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How Does Bankruptcy Punishment Impact on Renegotiable Debt Contracts?

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Outline

- Introduction
- The empirical Puzzle
- The model: general structure
- The game resolution: *propositions and programs*
- Simulations and comments

Introduction

Introduction

Bankruptcy, 2 types of efficiency:

- <u>Ex-post efficiency</u>: what is the best bankruptcy design, so that the default firms' value is maximized?

<u>Haugen and Senbet [1978] [1988]</u>: private renegotiations are superior to legal procedures (*bankruptcy costs*).

<u>Bebchuk [1988] [2000]</u>: auctions on default firms are efficient because they reveal information on the firms' value, especially when the creditors' beliefs differ.

Jackson [1986], Baird and Picker [1991], Blazy and Chopard [2005]: deviations from the APR are an efficient way of forcing the optimal solution *(liquidation vs. continuation).*

Intro

Introduction

Bankruptcy, 2 types of efficiency:

 <u>Ex-ante efficiency</u>: strategies taking place before any default include the design of bankruptcy laws (Berkovitch and al. [1998], Cornelli and Felli [1997], Gorton and Kahn [2000], Jappelli, Pagano, and Bianco [2005]).

Intro

Our approach aims at filling the gap between 2 specific types of efficiency:

- Legal efficiency (ex post): the way of resolving default is the cheapest one (cf. internalization of bankcupty costs).
- *Economic efficiency (ex ante)*: the undertaken investment projects are those with the highest expected value.

Introduction

- Bankruptcy procedures have 3 basic functions:
- <u>Coordination</u> avoiding the Common Pool Problem (i.e. the lack of coordination leads to a creditor run)
 - → stay of claims, rules of vote, Court's power of enforcement

Intro

- <u>Production of information</u> providing public information to the various stakeholders (close to Townsend [1979])
 - \rightarrow legal administrators audit the bankrupt firm



- <u>Repression*</u>: splitting the fate of the firm (bad luck) from the manager's one (fault): faulty managers only should be punished.

^(*) French Code n°85-98, 25th of January 1985, Title V, Art. 180 to 182.

Empirical Puzzle

What should happen after default? (the initial intuition)

- If renegotiation costs equal bankruptcy costs:
- faulty managers only should end up in bankruptcy. (so that sanctions can apply)
- If renegotiation costs are lower than bankruptcy costs:
- ⇒ nobody should turn to costly bankruptcy.

(so that bankruptcy costs are internalized)

Empirical data: the French part of the Davydenko & Franks' European database [Journal of Finance, 2007]

- 240 distressed* SMEs on the period 1985-2005
- Exposure at default > €100,000

^(*) Default means 'a delay superior to 90 days' (Basel II criteria)

'Faulty management' covers:

Asset substitution, voluntary excessive risk taking, private abuse of the company's assets, tricky behavior and swindle, accounts falsification and financial fraud.

According to the French legislation (Code n°85-98, 25th Jan. 1985, Title V, Art. 180-182), <u>all these actions are subject to</u> <u>pecuniary sanctions</u> ("*action en comblement de passif*, "*extension de procedure*").

Faulty Management and Default Resolution

Sample : 240 French	Direct	Pure	Renegotiation **•	Total of Defaults	
(1985-2005, 5 banks)	Bankruptcy	Renegotiation	and Bankruptcy	%	Number
Faulty management (subject to legal sanctions) ? **					
(asset subtitution, private benefits, account faisification, voluntary excessive risk taking)					
No	81.5%	90.0%	68.4%	80.8%	194
Yes	18.5%	10.0%	31.6%	19.2%	46
Last firm's rating					
("Banque de France" rating, as collected by the bank itself)					
Unknown	23.5%	17.5%	23.7%	22.5%	54
Group: "Risky"	38.9%	47.5%	36.8%	40.0%	96
Group: "Safe"	37.7%	35.0%	39.5%	37.5%	90
Length of the credit relationship					
< 2 years	25.3%	12.5%	18.4%	22.1%	53
2-5 years	30.3%	32.5%	42.1%	32.5%	78
5-10 years	27.2%	32.5%	15.8%	26.3%	63
10 years +	.17.3%	22.5%	23.7%	19.2%	46

These empirical features suggest that:

- The tradeoff between renegotiation and formal bankruptcy heavily depends on:
- *1. The quality of the information at the time of the default 2. The legal environment of bankruptcy*
- The consequences of this complex tradeoff does not affect *ex-post* strategies only, <u>but may impact on the *ex-*</u> <u>ante decisions too</u>.

2 purposes of the paper:

- Study the <u>tradeoff</u> between private renegotiation and formal bankruptcy under asymmetric information (legal efficiency)
- Study the impact of a change of the legal environment onto investing decisions (economic efficiency), when those decisions stem from the <u>financing conditions</u> (interest rate)

The Model



Game Resolution & Results

THREE EQUILIBRIUMS

- Equilibrium E1: the firm purely undertakes project (j).
- Equilibrium E2: the firm purely undertakes project (j').
- Equilibrium E3: the firm undertakes (j) with prob. (p)

EQUILIBRIUM E1 (project j)

Propositions 1.

• All defaults lead to private agreements: E1 is not only economically efficient, but it ensures legal efficiency too (Haugen and Senbet [1978/88]).

• The stability of E1 **does not depend on the level of legal sanctions.** The legislator is powerless regarding the implementation of the best equilibrium.



E1. Time: t+2

EQUILIBRIUM E1

The debt contract (Bank's program).

- $i_1^* = arg \max E(\Pi^B | i, j)$
- 9 8 7 8 7 8

E1. Time: t u.c. Firms's participation: $E(\Pi|i,j) \ge 0$ Bank's participation: $E(\Pi B | i,j) \ge 1$ Incitation to (E1): $E_i^{\infty} (X|j) + (c+i) \cdot F_{X|j}(i) > E_i^{\infty} (X|j') + (c+i) \cdot F_{X|j'}(i)$

EQUILIBRIUM E2 (project j')

Propositions 2.

• All defaults lead to private agreements: E2, as for E1, is legally efficient (but not economically).

 The enforcement power of the legislator is indirect only. If interest rates take central values, an increase of legal sanctions may avoid the occurrence of E2. In other terms, the legal policy is not independent from the financial environment.



E2. Time: t+2

EQUILIBRIUM E2

The debt contract (Bank's program).

$$i_2^* = \arg \max E(\Pi^B | i, j')$$

 1^{*}_{2}

E2. Time: t

u.c. Firms's participation:
$$E(\Pi|i,j') \ge 0$$

Bank's participation : $E(\Pi^B|i,j') \ge 1$
Incitation to (E2): $s < f_1(i)$

$$c + \frac{E_{i}^{\infty}\left(X|j'\right) - E_{i}^{\infty}\left(X|j\right)}{F_{X|j'}\left(i\right)} + i \cdot \left(1 - \frac{F_{X|j}\left(i\right)}{F_{X|j'}\left(i\right)}\right)$$

EQUILIBRIUM E3 (project j with prob. p)

Renegotiation depends on the bank's beliefs.

Honest Firms $1 + x - R \ge 0 \Leftrightarrow R \le 1 + x$

Tricky Firms $1 + x - R \ge -s \Leftrightarrow R \le 1 + x + s$

E3. Time: t+2

Bank

$$R \ge 1 + x - c + (1 - p(j|x)) \cdot s$$
with
$$p(j|x) = \frac{f(x|j) \cdot p}{f(x|j) \cdot p + f(x|j') \cdot (1 - p)}$$

EQUILIBRIUM E3

Propositions 3.

<u>If the bank is "suspicious" before (R) is disclosed</u>, the bargain is **separating** and the initial project is discovered. Honest firms go to bankruptcy, whereas tricky ones renegotiate (at the highest price). As bankruptcy costs are not fully internalized, **E3a is legally inefficient**.

E3. Time: t+2

• If the bank is "confident" before (R) is disclosed, the bargain is **pooling** and the initial project remains unknown. All firms privately renegotiate. As bankruptcy costs are fully internalized, **E3b is legally efficient**.

EQUILIBRIUM E3

Propositions 4.



Equilibrium E3 is stable provided a unique relation between the legal sanctions and the interest rate prevails.

E3. Time: t+2 In other terms, any change in the legal environment affects the cost of credit and the firms' mixed investment policy.

EQUILIBRIUM E3

The debt contract (Bank's program).

 $i_3^* = arg \max E(\Pi^B | i, p(j|x))$ u.c. Firms's participation: $E(\Pi|i,j,p(j|x)) = E(\Pi|i,j',p(j|x)) \ge 0$ Bank's participation : $E(\Pi^B | i, p(j|x)) \ge 1$ Incitation to (E3): $s = f_2(i,p)$ $E_{i}^{\infty}(X|j') - E_{i}^{\infty}(X|j) + i \cdot \left(F_{X|j'}(i) - F_{X|j}(i)\right)$ $+ c \cdot \left(F_{X|j'}(i) - \int_{S_i} f(x|j) dx \right)$ $F_{X|j'}(i) - \int_{S_i} \frac{f(x|j) \cdot f(x|j')}{p \cdot f(x|i) + (1-p) \cdot f(x|j')} dx$ ·* 1₃

E3. Time: t

> Simulations and Comments

SIMULATIONS: the considered values

- Bankruptcy costs: 5%
- The conditional result (X|j) and (X|j') follows a Gaussian Law.
- Averages: 0.50 (j) and 0.49 (j')
- Standard dev.: 0.04 (j) and 0.14 (j') [curve 1] 0.07 (j) and 0.14 (j') [curve 2] 0.10 (j) and 0.14 (j') [curve 3]

SIMULATIONS: the graphs

$$i^{**} = \arg \max_{i^{*}} \left[E\left(\Pi_{B} | i^{*} = i_{1}^{*}\right); E\left(\Pi_{B} | i^{*} = i_{2}^{*}\right); E\left(\Pi_{B} | i^{*} = i_{3}^{*}\right) \right]$$



SIMULATIONS: the graphs

As legal sanctions are increasing, the interest rate (i) tends to decrease. This result is coherent with Qian and Strahan [2007], whose cross-country analysis confirm that **low interest rates** are related to codes with a **strong creditor protection**.



SIMULATIONS: the graphs

When sanctions are moderate, **the bank accepts some moral hazard** leading to sanctions in case of default: the bank can charge more the firm (**risk premium**). The story changes as the legal environment becomes more severe.



SIMULATIONS: the graphs

There is an optimal level of sanctions (21%, 35%, and 69%) which ensure equilibrium E1, so that both economic and legal efficiencies are preserved: **extreme severity is not needed.**



SIMULATIONS: the graphs

Whereas the rationale behind the implementation of sanctions is to protect creditors against a risk of moral hazard from their debtors, **the firm's profit surprisingly increases with sanctions**.



SIMULATIONS: the graphs

<u>Effect 1 (-)</u>: the firm turns toward a less risky project (σj < σj')
 <u>Effect 2 (-)</u>: the firm pays higher sanctions in case of default.
 BUT...



SIMULATIONS: the graphs

- ...
- <u>Effect 3 (+)</u>: the firm turns to a profitable project (E(X|j) > E(X|j'))
- Effect 4 (+): the firm pays a lower level of interest rate.



SIMULATIONS: the graphs

The effects 3 and 4 overcompensate the effects 1 and 2.



We thank you for your attention.