

# **Rating SME Using Consolidated Information**

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## **Abstract**

*SME belonging to business groups can be rated using their financial accounts, but this leads to ignoring the potential interactions between a SME and the other companies belonging to the same business group. Surveys indicate that in business groups of a certain size, the structure of credit risk and the interactions of default are significantly different from that of independent companies. This cannot but be taken into account while rating SME.*

*Based on figures from the French market, this paper describes French SME and the business groups they belong to, the interactions between individual credit risk and business group credit risk, and gives some ways of taking into account both individual and consolidated information in Basel II ratings. In this vein, the paper proposes an econometric model of the link between subsidiaries and their headquarters that allows to quantify the relationships in terms of credit quality.*

## 1. Introduction

### ■ **Since the early 80's, SME have structured themselves by gathering into business groups**

The structure of the economy has widely changed: analyzing a SME by itself is no longer enough. In France, half of the companies with turnover around 50 M€ belongs to a business group and this proportion increases rapidly with companies' size.

### ■ **Banks usually perform financial analysis on both individual financial documents and consolidated data**

In the Basel II internal ratings based (IRB) approach, banks have to integrate the financial situation and support of the company' owner in the determination of the probability of default of an exposure.

### ■ **Using those two sorts of information in rating systems is not easy**

- How much is a subsidiary's credit risk dependent from the one of the group it belongs to ?
- Risk-wise, how much does the main company of a group benefits from its subsidiaries ?
- Is group analysis always more relevant than individual analysis ?
- Analyzing consolidated data is time-consuming: is it always relevant ?

### ■ **We performed several analyses on credit quality in French business groups**

- Classification of groups according to their profiles
- Analysis of the subsidiaries' credit risk
- Analysis of the main companies' credit risk

### ■ **The final objective of the paper is to model and to quantify SME' ratings belonging to small or large business groups**

- Model and quantify SME' ratings using both individual and group information
- What is the correct rating of an subsidiary company : the headquarters' rating ? the

subsidiary's rating ? A mix of the two ratings ?

- How to weight the two ratings ? How evaluate the contribution of the headquarter' rating to the final rating of the subsidiary company ?
- A logit model is developed that helps to quantify the links between headquarters and subsidiaries in terms of credit quality.

## **2. Data and identification of business groups**

### **2.1. Data**

- Large database containing French business groups, provided by COFACE
- 51.000 subsidiaries and 23.000 headquarters
- For each firm in the database ( subsidiary or headquarter) we know the complete scope of financial links. Other information exist also Internal ratings, and COFACE financial ratings

### **2.2. Methodology : a map of the French business groups**

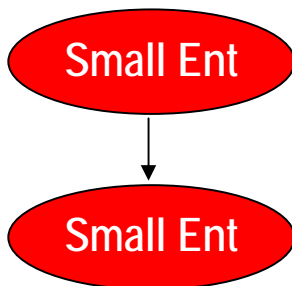
- **A) Business groups can be distinguished according by using the following criterions :**
  - The size of the main company or headquarter (small enterprise, medium enterprise, big company).
  - The social status of the main company : holding or not.
  - The strength of the link (measured ordinarily by the percentage of capital). In this study, we assume that a company controls another one if it owns directly or indirectly more than fifty percent (50%) of the hares of that company.
  - The level of the link, being direct or indirect (via other companies or affiliates). The headquarter could maintain control through multiple indirect links. For instance, if the company who finally controls the subsidiary (with more than 50% of shares) draws its control by controlling a company who control directly the subsidiary (such that there are three successive links), the level of control by the headquarter is the third one.

■ B) A typology with eight main sorts of business groups

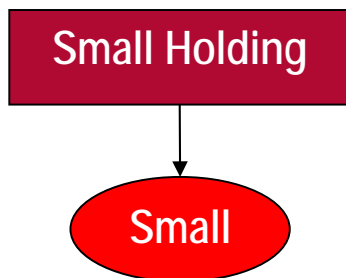
- **Independent SME** : companies having no financial dependency whatsoever with other companies



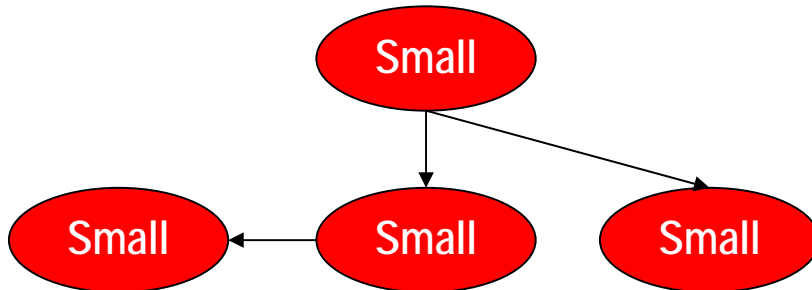
- **Micro-groups** : only with one SME and its subsidiary. The main SME has a small turnover (less than 50 M€). The subsidiary is control directly by the main company. The level of ownership is level one.



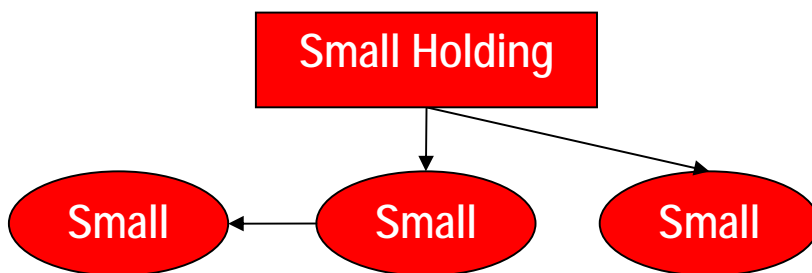
- **Micro-groups with holding** : only with one holding and its subsidiary. The main holding has a small turnover (less than 50 M€). The level of ownership is level one.



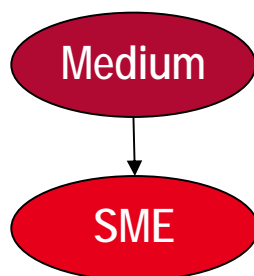
- **Small groups** : only with one SME and its subsidiaries (several levels). The main SME has a small turnover (less than 50 M€). The level of ownership could be higher than one.



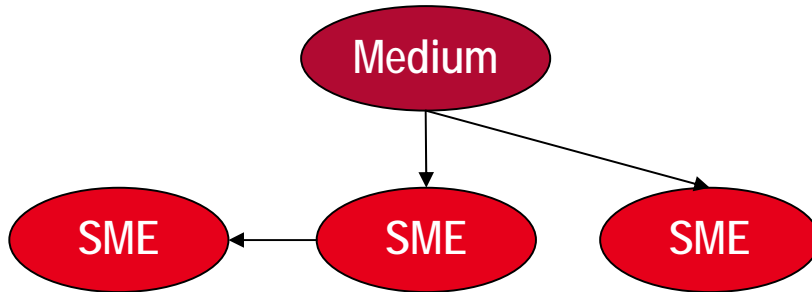
- **Small groups with holding** : only with one holding and its subsidiaries (several levels). The main holding has a small turnover (less than 50 M€). Again, the level of ownership could be higher than one.



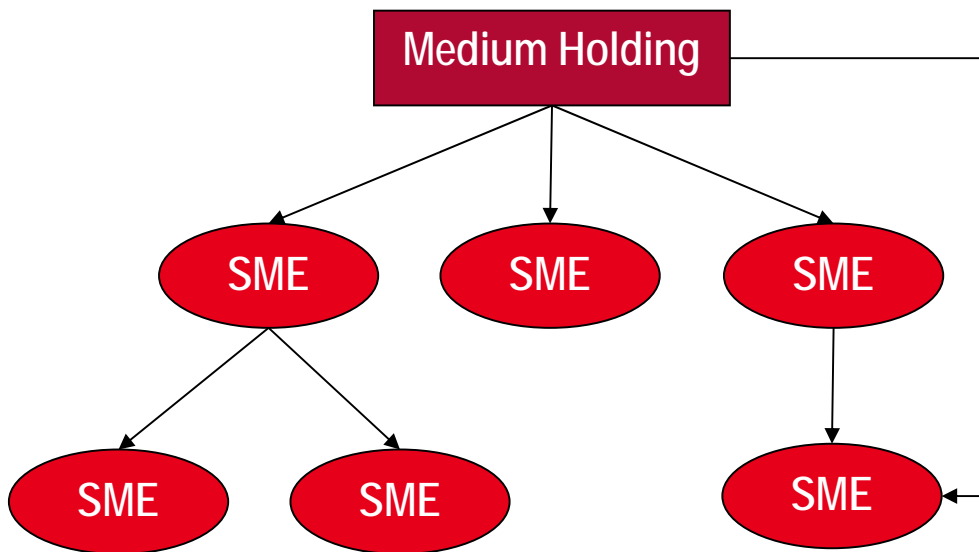
- **Simple macro-groups** : only with one SME and its subsidiary. The main SME has an important turnover (more than 50 M€). The owner is located at level one.



- **Complex macro-groups** : only with one SME and its subsidiaries (several levels). The main SME has an important turnover (more than 50 M€). The level of ownership could be higher than one.

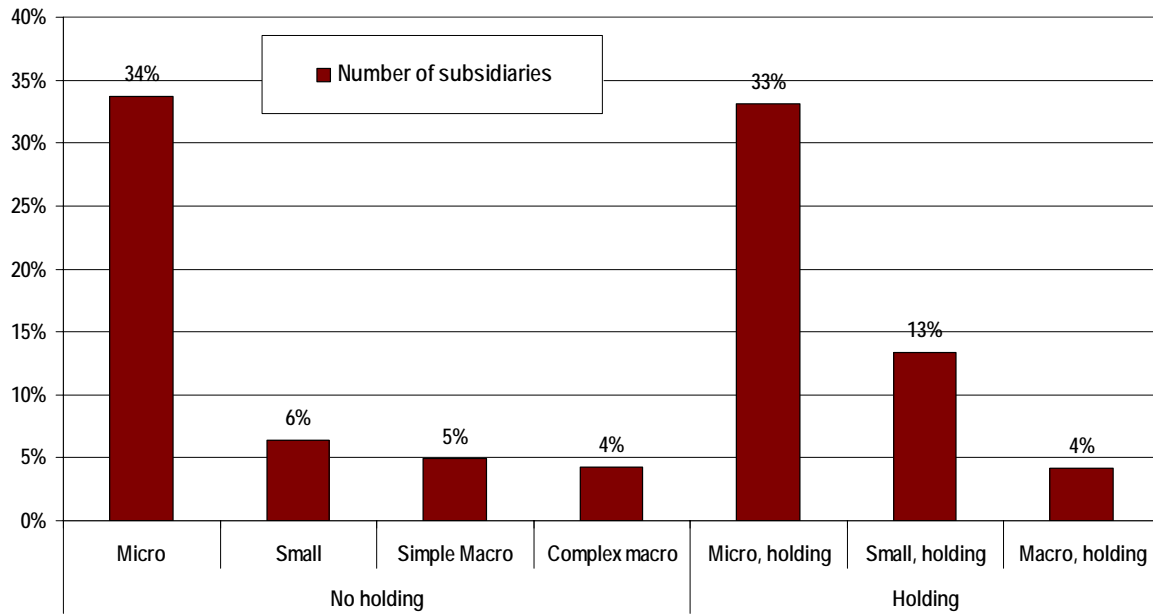


- **Complex macro-groups with holding**: only with one holding and its subsidiaries (several levels). The main holding has an important turnover (more than 50 M€). Again, the level of ownership could be higher than one.

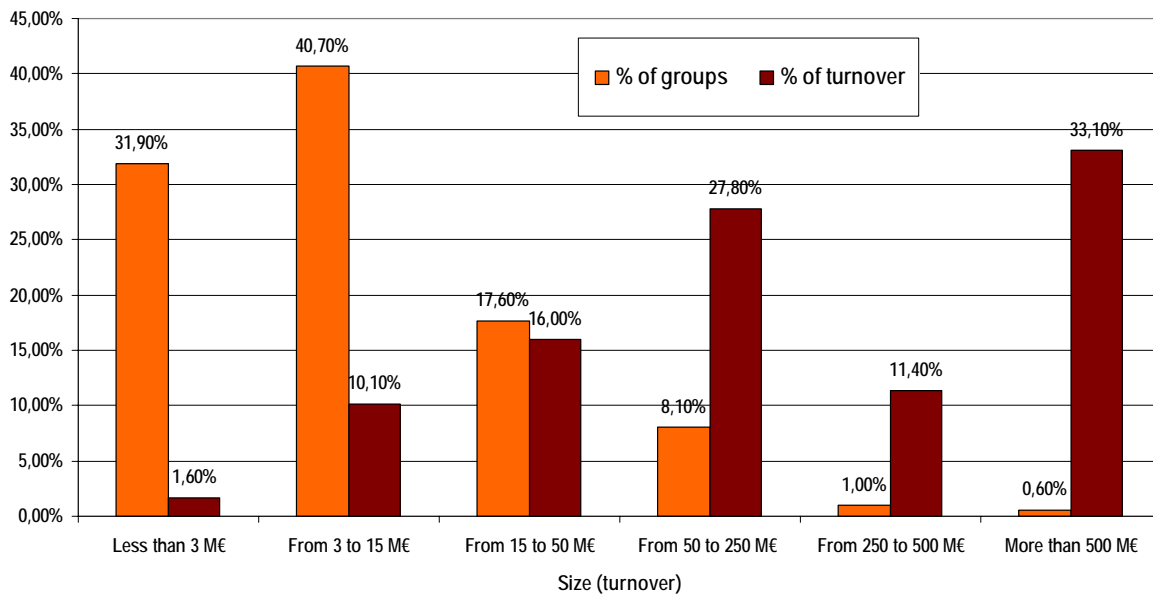


■ C) A strong majority of subsidiaries belong to small or very small groups

It is what we observe in French businesses population.



■ D) A very concentrated portfolio



## **4. Financial health and credit risk in business groups**

### **4.1. Issues**

#### **■ Given those 8 types of groups, can we say that...**

- The financial situation of subsidiaries is influenced by their belonging to a business group?
- If so, is it different for each type of business group?

#### **■ We know that...**

- Belonging to a business group is very likely to have an impact on financial solidity
- The bigger the company, the better the financial situation.

#### **■ Hence we expect that...**

- The financial situation of the main company is directly linked to the size of the group
- The financial situation of the subsidiaries benefits from the size and the complexity of the group

### **4.2. From the subsidiary's point of view : an analysis of the relationships between subsidiaries' credit quality and headquarters' credit quality**

#### **■ Methodology : comparing scores using only balance sheet information**

##### **■ The COFACE balance sheet rating**

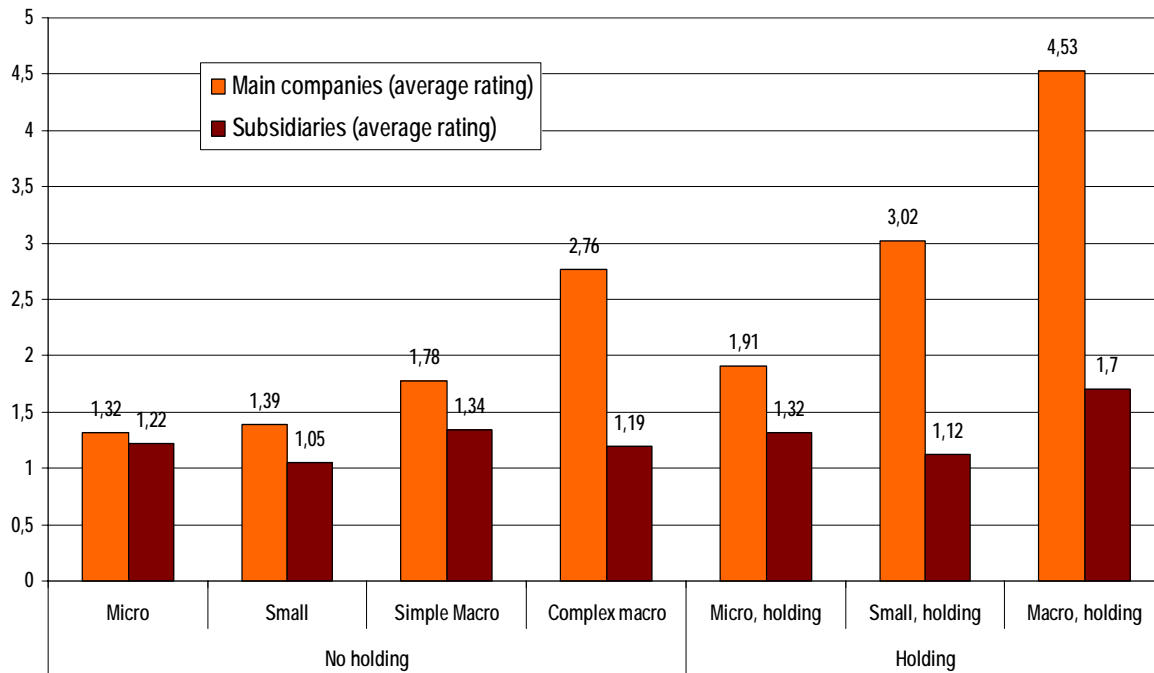
- Uses financial information
- Predicts legal default (bankruptcy) of the company
- No qualitative/expert components
- No use of information related to delays of payments
- 7 different ratings in our analysis (1 = very low risk, 7 = high risk)

#### **■ We performed three types of analysis**

- A) Values of the rating of the company and the rating of the main company of the group it belongs to, for each type of group.

- B) Measurement of the correlation between the rating of the company, the rating of the main company of the group it belongs to, for each type of group.
- C) Measure of the difference between both ratings.

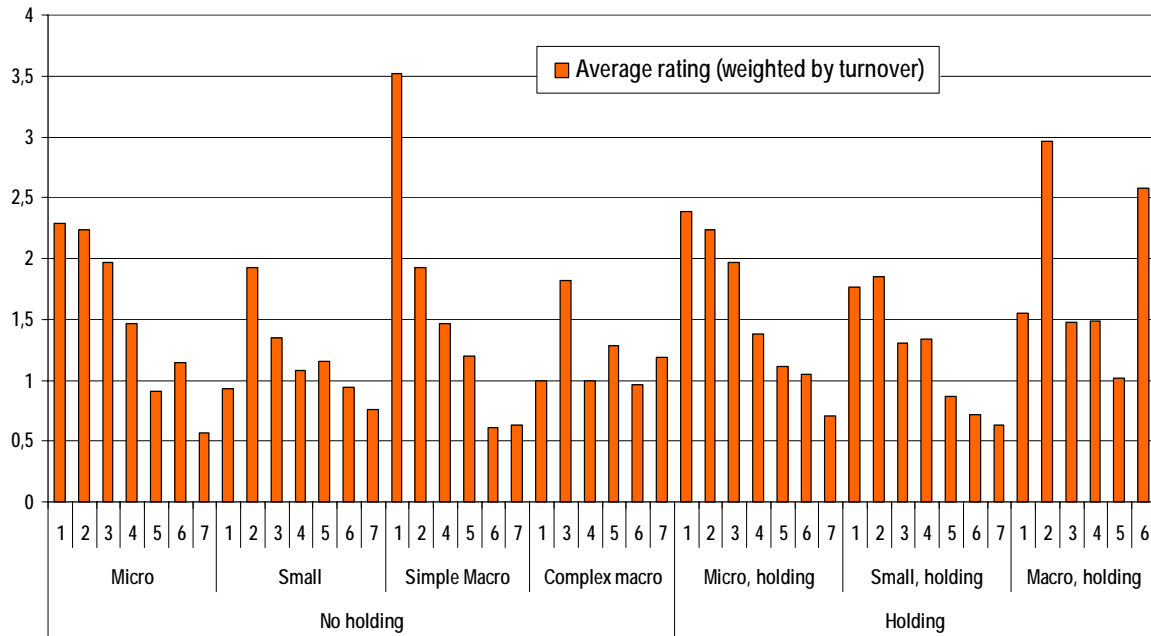
#### A. The subsidiary's rating vs. main company's rating: values



#### ■ Results and interpretation

- The bigger the group, the better the credit quality of the group's headquarter
- Main companies have a better rating than subsidiaries
- Holdings (consistent ones) have a better rating

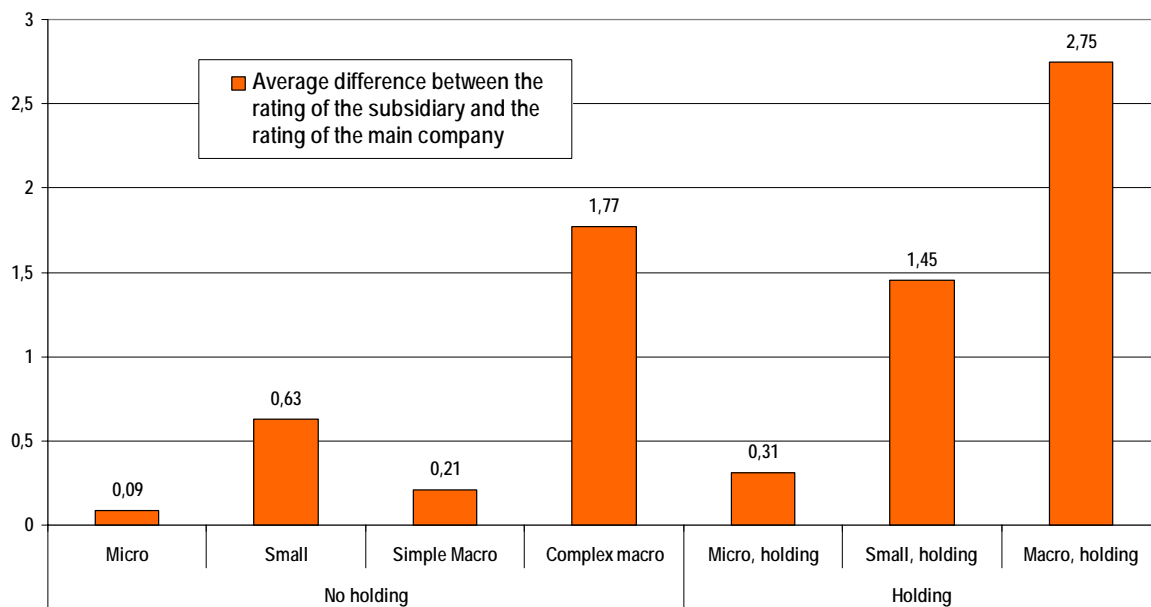
## B. The subsidiary's rating vs. main company's rating: correlation



### ■ Results and interpretation

- There is a strong correlation between the subsidiaries' ratings and those of the main companies for small groups, including holdings
- This is less verified in bigger business groups (holding or not)

### C. The subsidiary's rating vs. main company's rating: difference



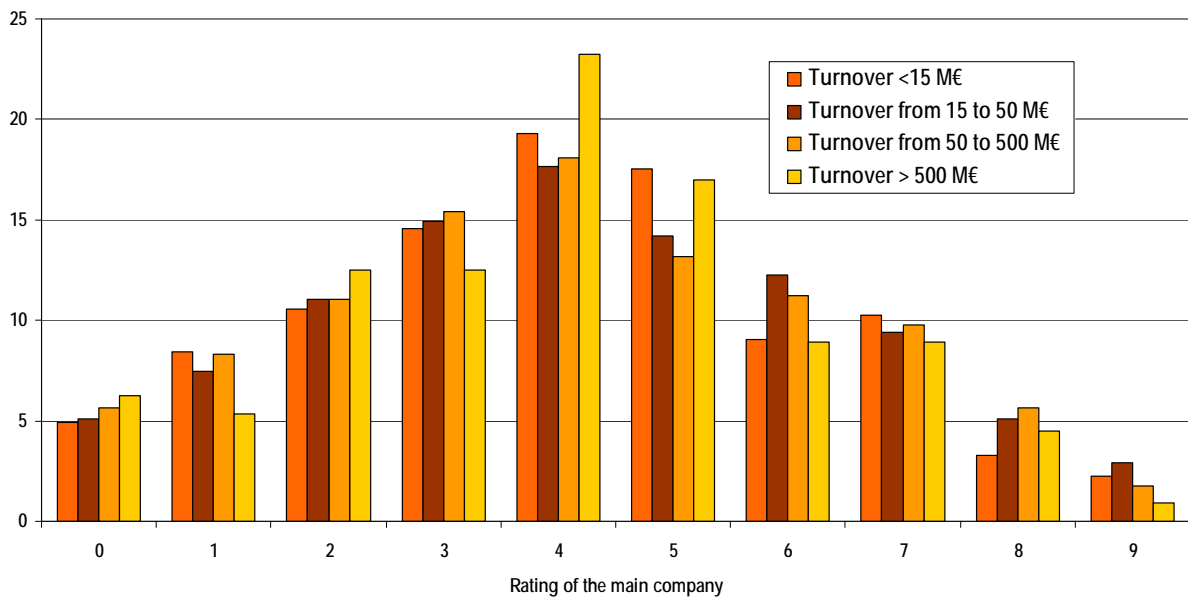
#### ■ Results and interpretation :

- The difference is minimal in small groups
  - Especially for micro-groups without holding
- The bigger or the more complex the group, the higher the difference between the rating of the subsidiaries and the rating of the main company
- These three analyses show (from the subsidiary's point of view) that...
  - The size of the group has a stronger influence on the main company of the group than on its subsidiaries
  - The main companies are almost always less risky than their subsidiaries
  - There is a very strong correlation between the ratings of the companies in small groups
  - This correlation is however non-significant in big groups with a complex structure (many subsidiaries)

## 4.2. From the main company point of view

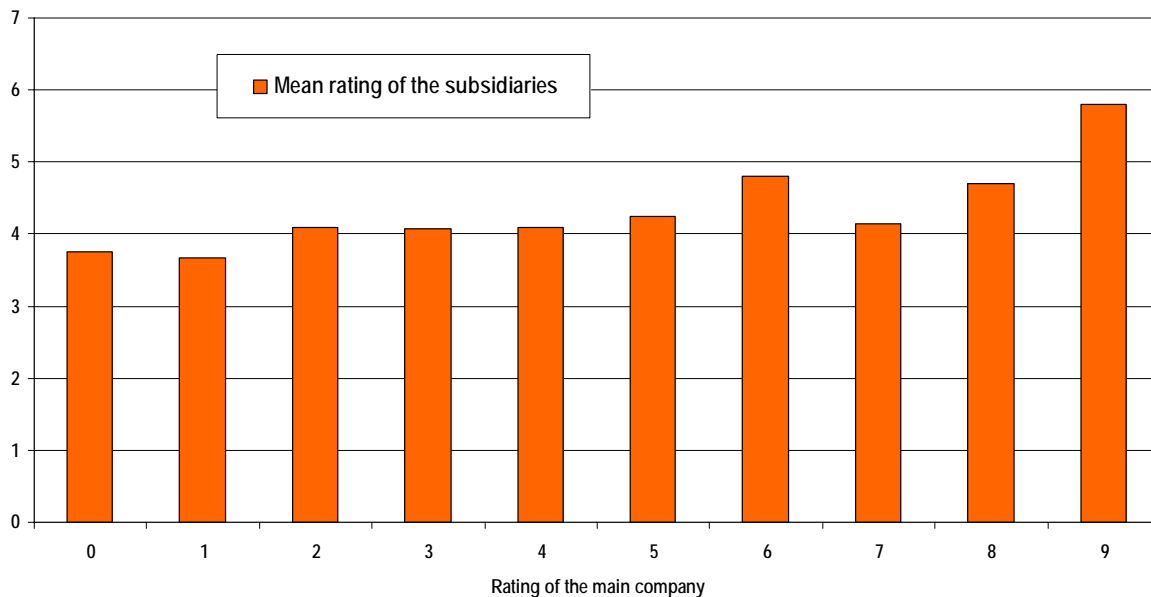
### ■ Main companies publishing consolidated financial information are rated with an internal model

- 4.200 French companies publishing consolidated accounts
- We have built a specific ratings system (expert- model) ranking companies from 0 (low risk) to 9 (high risk) : the following figure shows the ratings' distribution in this population, separating companies by size (turnover).



### The main company's rating vs. the subsidiaries' rating: values

In the analysis that follows, we compare the means of subsidiaries' financial ratings belonging to business groups which are distinguished by the value of headquarters' ratings (built by using consolidated information).



- **We still observe a correlation between subsidiaries' ratings and headquarters' ratings**
  - Increase of the subsidiaries' average rating with the quality of the main company

## 5. Methodologies to rate a subsidiary using group information

### 5.1. Objectives

- **For each subsidiary, we can use**
  - Its proper rating (individual)
  - The rating of the group it belongs to (using consolidated data)
- **The choice must be based on**
  - The correlation between the subsidiary's credit quality and the main company's credit quality
  - Our opinion on the link between both companies (strength of the relationship)
- **Given the previous analysis, we suggest that**
  - In a small group, using consolidated data is of nearly no use
  - In a bigger group, it depends on the size of the subsidiary

Size of the main company → Size of the subsidiary ↓	Small (turnover < 50 M€)	Medium (turnover > 50 M€)
Small (turnover < 50 M€)	Individual rating (no group information)	→ Strong link: main company's rating → Medium link: same - 1 → Weak link: same - 2
Medium (turnover > 50 M€)	<i>(impossible)</i>	→ Strong link: main company's rating <i>or</i> individual rating + 2 → Medium link: individual rating → Weak link: same - 2

## 5.2. Quantifying the link between a subsidiary and its group : an econometric model

- 5 elements define the strength of the link between a company and the group it belongs to
    - The strategic role of the company (activity, turnover...)
    - The participation of the main company in the capital of the subsidiary
    - The level (direct link or not)
    - Control of the management
    - Proofs of support (e.g. guarantee)
  
  - The first three can be quantified
    - If the subsidiary is strategic, or the participation (direct or indirect) in the capital important, the group cannot let its situation worsen
    - Symmetrically, the group benefits from the good health of the subsidiary
- Hence we can use the ratings to model the strength of the link

■ **A logit model predicts the difference between the rating of the subsidiary and the one of the main company using:**

- In the logit model, the exogenous variable is the difference between the rating of the subsidiary and the one of the headquarter: more precisely, this difference is split into three classes : strong, medium, weak , so that the logit model is a polynomial one.
- The explanatory variables are (most variables are separated into several classes to deal with a potential non-linearity of the relationship) :
  - The contribution of the subsidiary to the operating income of the business group
  - The number of companies in the business group
  - The share of the owner company in the capital of the subsidiary (%)
  - The rating of the main company (headquarter)

■ **Results of the logit model**

Parameters		Coefficients	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-4.8096	0.2098	525.4454	<.0001
Intercept	2	-2.6599	0.1967	182.9482	<.0001
class share operating-income subsidiary	2	0.7868	0.0976	65.0404	<.0001
class share operating-income subsidiary	3	1.1024	0.1393	62.6409	<.0001
class_ share operating-income subsidiary	4	0.5040	0.1600	9.9217	0.0016
numbers of subsidies in the business group	4	0.3591	0.0913	15.4820	<.0001
Level of ownership		-0.0733	0.0379	3.7394	0.0531
class rating headquarter	2	0.4906	0.4129	1.4116	0.2348
class rating headquarter	3	1.1709	0.1770	43.7375	<.0001
class rating headquarter	4	2.5481	0.1762	209.2349	<.0001
class rating headquarter	5	4.0214	0.1846	474.6960	<.0001
class rating headquarter	6	5.2739	0.2199	575.1827	<.0001
class rating headquarter	7	7.0972	0.4048	307.3879	<.0001

- **The model is quite predictive (Somers's D = 0.715) and confirm expected effects :**
  - The more the subsidiary provides a great part of the group's result, the smaller the difference between the ratings
  - The more complex the group (number of companies), the bigger the difference between the ratings
  - The better the main company's rating, the smaller the difference between the ratings
  - The participation in the capital is not very significant

## **6. Conclusion**

- **Our analysis shows that using consolidated group information is often relevant**
  - It is not necessary to rate SMEs belonging to small groups
  - It can be very helpful in bigger groups
  - Its usefulness depends on the sizes of the companies
- **We also provide a method to combine both levels of information**
  - Individual information and group (consolidated) information
  - Via the qualification of the link between a company and its group (easy-to-use model)
- **Going further**
  - Adding information about types of activity in the analysis could improve the diagnosis