



THE LEASE-BUY DECISION

From the classical analysis to the
agency theory approach



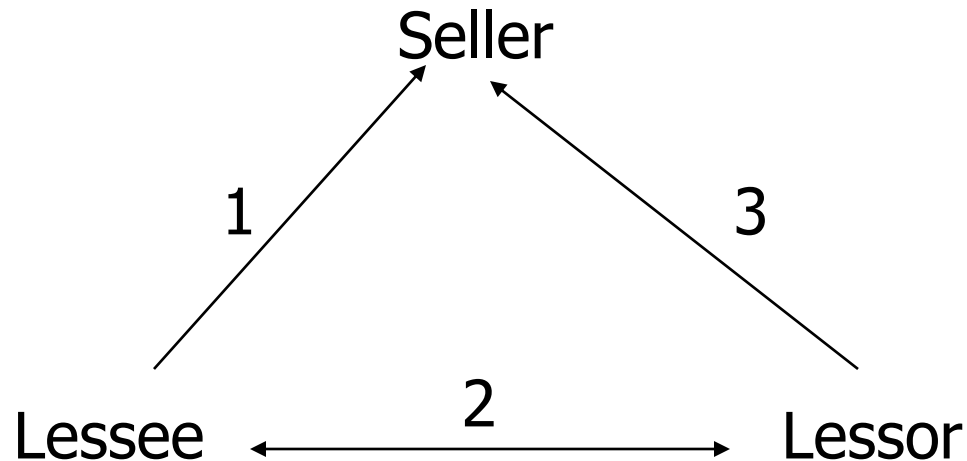
THE LEASE-BUY DECISION

- The classical analysis
- The agency costs of leasing
- The lease-borrow decision and moral hazard



1-THE CLASSICAL ANALYSIS

- The leasing contract





1-THE CLASSICAL ANALYSIS

- Step 1: The lessee specifies the asset's characteristics and chooses the seller
- Step 2: Agreement between the lessee and the lessor; a contract is signed:
 - The lessor is the owner; he has to depreciate the asset
 - Lease payments and the maturity of contract are defined
 - At the end of the contract, the lessee has 3 possibilities (neglected hereafter):
 - Buy the asset for a residual value (fixed initially)
 - Give up to the asset
 - Renegotiate a new contract



1-THE CLASSICAL ANALYSIS

- Step 3: The lessor buys the asset and lend it to the lessee
 - Beginning of the operations



1-THE CLASSICAL ANALYSIS

- What determines the lease market?
 - Determinants of the demand for leasing
 - A quick decision for the lessor (because nearly riskless)
 - A 100% financing solution
 - Lease payments are paid monthly, each semester, ...
 - Leasing doesn't appear in the balance-sheet of the lessee
 - But financial analysts are used to consider leasing as financial debt
 - A last financing solution for risky small and medium-sized firms (think to the lease-back)



1-THE CLASSICAL ANALYSIS

- What determines the lease market?
 - Determinants of the supply of leasing
 - Leasing seems to be riskless
 - Lessor is the owner of the leased asset
 - In fact, $\text{risk} = f(\text{asset specificity})$
 - Many banks have leasing affiliates to increase their market towards risky firms
 - When firms are credit constrained, leasing companies have a strong market power
 - Leasing is a profitable activity



1-THE CLASSICAL ANALYSIS

- The lease-buy decision: a simple model
 - Notations
 - P = the asset price
 - R_t and I_t = debt and interest paid in period t
 - L_t = lease payment in t
 - C_t = extra charges (insurance) in case of leasing
 - D_t = depreciation charges
 - r = borrowing rate of the firm
 - τ = tax rate of the firm



1-THE CLASSICAL ANALYSIS

- The lease-buy decision: a simple model
 - Hypothesis: As in a MM world, investment and financing decisions are separate
 - Rule
 - Compute the NPV of the project as:

$$NPV(L) = P - \sum_t \frac{L_t(1-\tau) + C_t(1-\tau) + \tau D_t}{[1+r(1-\tau)]^t}$$

- If $NPV(L) > 0$, you choose leasing
- If not, you borrow



1-THE CLASSICAL ANALYSIS

- Comments

- The firm has decided to invest. The only problem is to choose financing
- The tax advantage of depreciation must be considered as an extra-cost for leasing
- Note that:

$$NPV(B)=P-\sum_t \frac{R_t+I_t(1-\tau)}{[1+r(1-\tau)]^t}=0$$



1-THE CLASSICAL ANALYSIS

- Comments
 - The rule $NPV(L) > 0$ is equivalent to the rule $NPV(L) > NPV(B)$
 - In this model, the cost of leasing is exogeneous
 - In reality, the cost of leasing should be:
 - Positively linked to the underlying asset specificity
 - Positively linked to credit rationed status of the firm
 - Negatively linked to the value of the underlying asset (which belongs to the lessor)
- It's necessary to enlarge the framework to consider the agency costs of leasing

2-THE AGENCY COSTS OF LEASING

- Main ideas:
 - The previous simple model neglects default risk
 - We focus our attention on the guarantee given to the lessor and its effects
 - All things equal, the value of the lease contract $>$ the value of the bank debt contract
 - Value of lease contract = value of a secured debt
 - Value of a secured debt = value of an unsecured bank debt + value of a guarantee

2-THE AGENCY COSTS OF LEASING



- Main ideas:
 - An unexpected lease decision will depreciate the initial unsecured bank debt of the firm

2-THE AGENCY COSTS OF LEASING

- Example:
 - Consider a firm with the following balance-sheet

T=0

assets	equity
	Bank debt

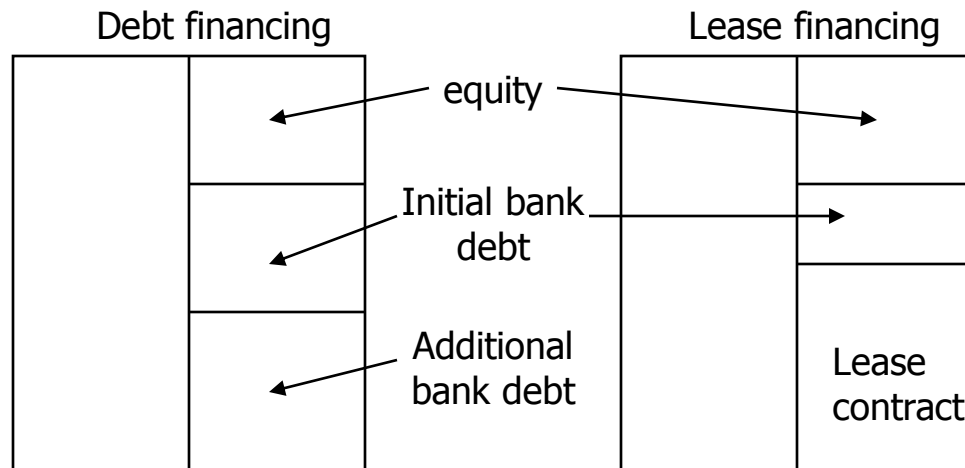
2-THE AGENCY COSTS OF LEASING



- Example:
 - The firm needs to finance an additional asset
 - The firm has the choice between
 - An additional bank debt with the same seniority as the initial bank debt
 - A lease contract

2-THE AGENCY COSTS OF LEASING

- Example: after the firm has invested, following the financing decision, the new balance-sheet (market values) will be:

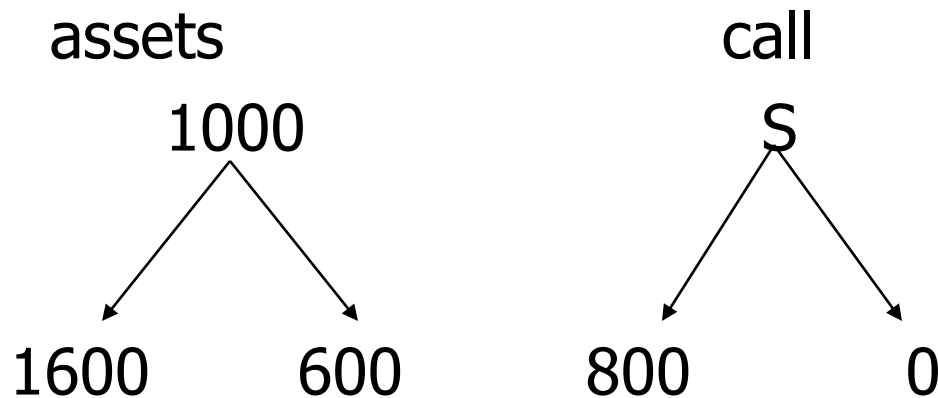


2-THE AGENCY COSTS OF LEASING

- Suppose that the assets value is today 1000 and will be in one period either 1600 or 600 with the same prob.
- Initial bank debt promises a payment of 400 in one period
- Additional bank debt promises the same 400 payment in one period
- Lease contract includes a 300 lease payment in one period and a 100 residual value at the end of the contract; the firm doesn't want to exercise the buy option
 - Note that in both solutions, additional debt and lease contract impose to the firm a 400 value cash-outflow in one period
- Riskless rate is 10%

2-THE AGENCY COSTS OF LEASING

- Shareholders have a call on the assets value and the value of equity can be computed as the call value



2-THE AGENCY COSTS OF LEASING

- Applying Black and Scholes model leads to:
 - $S=363,6$
- Other firm claimants have to share a total value of $1000-363,6=636,4$

2-THE AGENCY COSTS OF LEASING

- The case of leasing
 - In that case, the lessor is the the owner of the underlying asset; the value of the lease contract L is:

$$L = \left[\frac{100}{1+10\%} \right] + \left[\frac{300}{300+400} \right] \left[1000 - 363,6 - \left(\frac{100}{1+10\%} \right) \right] = 324,7$$

2-THE AGENCY COSTS OF LEASING

- Similarly, the value of the initial debt is:

$$D_0 = \left[\frac{400}{300+400} \right] \left[1000 - 363,6 - \left(\frac{100}{1+10\%} \right) \right] = 311,7$$

- Note that the initial debt holder has a claim on the assets but not on the leased asset which belongs to the lessor

2-THE AGENCY COSTS OF LEASING

- The balance-sheet is the following

Lease solution

1000	363,6	Equity
	311,7	Initial debt
	324,7	Lease contract

2-THE AGENCY COSTS OF LEASING

- The case of additional debt
 - That case is very simple because initial and additional debt have the same seniority
 - $D_0 = D_1 = (1/2)[1000 - 363,6] = 318,2$

2-THE AGENCY COSTS OF LEASING

- The balance-sheet is the following

Debt financing		
1000	363,6	equity
	318,2	Initial debt
	318,2	Additional debt

2-THE AGENCY COSTS OF LEASING

■ Summary

- Note that the value of equity is not affected by the lease or borrow decision
- Note that an unexpected lease decision would depreciate the initial debt value by an amount of $318,2 - 311,7 = 6,5$, which corresponds to an increase in the risk premium from 15,7% to 18,3% (+2,6%)

2-THE AGENCY COSTS OF LEASING



■ Summary

- That explains why some bond contracts include covenants that prevent the firm from engaging in lease contracts beyond a certain limit
- Such covenants have a double impact:
 - They limit the risk premium paid by the firm
 - They signal firm's value to the stock market (only good firms can limit their lease financing!)



3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Objective
 - To explain the structures of external financing of firms by analysing the consequences of a leasing decision for:
 - Unsecured creditors
 - shareholders



3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Inventory of the agency costs related to a leasing decision; 3 types of agency costs:
 - Costs linked to the downgrading of unsecured debt
 - Reduction of the agency costs of debt
 - A negative externality: the loss of operating flexibility



3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Costs linked to the downgrading of unsecured debt= $C1$
 - An unanticipated leasing decision leads to a retrogradation in rank of the unsecured creditors in the event of liquidation
 - Unsecured creditors do not have any claim on the leased asset
 - The reduction of the unsecured debt value expresses the extent of the agency cost born by the unsecured creditors
 - Note that these costs are transferred to the firm's shareholders

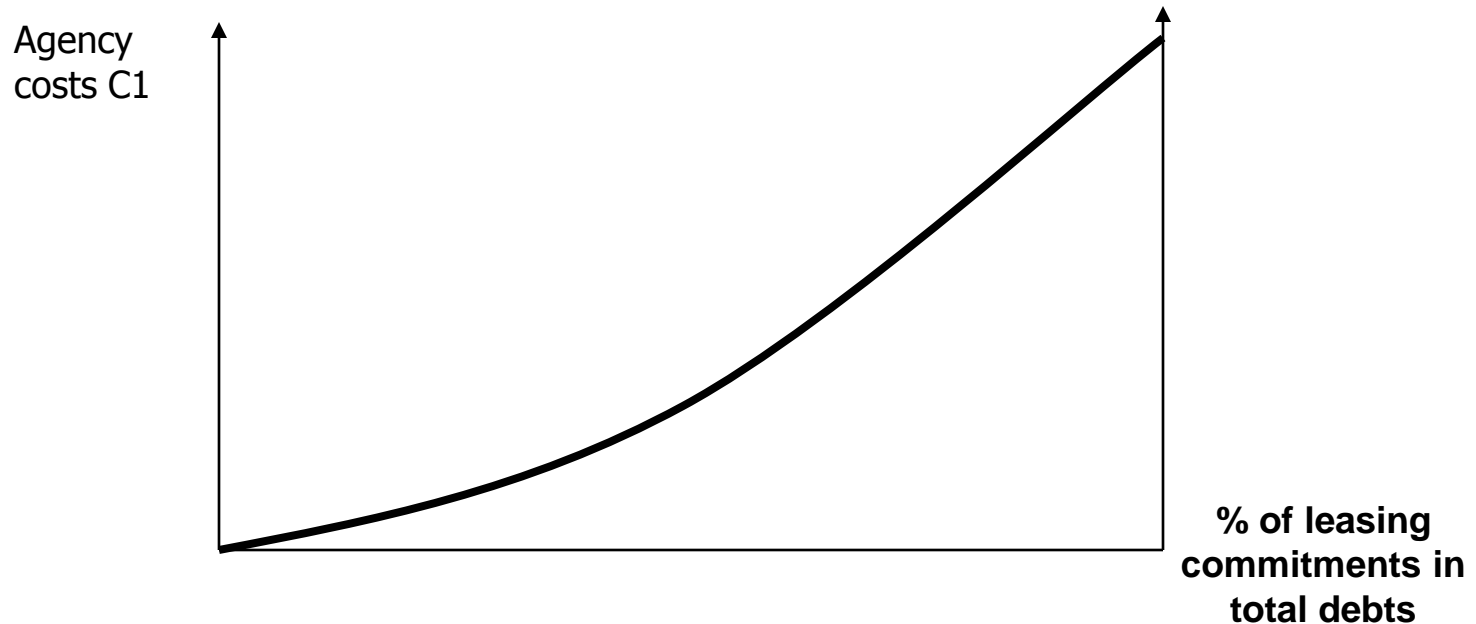


3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Costs linked to the downgrading of unsecured debt= $C1$
 - $C1$ is increasing in the percentage of leasing financing (price effect)

3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Costs linked to the downgrading of unsecured debt= $C1$



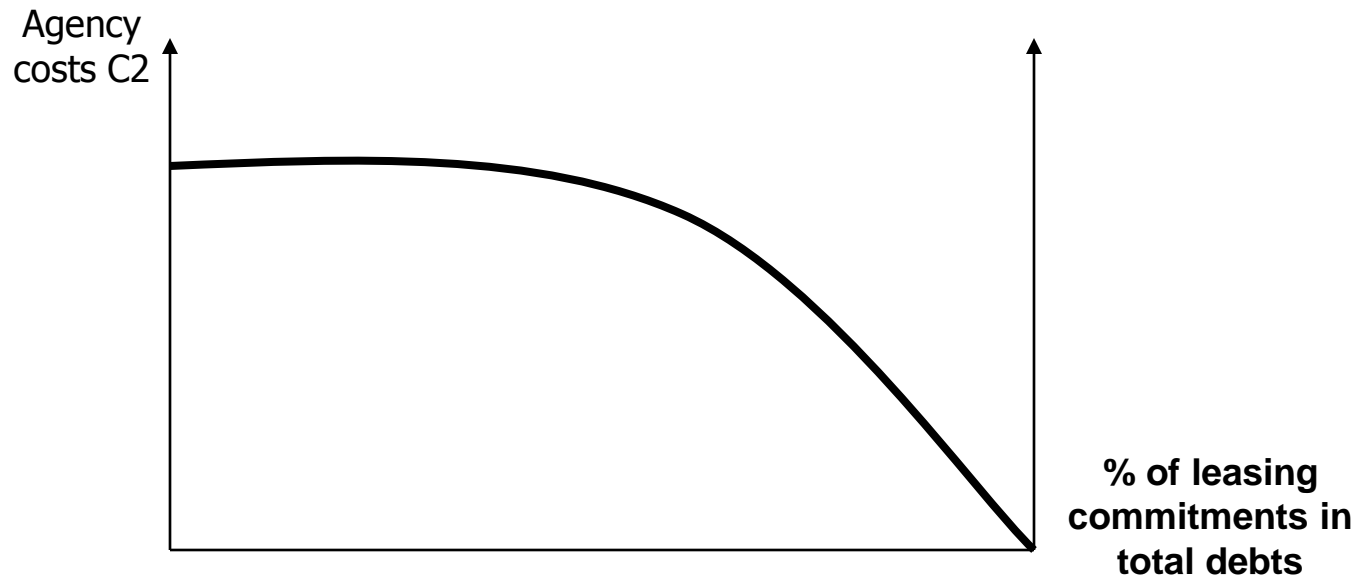


3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Reduction of the agency costs of debt=C2
 - Leasing, by separating use and ownership of the asset, prevents any asset substitution moral hazard
 - Banking debt creates « agency costs »
 - On the contrary, leasing creates « agency gains »
 - Note also that these costs are passed on to the shareholders
 - The agency costs of debt C2 are decreasing with the percentage of leasing in the financial debt

3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Reduction of the agency costs of debt= $C2$



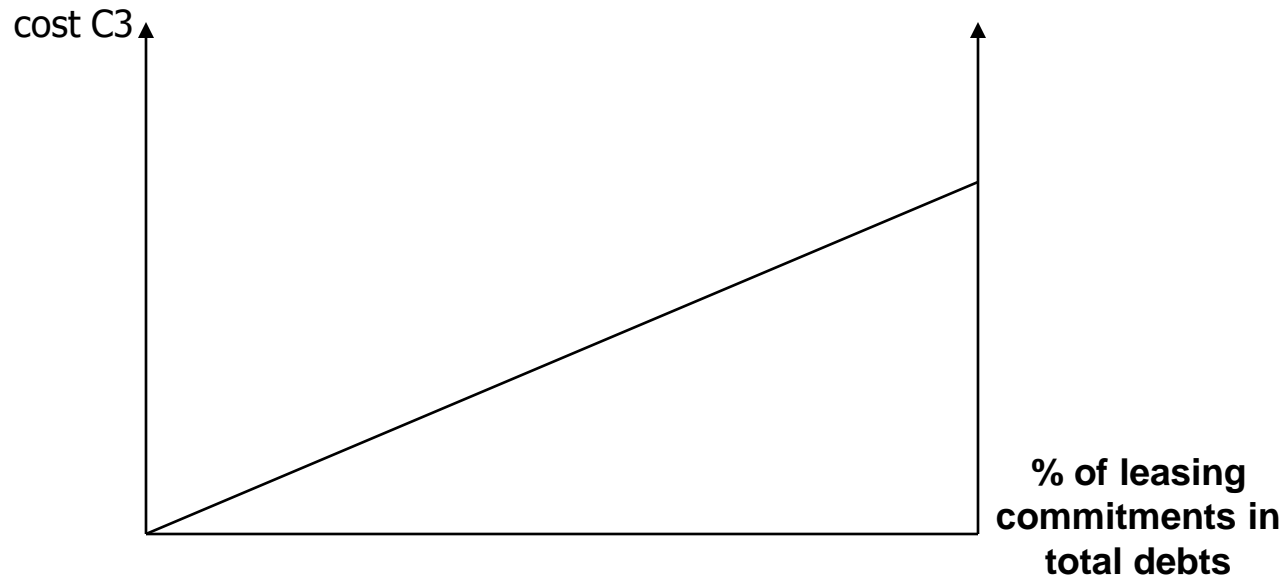


3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- A negative externality: the loss of operating flexibility= $C3$
 - In case of sectorial distress, leasing limits industrial redeployment
 - The higher the percentage of leasing in external financing, the higher the cost $C3$
 - $C3$ is born by the firm's creditors and shareholders

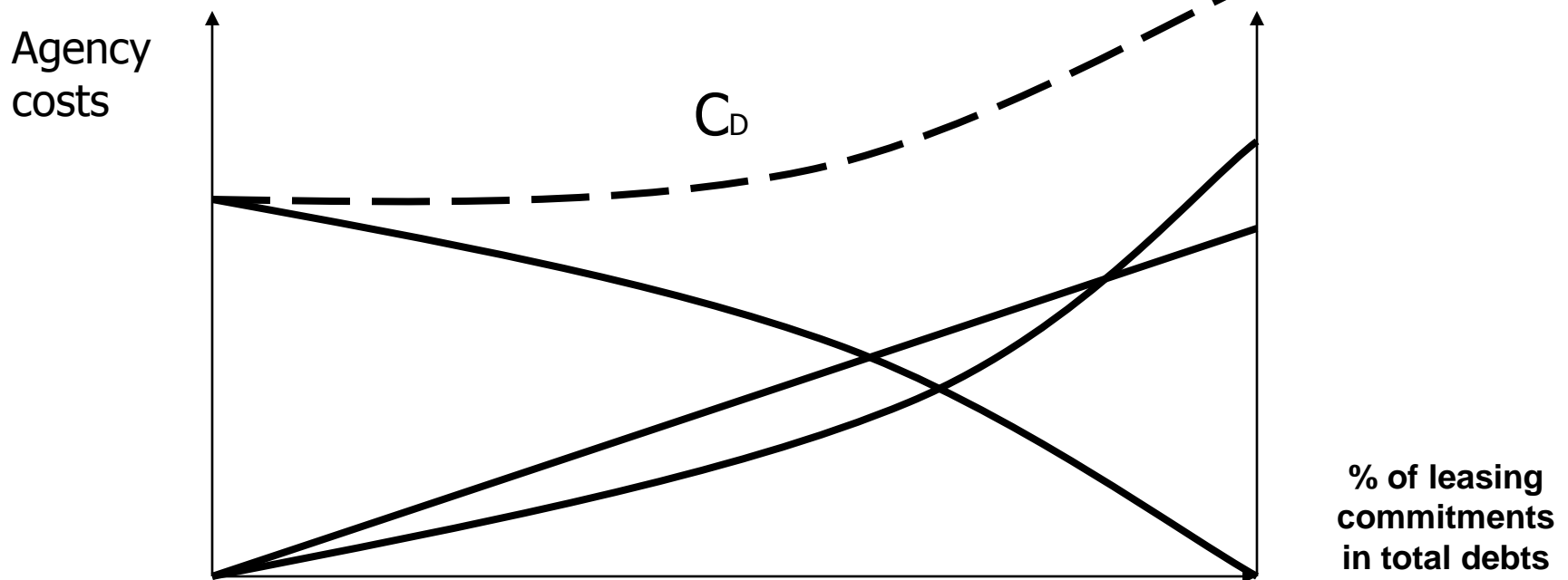
3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- A negative externality: the loss of operating flexibility= $C3$



3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Synthesis of agency costs of debt implied by a lease/borrow decision; total cost C_D is the cost of debt implied by a lease financing



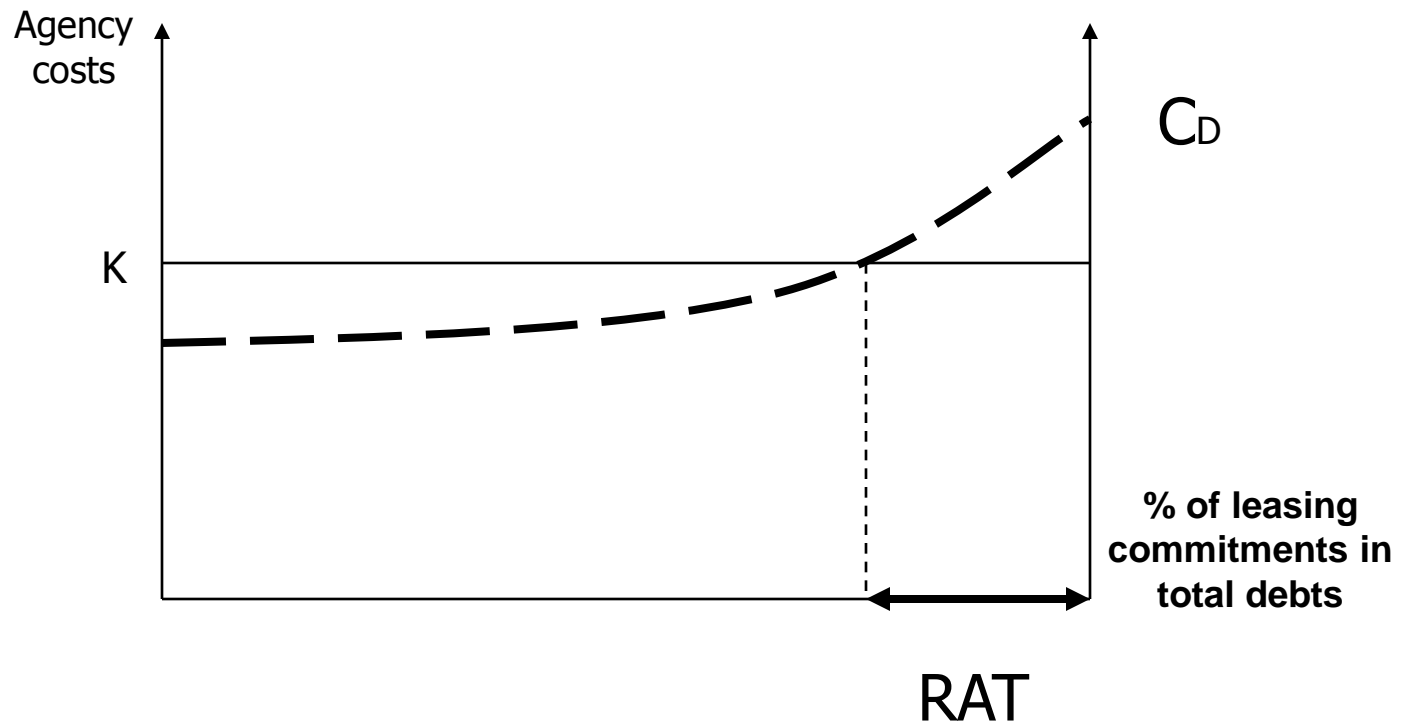


3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Agency costs and credit rationing: consider now the bank participation constraint
 - The bank bears a total cost C_D
 - These costs can't completely be passed on to the shareholders because such increases in interest rate could induce in turn moral hazard problems
 - So, beyond a certain threshold K , the bank will ration the firm

3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Agency costs and credit rationing



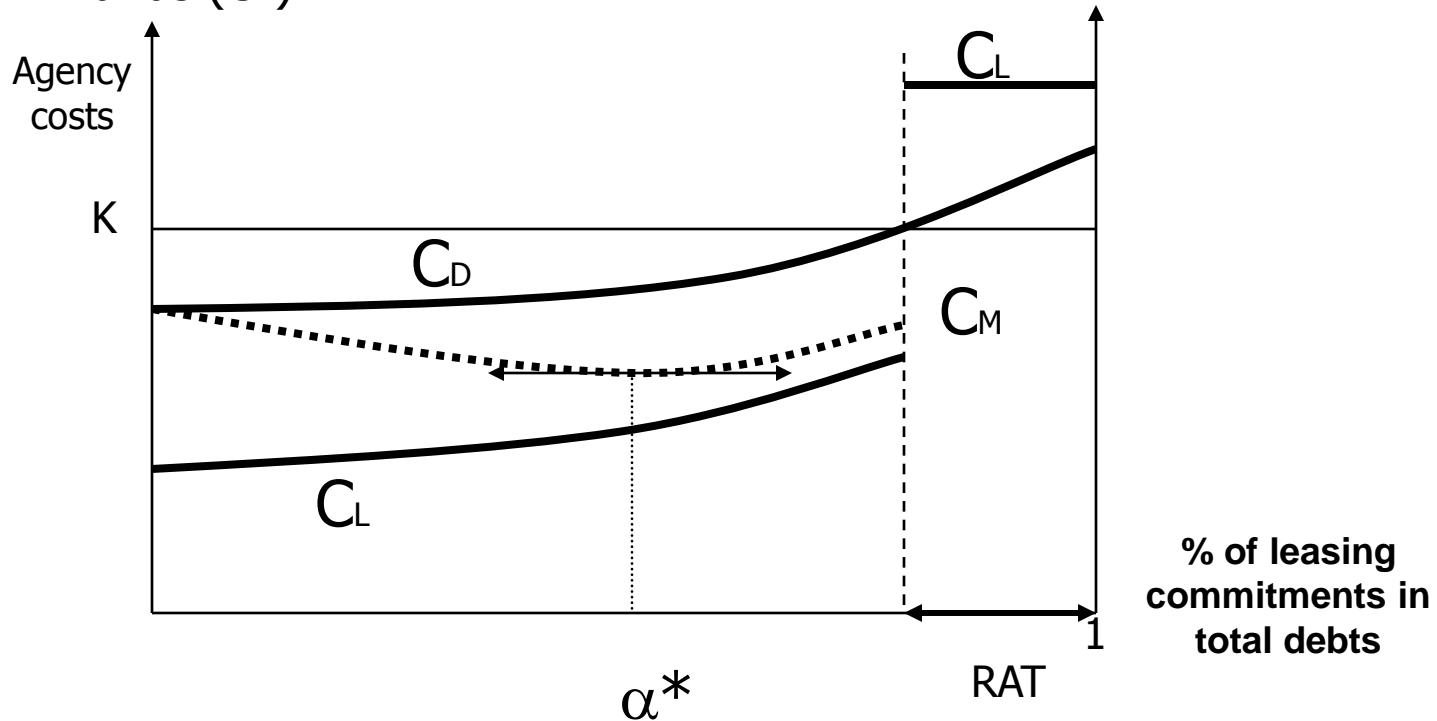


3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- The cost of leasing: determinants
 - When the firm is credit rationed, the lessor has a strong market power (monopoly)
 - Leasing is more expensive than debt
 - When the firm is not credit rationed, the value of the asset leased limits the risk for the lessor and, in turn, the cost of leasing
 - Leasing is cheaper than debt

3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Cost of leasing (C_L), cost of debt (C_D) and average weighted cost of funds (C_M)





3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Conclusion
 - The optimal external financial structure is that one (α^*) which minimizes the average weighted cost of funds
 - $C_M(\alpha) = (1-\alpha)C_D(\alpha) + \alpha C_L(\alpha)$



3-THE LEASE-BORROW DECISION AND MORAL HAZARD

- Determinants of α^*
 - An increase in risk has several effects
 - An increase in the agency costs of debt
 - A smaller effect (increase) on the cost of leasing
 - So the credit rationing area extends in the left direction
 - In the no-rationing area, an increase in risk tends to increase α^*
 - The resulting effect is not clear



SUMMARY

- Classical analysis of the lease-borrow decision ignores how the cost of debt depends on the external financial structure of the firm
- Agency theory identifies 3 types of agency costs which are specific to the lease decision
- Agency costs of debt, when too high, can induce credit rationing by banks
- Cost of leasing is cheaper than cost of debt, unless the firm is credit rationed
- A optimal external financial structure can be obtained by minimizing the average weighted cost of funds



THE LEASE-BUY DECISION

- References

- De Bodt, E., Filareto, M.C. et Lobeze, F., « Décision de crédit-bail, dette bancaire et risque moral », Banque et Marchés, 54, 5-18, 2001.