

Interrelations between Assets and Financial Structures: the case of French NTIC firms

Sylvie Cieply¹, Rafik Abdesselam²

CREM UMR CNRS 6211, Institute in Banking and Insurance
CREM UMR CNRS 6211, Faculty of Economics and Management
University of Caen, Campus 4 - Claude Bloch, 14032 Caen, France
sylvie.cieply@unicaen.fr, rafik.abdesselam@unicaen.fr

Abstract: This article focuses on interactions between assets and financial structures of French firms specialized in New Technology of Information and Communication (NTIC). We select a sample of firms in the database DIANE and apply data analysis methods and Dissymmetrical Correspondence Factorial Analysis. Our results confirm interdependences. Assets structure influences financial structure. Liquid and secured assets improve the access of firms to short term banking loans. Intangible assets are bound to high leveraged and low liquidity firms finance more themselves with trade credit. Financial structure influences asset structure too. More the access to finance (internal, grants or debts) is easy, more the firms innovate.

Keywords: Assets and financial structures, dissymmetrical associations, correspondence analysis.

1 Introduction

With the recognition of imperfect information, the influence of finance on firms' assets, above all investments, is supported by lots of researches (for example, Myers and Majluf (1984), Myers (1984), Bernanke and Gertler (1989)). The reverse relationship, from assets to finance, is less mentioned and empirically studied. However, the Transaction Cost Approach (TCA) (Williamson (1988)) shows the influence of assets' characteristic, in particular their specificity³, on firms' financial structure. This article completes prior research on this topic. It analyzes interdependences between financial structure and assets for the French NTIC sector in 2002 by using data analysis methods and dissymmetrical Correspondence Factorial Analysis (Abdesselam and Schektman (1996), Lauro and D'Ambra (1983)).

2 Methodology

A sample of 25,366 firms specialized in the NTIC is extracted from the DIANE database⁴.

Variables describe two themes. The first theme - *assets structure* - takes into account eight variables: fixed assets relative to total assets (FA/TA), and among them intangible

³An asset is specific when its destination and its user cannot be easily changed.

⁴This database contains information on company accounts, ratios, activities, ownership and management.

assets relative to fixed assets (IA/TA)⁵, tangible assets relative to fixed assets (TA/FA)⁶ and financial assets relative to fixed assets (OA/FA), stocks relative to total assets (S/TA), debtors relative to total assets (D/TA), marketable securities relative to total assets (M/TA) and cash and cash equivalent relative to total assets (C/TA)⁷. The second theme - **financial structures** - takes into account six variables: shareholders funds relative to total liabilities (SF/TL) and, among them, profit relative to shareholders funds (P/SF), investment grants relative to shareholders funds (IG/SF), financial debt relative to total debt (FD/L), short term banking loans relative to total debt (ST/L) and creditors relative to total debt (Cred/TL).

Each theme is synthesized by a methodological chain of data analysis methods, which consists to apply a k-means classification on the significant factors of principal component analysis. Then, correspondent analysis methods analyze interrelations between themes.

3 Empirical results

The classification of assets structures shows four classes of firms:

- In the first class ((AS1), 28.70% of the sample), firms are rather liquid and own tangible assets.
- In the second class ((AS2), 38.45%), firms' liquidity is low and assets are rather tangible.
- In the third class ((AS3), 12.84%), firms' liquidity is low and the proportion of financial assets is rather high.
- In the fourth class ((AS4), 20.01%), firms' assets structure is characterized by a high proportion of intangible assets and a low level of liquidity.

The classification of financial structures shows five groups of firms:

- In the first one ((FS1), 37.55% of the sample), firms are short term banking financed.
- In the second class ((FS2), 15.00%), firms are high leveraged.
- In the third class ((FS3), 25.50%), the proportion of creditors finance is rather high.
- The fourth class ((FS4), 11.81%) is very closed to the next one and differs only because of low profits.
- The last class ((FS5), 10.15%) is characterized by high subsidizes and high profits.

Table 1 shows the repartition of NTIC firms according to the two qualitative variables associated to the synthesis of each theme. The Pearson independence Chi-Square test leads indisputably to reject the independence hypothesis between these two themes. The symmetrical correspondence analysis (Benzecri, 1982) puts into light five main significant and positive relationships between all pairs $\{(AS_i, FS_j) / i = 1, 4; j = 1, 5\}$ of assets and financial structures.

Table 2 summarizes the significant results of symmetrical and dissymmetrical correspondence analysis. The proposed dissymmetrical analysis gives us more details on the causality direction between assets and financial structures.

Concerning the influences of assets on financial structures, the highest significant result is the influence of liquid and secured assets on the access of firms to short term banking loans. The second evidence is the influence of intangible and low liquid assets

⁵ A high proposition of intangible assets characterizes high innovative firms.

⁶ Tangible assets can be used as collateral to secure loans.

⁷ A high proportion of cash and marketable securities characterizes high liquid firms.

Table 1: *Contingency table - Row and column profiles.*

Frequency Row Pct Col Pct	FS1	FS2	FS3	FS4	FS5	Total
AS1	3257 44.74 34.20	876 12.03 23.03	1719 23.61 26.57	875 12.02 29.22	553 7.60 21.48	7280 100.00 28.70
AS2	3330 34.14 34.96	1479 15.16 38.88	2870 29.42 44.37	1178 12.08 39.33	897 9.20 34.85	9754 100.00 38.45
AS3	1165 35.77 12.23	421 12.93 11.07	820 25.18 12.68	416 12.77 13.89	435 13.36 16.90	3257 100.00 12.84
AS4	1772 34.92 18.61	1028 20.26 27.02	1060 20.89 16.39	526 10.36 17.56	689 13.58 26.77	5075 100.00 20.01
Total	9524 37.55 100.00	3804 15.00 100.00	6469 25.50 100.00	2995 11.81 100.00	2574 10.15 100.00	25366 100.00 100.00

Statistic Chi-Square: DF = 12, Value = 559.4631, Probability < .0001, Test Value = 22.46

Table 2: *Symmetrical and Dissymmetrical Correspondence Analysis results.*

Descending Order	Dissymmetrical AS \rightarrow FS	Symmetrical AS \leftrightarrow FS	Dissymmetrical AS \leftarrow FS
1	AS1 \rightarrow FS1	AS1 \leftrightarrow FS1	AS4 \leftarrow FS2
2	AS4 \rightarrow FS2	AS4 \leftrightarrow FS2	AS4 \leftarrow FS5
3	AS2 \rightarrow FS3	AS2 \leftrightarrow FS3	AS2 \leftarrow FS3
4	AS4 \rightarrow FS5	AS4 \leftrightarrow FS5	AS1 \leftarrow FS1
5	AS3 \rightarrow FS5	AS3 \leftrightarrow FS5	AS3 \leftarrow FS5

on high leverage of firms. Third, we show the influence of a low proportion of liquid assets associated with a high proportion of tangible assets on creditors finance. Fourth, a high proportion of intangible and low liquid assets influences positively the profit of firms and their access to subsidies. Fifth, when the assets structure is dominated by financial and low liquid assets, firms are more profitable and eligible to subsidies.

Concerning the influences of financial structure on assets, we observe first the influence of high leverage on the proportion of intangible and low liquid assets. Second, when firms are more profitable and eligible to subsidies, they own intangible assets. Third, when firms are creditors financed, their liquidity is rather low and assets rather intangible. Fourth, when they are short term banking financed, they are liquid and own rather tangible assets. Fifth, when firms are subsidized and highly profitable, they own more financial assets and are rather liquid.

Finally, we observe different hierarchies in dissymmetrical correspondences between financial and assets structures for above all two couples of modalities:

- the relationship from AS1 on FS1, which is the most important correspondence when we study the influence of assets on finance short term banking debt whereas the reverse relation from FS1 to AS1 is less strong,
- the relationship from FS5 on AS4, which is the second most important correspondence when we study the influence of finance assets whereas the reverse relation from AS4 to FS5 is less strong.

For the other couples, all correspondences are quite the same, whatever the sense of causality may be.

4 Discussion and conclusion

Results show relationships between assets and financial structures of French firms specialized in the NTIC during 2002.

On the one hand, financial structure influences assets structure. We confirm some theoretical predictions such as the negative link between creditors' finance and liquidity of assets: when firms are financed by creditors, their liquidity is rather low. We stress too a positive relation between short term banking loans and liquid and tangible assets: when firms are short term financed by banks, they own more tangible and liquid assets, which make loans more secured and financial distress less frequent. This result can illustrate the disciplining effect of short term debt on corporate governance. Finally, we show the positive relation between both profit and access to subsidies and intangible assets and confirm the first proposition of all pecking order theories (Myers, 1984, Majluf, Myers, 1984, Williamson, 1988), which underline the dominant role of internal finance in financing investments.

On the other hand, assets structure influences financial structure. Liquid and tangible assets, by reducing risks of failure, make access of firms to short term banking loans increase. A high proportion of intangible assets is associated with rather high profits and subsidies. Finally, we reject the theoretical prediction given by the TCA (Williamson 1988), which anticipates a negative relation between specific assets and debt. In France, in 2002, when firms from the NTIC sector own a high proportion of intangible assets, they are more highly leveraged.

The analysis of dissymmetrical correspondences underlines the importance of the relation between leverage and both intangibility and illiquidity of assets, which can characterize highly specific assets. When we study the influence of financial structure on assets structure, this relation is the strongest one, whereas, when we study the reverse influence, the strongest relation is the influence of liquid and tangible assets on short term banking finance. These results support the need to interconnect theories and to use statistical methods which study the diversity of causalities between financial and assets structures.

References

- Abdesselam R. and Schektman Y. (1996) Une analyse factorielle de l'association dissymétrique entre deux variables qualitatives, *Rev. Stat. Appl.*, XLIV 2, 5–34.
- Benzecri J. (1982) *L'Analyse des données : L'Analyse des Correspondances*, Dunod.
- Bernanke B. and Gertler M. (1989) Agency costs, net worth, and business fluctuations, *American Economic Review*, 1, 14–31.
- Lauro N. and D'Ambra L. (1983) Analyse non symétrique des correspondances, *Data Analysis and Informatics*, E. Diday and all. Editors, North-Holland Publishing Company, 433–446.
- Myers S. (1984) The capital structure puzzle, *Journal of Finance*, 3, 575–592.
- Myers S. and Majluf N. (1984) Corporate financing and investment decisions when firms have information that investors do not have, *Journal of Financial Economics*, 13, 187–221.
- Williamson O. (1988) Corporate finance and corporate governance, *The Journal of Finance*, XLIII, 567–591.