# Legal Difference Regarding Inside Collateral: Tradeoff of Outside Collateral

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## 1 Introduction

Financial law affects economic performance and corporate external finance. It also influences the activities of entrepreneurs, and the investors who finance projects. Many authors report differences in financial law between common and civil law countries. It is well known that weak legal protection for investors leads to credit rationing, a situation in which entrepreneurs cannot find sufficient investment and are therefore unable to set up firms. Collateral is a secured asset that is forfeited to investors should a project fail; thus, investors are more prepared to provide finance when there is collateral than when there is not. Consequently, collateral is one of the devices that alleviate credit rationing. The law concerning collateral differs around the world, especially between common and civil law countries.

We examine the legal differences regarding collateral in common and civil law, and consider the effect of these on the activities of entrepreneurs and investors by using the standard moral hazard model of corporate finance. In this context, we focus on the following characteristics of the laws regarding inside collateral. In civil law, each asset must be individually registered as collateral; it is not possible to register a group of assets as one item of collateral. In order to evaluate the value of the collateral, investors have to evaluate each asset. As a result, the more collateral that is registered and

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is evaluated, the higher the overall cost. Such registration and evaluation costs are variable, although each one is relatively low. On the other hand, in common law all the assets of a firm can be registered as one item of collateral. When collateral is registered in this way, the registration and evaluation cost is fixed, but might be high because of the need to estimate the assets' total value. These differences between common and civil law regarding collateral affect entrepreneurial and investment decisions, especially inside and outside collateral, and determine the extent of credit rationing and set-up business.

We incorporate these characteristics into the standard model of corporate finance, and show the following. In order to obtain the loan, the amount of outside collateral is larger in civil law tradition than common law tradition; as a result, the entrepreneurs in civil law countries tend to suffer more from credit rationing or set-up bussing.

## 2 The model

We adopt a simple model of external financing to analyze the effect of legal difference on the decisions of the entrepreneur and investors. The most of research seems to be based implicitly on the common law tradition, where creditors can acquire all of the value of the project as collection of debt when bankruptcy. The creditors can relatively easily sell the project as a whole and collect their debt. On the other hand, in the civil law tradition the creditors cannot describe the whole project as collateral in the contract, and they can evaluate and register individual asset as collateral.

We first analyze the credit rationing model under the common law and civil law traditions, and then examine the effect of legal difference.

### 2.1 The common law tradition

Following the Tirole's corporate finance model[1], let us consider the debt contract between entrepreneurs and investors with moral hazard. The rep-

[1]See Tirole (2003) and (2006).

resentative entrepreneur (borrower) is risk neutral and borrows a fixed loan $L$ from investors to set up a project. Investors are also risk neutral. The capital market is competitive, and the loan is arranged as long as the investors break even on average.

The state of the project, which is a success or a failure, is observable for the investors, but the substance of the project, which is good or bad, is unobservable. A good project brings a higher probability of success than a bad one ($p > p_b$). A bad project earns private benefit $B$ for the entrepreneur, and this is the source of moral hazard in the model. When a project becomes success and the borrower pays the repayment of loan $R$, and then the borrower gets cash flow of the project $y_s$. This cash flow can be interpreted to include the expected future cash flow of the project as well as the present one. However, when a project becomes failure and bring zero cash flow, in the common law tradition, the creditors can sell or take over the project and receive the cash flow $y_2$. In addition to the future value of the project, the creditors can collect the borrower's own assets (including his house, for example) as outside collateral $C_o$ under default. The value of outside collateral is assumed to be $\beta C_o$ for the borrower, where $\beta > 1$. That is, the transfer of the borrower's asset to the creditors creates social cost or dead-weight loss $(\beta - 1)C_o$[2].

We assume that investors make a take-it-or-leave-it offer to the entrepreneur. In order to prevent the entrepreneur from choosing a bad project, that is, for the prevention of moral hazard, the contract have to satisfy the following condition:

$$\begin{aligned} p(y_s - R) + (1-p)(-\beta C_o) &\geq p_b(y_s - R) + (1-p_b)(-\beta C_o) + B \\ R &\leq y_s + \beta C_o - \frac{B}{\Delta P}, \end{aligned} \tag{1}$$

where $\Delta P$ is defined as $p - p_b$. This condition is called as incentive com-

[2]Bestor (1994) assume a similar assumption of outside collateral and the dead-weight loss.

patibility (IC) condition. The condition indicates that the repayment has a ceiling. Hereafter, we suppose that the IC condition is satisfied; the entrepreneur chooses a good project which has success with the probability $p$.

In common law tradition, at a stage when the borrower and creditor draw up a credit contract, they can set a project itself as collateral. Thus, if the borrower cannot repay the debt, following the contract the creditor can take over the project as collateral and collect partial of the debt. We assume that it is costly to evaluate the project as collateral or the future project value. Investors is assumed to find the future value of the project $y_2$ after they evaluate with fixed costs $\Gamma$. Given this cost, Investors can lend the money to the borrower if their expected return of the loan exceeds the opportunity cost of the loan:

$$pR + (1-p)(y_2 + C_o) - \Gamma \geq (1+\rho)L, \tag{2}$$

where $\rho$ is the risk free rate. We assume that the risk free rate is zero for simplicity, henceforth. We refers this condition individual rationality (IR) condition.

The value of the project is assumed to be perfectly observable for creditors if the creditors evaluate the future project by bearing the evaluation cost. It is profitable for the investors to evaluate the future project $y_2$ if

$$(1-p)y_2 - \Gamma \geq 0. \tag{3}$$

This condition means that the expected value of collateral must be greater than the evaluation cost. To make the evaluation meaningful, both the future project value $y_2$ and evaluation cost $\Gamma$ are satisfied the condition (3).

Given the above conditions, we consider the condition of outside collateral $C_o$ necessary to provide the loan $L$. We can rewrite the IR condition

by using the conditions (1) and (3):

$$(1-p)C_o \geq -p(y_s + \beta C_o - \frac{B}{\Delta P}) + L + \Gamma - (1-p)y_2. \tag{4}$$

The left-hand side means that the expected value of outside collateral for the creditors, and then we can interpret the right-hand side as the necessary value of the expected outside collateral. We denote the right-hand side as $\underline{C}^A$, which is minimum of the expected outside collateral in order to arrange the loan. To make this interesting, we assume that the left-hand side has a positive value, otherwise, outside collateral is not necessary to obtain the loan. Therefore, the entrepreneur with $C_o < \underline{C}^A/(1-p)$ cannot attract the necessary loan to set up the business, and be suffering from credit rationing.

### 2.2 The civil law tradition

Let us consider the situation under the civil law tradition where in order to register as collateral each asset of the firm must be individually registered. It is not possible to register a group of assets, and the project itself is much more impossible as collateral. In order to capture the characteristics of civil law regarding collateral, the investors can observe the value of each asset after spending the evaluation cost: the value of each asset is defined as $v_i$, $i \in \{1, \ldots, n\}$ and the cost of evaluation about each asset is $c_i$, $i \in \{1, \ldots, n\}$. In addition, without loss of generality, we assume that $v_1 = v_2 = \cdots = v_n$ and $c_1 < c_2 < \cdots < c_n$, and that there exists an asset $k$ such as $(1-p)v_k = c_k$. This means that at an asset $k$ marginal benefit of evaluation $(1-p)v_k$ equals to marginal cost $c_k$. Therefore, if the expected value of assets investors can collect when the project fails is greater than the evaluation cost, the investors have an incentive to evaluate the assets. The following condition is satisfied:

$$(1-p)\sum_{i=1}^{k} v_i - \sum_{i=1}^{k} c_i > 0. \tag{5}$$

Given the above evaluation process, the break-even condition for in-

vestors (IR condition) under civil law tradition is

$$pR + (1-p)(\sum_{i=1}^{k} v_i + C_o) - \sum_{i=1}^{k} c_i \geq L. \tag{6}$$

The condition for prevention of the entrepreneur's moral hazard (IC condition) is the same as the condition (1). Simple calculation of jointing (1) and (5) with (6) leads to the condition of the expected value of outside collateral under civil law tradition as well as common law:

$$(1-p)C_o \geq -p(y_s + \beta C_o - \frac{B}{\Delta P}) + L + \sum_{i=1}^{k} c_i - (1-p)\sum_{i=1}^{k} v_i. \tag{7}$$

The right-hand side indicates the expected value of outside collateral necessary for the entrepreneur to attract credit, and is denoted as $\underline{C}^J$. We can interpret this condition as similarly as under the common law tradition; the entrepreneur who is able to pledge only amount of outside collateral $C_o < \underline{C}^J/(1-p)$ is suffering from credit rationing.

### 2.3 Effect of legal difference on outside collateral

Now let us consider the effect of legal difference on outside collateral and the decision of the entrepreneur. The minimum (expected) outside collateral for credit in common and civil law traditions are described as $\underline{C}^A$ and $\underline{C}^J$, respectively. The difference of the amount of the minimum outside collateral is

$$\underline{C}^J - \underline{C}^A = (1-p)(y_2 - \sum_{i=1}^{k} v_i) + (\sum_{i=1}^{k} c_i - \Gamma). \tag{8}$$

The first term of the right-hand side is the difference of the expected value of inside collateral in common law and civil law, and the sign of the first term is positive because $y_2 > \sum_{i=1}^{n} v_i > \sum_{i=1}^{k} v_i$. The second term is the difference of evaluation costs, where one is variable type of cost (in civil law) and the other is fixed type of cost (in common law), and the sign is

uncertain from the assumption in the model.

If the fixed evaluation cost of the project is smaller than the variable evaluation cost of the assets, then the sign of the second term is also positive. On one hand, the aggregate of evaluation cost of each asset seems to require a lot of time and effort because some of the assets in the firm might be special in the business field and it requires specialists in the field for evaluation of such assets. On the other hand, evaluation of the project is also troublesome, but people can evaluate a fair value of it from some accounting information and the specialist in the field can easily evaluate. In such a manner of consideration, we cannot necessarily say that the evaluation cost of the project $\Gamma$ is larger than the aggregate of evaluation cost of each asset $\sum_{i=1}^{k} c_i$. After all, the left-hand side of the condition (8) tends to have a positive value. If so, the required minimum outside collateral in the civil law tradition is larger than that in the common law tradition. We summarize as the following result.

*Result 1: The entrepreneur in civil law has to provide larger amount of outside collateral than in common law as long as the project evaluation cost in common law is not enough large.*

Now we examine the difference of payoff of the entrepreneur in each legal tradition. We use superscript $J$ and $A$ for civil law and common law, respectively. For example, we denote payoff of the entrepreneur (borrower) in civil law and in common law as $U_b^J$ and $U_b^A$, respectively.

By using the IC condition, the payoff of the entrepreneur in the civil law tradition is as follows:

$$\begin{aligned} U_b^J &= p(y_s - R) + (1-p)(-\beta C_o) \\ &\geq p(\frac{B}{\Delta P} + \sum_{i=1}^{k} v_i) - \beta C_o^J, \end{aligned} \tag{9}$$

where $C_o^J$ is the required outside collateral in civil law which satisfy the condition (7). Similarly, the payoff of the entrepreneur in the common law

tradition is as follows:

$$\begin{aligned} U_b^A &= p(y_s - R) + (1-p)(-\beta C_o) \\ &\geq p(\frac{B}{\Delta P} + y_2) - \beta C_o^A, \end{aligned} \tag{10}$$

where $C_o^A$ is the required outside collateral in civil law which satisfy the condition (4). After simple calculation of these condition, we can obtain the difference of the payoffs:

$$U_b^A - U_b^J = p(y_2 - \sum_{i=1}^{k} v_i) + \beta(C_o^J - C_o^A) \tag{11}$$

Again, sign of the first term is positive by the assumption and that of the second term tends to be positive under the above discussion. Therefore, the payoff of the entrepreneur in the common law tradition is likely to be larger than than in the civil law tradition. Additionally, If the required outside collateral is large enough, the payoff of the entrepreneur can have a negative value and she would not start up a business. Such situation tends to be occur in the civil law tradition. The following is the summary

*Result 2: the entrepreneur in the civil law traditon is more likely to give up to start up a business as long as the project evaluation cost in common law is not enough large.*

From the above discussion, we find that there is cost and benefit of outside collateral: benefit is to provide external finance In addition to inside collateral, and cost is to prevent the entrepreneur from starting up a business.

## 3 Concluding remarks

We examine the effect of legal difference between the common law and civil law traditions on the credit contract by using a simple corporate finance model. We find that the required amount of outside collateral in civil law

tends to be larger than that in common law in order to compensate for the value of inside collateral. In addition, we suggest that under a reasonable premise the entrepreneur in civil law who face a larger amount of outside collateral is giving up to start up a business.

## References


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