner-manager to choose the formal financing contract or to choose the relational financing contract. This kind of choice can be seen as arbitrage, which captures the rent difference in the formal and relational financing.

By introducing the conception of the institutional cost under the formal financing contract and the uneasiness cost under the relational financing contract, we can obtain different types of investors and owner-managers. The corresponding mathematical treatment method is greatly different from that of the existing literature, which may be used as a benchmark framework to deal with the similar questions in transition economies in the future.

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