

THE FOLLOW-UP OF FINANCIAL VALUE CREATION INDICATORS TO PREVENT BANKRUPTCY IN BELGIAN SMEs : AN EMPIRICAL MULTIVARIATE APPROACH (Paper presented at the 2001 Babson College Conference – Jönköping, Sweden – June)

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ABSTRACT

Business failure prediction is heavily investigated in literature, but specificities of SMEs are often neglected. Simultaneously, relatively few attention is paid to very early warning indicators. So, we first explore the concept of economic business failure in SMEs and propose a structured methodology (cluster analysis, discriminant analysis and correspondence analysis are successively applied) to empirically investigate their failure processes. Then, we apply it to a representative sample of 6.215 Belgian SMEs on a four year period (1995-1998). Results show that a high continuous added value which opens on a high liquidity and solvency, an efficient cost structure, an ability to generate important cash flow compared to debt and a balanced growth in fixed assets and equities, is the main factor that decreases failure risk in Belgian SMEs.

INTRODUCTION

Since the Fitz Patrick's (1932) early works, business failure has been very frequently studied (mainly during the last 30 years), due to 2 main factors (Morris, 1997) :

1. Conceptually, corporate performance, and its origin, became one of the most investigated topics in finance and strategic literature, due to the emergence of an extremely fast moving environment that disturbed the conditions in which most companies had generated relatively constant and high

rates of return for a long period (Kaplan, Norton, 1996) (Copeland et al., 2000) ; as a result, due to the magnitude of its external consequences on employment and economic regional welfare, financial and organizational business decline and failure perceived more and more attention from both researchers and economic authorities (Morris, 1997).

2. Technically, an increased availability of credible data, coupled with a strong development of mathematical and statistical techniques and an exponential evolution of informatics, has resulted in a strong and steady flow of quantitative researches (Dimitras et al., 1996). This has had a disturbing consequence : most of these quantitative studies focused on the ability of some techniques to correctly predict business failure one to five years prior a legal bankruptcy, considering almost systematically that managers were deterministically unaware of the problems their companies face and unable to take corrective decisions ; business failure was then too often reported as due to "mismanagement" and companies were considered as "black boxes" in the hands of their environment (Altman, 1984) (Morris, 1997). Simultaneously, and rather curiously, only a few studies (Argenti, 1976) (Keasey, Watson, 1991) (Laitinen, 1991) (Sharma, Mahajan, 1980) have considered business failure as a process, of which bankruptcy is only the potential legal last extremity and on which managers may act with some judicious strategic decisions. In fact, "a unifying theory of business failure has not been developed, in spite of a few notable efforts" (Dimitras et al., 1996), which were materialized in a steady flow of many hundred papers, each of them being contingent on two complementary but very rarely associated approaches : the organizational view of business failure and the financial one (Hansen, Wernerfelt, 1989) (Morris, 1997).

REVIEW OF THE LITERATURE

Most reviews of the literature, either global (Altman, 1996) (Dimitras et al., 1996) (Morris, 1997) (Oghe et al., 1995) or SMEs-oriented (Berryman, 1983) (Keasey, Watson, 1991), show that :

- conceptual papers and empirical researches take essentially into account a financial conception of business failure, from an outsider's viewpoint : this may be explained by a more easy access to data (financial data, especially in biggest companies, are frequently audited and thus available and credible) and by the fact that most of these studies focus more¹ on a credit-risk perspective than on a managerial perspective (business failure prediction with a short-term horizon is privileged, while business failure prevention with a long term perspective is generally neglected) ;
- most of the research is focused on big companies, of which financial and sometimes internal data are more available and whose failure (in a dominating credit-risk perspective) would have a bigger impact on their environment (banks, clients, suppliers and Public Authorities essentially) than the failure of a SME : so, intrinsic characteristics of SMEs (structure of equities, major role of the entrepreneur, small control on its environment, ...) are most often not integrated as a theoretical background to formulate research hypotheses and are deduced as particular results inferred from the global results of these researches.

However, SMEs are not completely ignored by the specialized literature. Indeed, the organizational approach of business failure (the "insider's view") starts effectively in the mid-1970, when Argenti (1976) publishes a small book dedicated to "Corporate Collapse" and focused on Medium-Sized companies. In this book, for the first time, an author considers explicitly that the most important explanatory factors of corporate collapse have to be found inside the company,

both (and essentially) in the person of the manager/founder and in the inappropriate management processes he implements inside the company. However, Argenti remains very descriptive and does not deepen what he considers himself as a conceptual approach of business failure process : the existence of one or some "failing paths" through which companies are evolving and that lead to bankruptcy if corrective appropriate strategic and operational decisions are not taken.

Many authors explore then some of the micro-aspects depicted by Argenti (Keasey, Watson, 1987) and a lot of papers and researches, often empirically grounded, focus on some organizational aspects of the management of failing companies. The rare studies dealing explicitly with SMEs characteristics highlight explanatory factors we may classify into three main categories (D'Aveni, 1989a) (Keasey, Watson, 1991) :

- *Factors linked to the "corporate governance" system* : The entrepreneur, especially in small enterprises (Storey, 1985), plays a major role as both the owner and the manager of the company ; its personality and its objectives are thus strongly reflected in the management processes implemented within the company (Watkins, 1982). A lack of technical ability, insufficient education, some weaknesses in management skills, a lack of motivation or of self-confidence or, on the contrary, too optimistic attitudes are factors that were highlighted as explaining many failure processes in SMEs (Berryman, 1983) (Cromie, 1991) (Smallbone, 1990). An inadequate vision of the future of the company and inappropriate resulting strategies are also considered as explaining many bankruptcies : an excessive and too expensive lifestyle, too high salaries, launching a new venture as the only solution to unemployment are such explanatory factors (Hall, Young, 1991) (Smallbone, 1990) (Cromie, 1991).
- *Factors linked to strategic management* : Globally, strategic and long-term management appear to have received too few attention from managers at the top of failing companies (D'Aveni, 1989b) (Sheppard, 1994), while at the same time the environment in which any company evolves is developing faster and is becoming more and more complex (Porter, 1985). So, a gap appears between the low magnitude of strategic actions and decisions in failing company and the requirements of an always more complex environment. In the context of SMEs, a weak understanding of the complexity of this environment, the absence of innovating strategies, a lack of planning, a weak information system are, amongst others, factors depicted as critical to prevent bankruptcy (Robinson, Pearce, 1984). Relations between the failing SME and the major components of its environment have particularly been investigated (Sheppard, 1994). An intensive competition on the company's main markets, turnover depending excessively on one or a few failing clients, depending too much on some specialized suppliers, poor relations with the bank or the banker are then the main factors inducing a possible near bankrupt (Hall, Young, 1991) (Smallbone, 1990). More specifically, weak adequacy between the products developed and the requirements of investigated markets and a poor marketing plan have also been pointed out as explaining failing strategies (Cromie, 1991) (Smallbone, 1990).
- *Factors linked to operational management* : These factors are clearly the most investigated in the literature (Berryman, 1983) (Keasey, Watson, 1991) (Morris, 1997) : a poor daily management of operations and strong weaknesses in some critical operational functions (essentially finance and production functions) have largely been considered as the main explanatory factors that justify the death of a company. As examples, a persistent lack of equities, excessive short-term borrowing, depending too much on bank credit and too few on

commercial credit, a difficult access to credit and a weak bargaining position to negotiate the terms of this credit have been pointed out as major financial factors explaining bankruptcy (Hall, Young, 1991) (Walker, Petty, 1978) (Cromie, 1991). Difficulties to master and calibrate production process, having too much stocks, depending too much on suppliers to gain access to critical supplies or raw materials, difficulties to master lead times, weak or unstable quality of some products, too high production costs are also operational factors frequently underlined in the specialized literature (Cromie, 1991) (Hall, Young, 1991). As for the general management process at least, depending too much on some key people, a lack of responsibility delegation and difficulties to develop human skills are the main factors that justify bankruptcy in SMEs (Storey, 1985) (Watkins, 1982).

As for the outsider's view, centered around an almost exclusively financial perspective, it begins very early in the 20th century (Fitz Patrick, 1932), but is extremely rarely focusing or even integrating SMEs (Keasey, Watson, 1991) (Morris, 1997).

Two authors play an invaluable role in the elaboration of a true conceptual financial framework allowing to understand how a company enters in a failing path :

- The fund flow approach developed by Beaver (1966) considers the firm, either big or small, as a reservoir of cash, which is drained by operations and capital expenditures and is fueled by revenues from operations : if this reservoir is initially too small and / or if cash drains are far more important than cash gains, then the firm goes bankrupt. Insufficient cash flow and a weak liquidity position are then the essential concepts explaining failure process.
- The multivariate approach developed by Altman (1968), who is the first to use discriminant analysis to determine which financial factors differentiate bankrupt and non-bankrupt firms, supposes that business failure results from a conjunction of different phenomenon, linked to solvency, liquidity, profitability and assets turnover in the firm. But no assumption is made as for which is the first phenomenon to cause the first step to a failing path and the emphasis is put on the short-term predictive ability of this model.

Most of the papers published since these two fundamental works have only refined this conceptual framework or have focused on the application of new statistical or mathematical tools to the problem of bankruptcy prediction (Dimitras et al., 1996) (Altman, 1984) ; most of them have validated the models proposed by Beaver and Altman, so that it's reasonable to consider that :

- financial business failure is the result of a conjunction of a liquidity, a solvency and a profitability position rapidly degrading ; however, links between these positions have still to be refined in a longitudinal perspective ;
- the nearest the date of the legal failure (that's a business failure sanctioned by a legal decision), the worst the liquidity and the solvency situation of the firm ; this is explained by the fact that most of the national commercial legislations define corporate bankruptcy as resulting exclusively from both insolvency and absence of liquidity (Altman, 1996) (Ooghe, Van Wymeersch, 1996).
- while it's reasonably feasible to accurately predict a legal failure 1 to 3 years before bankrupt, it's far less easy to predict such an event four years or more before, due to the variety of failing paths observed in practice, to the absence of true theoretical frameworks empirically

validated showing how and why a SME fails and to the variety of corrective actions which may be taken by managers.

ASSUMPTIONS

A combined analysis of the organizational and the financial views of small business failure suggests thus theoretically that a researcher who wants to develop a financial model to prevent bankruptcy amongst SMEs (thus a descriptive model that is able to detect failure risk 3 to 5 years before a fatal extremity, that is able to detect financial indicators showing how corrective actions could be taken and that would be usable by an external analyst) has to develop a specific methodology taking into account the following assumptions :

Assumption 1. In a context dominated by an ever more rapidly evolving environment, early warning business failure indicators have to be found amongst indicators linked to value creation process (Copeland et al., 2000) (Sheppard, 1994).

Assumption 2. Liquidity, solvency, profitability and activity indicators are then factors that, from the very short term to a middle-range term, are degrading once value creation degrades (Altman, 1996) (Morris, 1997).

Assumption 3. Specific financial indicators reflecting SMEs specificities have to be integrated in this research methodology (Keasey, Watson, 1991) (Walker, Petty, 1978).

So, the aim of our research is to empirically verify if this basic theoretical model is validated when analyzing on a longitudinal basis financial statements delivered by Belgian SMEs.

RESEARCH METHODOLOGY

Population

Our population is defined as restricted to any SME being in going concern from 1995 to 1998 and delivering exhaustive and controlled financial statements to the National Bank of Belgium. This population contains 6.215 SMEs and is selected by using the following successive criteria :

- all private-owned companies, located somewhere in Belgium, and employing between 10 and 250 people in 1998, are first selected, a SME being defined as a private firm employing less than 250 people ;
- all companies delivering their financial data in a short format² in 1995, 1996, 1997 or 1998 are then excluded, to warranty comparability of data between firms and over time ;
- any company not delivering financial data in 1995, 1996, 1997 or 1998 is also excluded, to eliminate new firms of which behavior is extremely specific (Storey, 1985), dead or almost dead companies of which accounts are not available or validated by the National Bank of Belgium, and restructuring companies that benefit from larger delays to deliver their accounts.

Measures

In most studies, the independent variable measuring business failure is a binary control variable (Morris, 1997), contingent on a legal decision sanctioning bankruptcy. This causes problems because all failing companies are not submitted to a legal decision sanctioning their failure (most failing firms, and especially in SMEs, stop activities by their manager's own will, without any official external decision) and because legal decisions follow sometimes very late the true economic death of a company. So, it's necessary to use an independent variable less dependent on external contingencies and reflecting more accurately the true economic failure of a firm.

Fundamentally, if we refer to the literature (Altman, 1996) (Copeland et al., 2000) (Morris, 1997), economic business failure may be defined as characterizing a company which is unable to create value on a long period. In practice, a firm creates economic value as soon as it generates a return on assets exceeding the weighted average cost of its capital. But this approach refers to the market value of equities and debts, and most SMEs don't provide such information. So, as stated by Ooghe and Van Wymeersch (1996), we suggest to consider that business failure occurs as soon as a firm doesn't generate on a continuous basis an added value which is sufficient for paying its external resources (thus creating a positive added value) and for remunerating its internal resources (labor force, internal and external financial resources, taxes, amortization) at a correct market price.

So, we build a specific ratio, called "Economic Added Result / Total Assets (EARTA)", as a proxy of economic business failure ; the "economic added result" is defined as the amount of revenues from daily operations that stays within the company once it has paid cost of sales (external resources), labor force, interest expenses, depreciation and amortization, income taxes and dividends (internal resources), and this economic added result is compared to total assets to measure how efficiently a SME uses all its assets to create and maintain added value within the company³. This ratio is used as a dependent variable and is first calculated for each SME in our population in 1995, 1996, 1997 and 1998 ; to deal with potential abnormal values (depending on sector or intrinsic circumstances), we compute then the average value of these four data and we use this averaged value as the indicator of EARTA for each SME.

Independent variables are financial ratios chosen for their frequent use in the finance and bankruptcy literature (Altman, 1996) (Bernstein, Wild, 1998) (Morris, 1997) or for their ability to reflect some specificities of financial attitudes in SMEs (Walker, Petty, 1978). We select 155 different ratios⁴, reflecting liquidity, solvency, assets utilization and efficiency, profitability, cost structure and return on invested capital ; each of them is calculated on 1995 and 1998 data. Furthermore, assets structure and capital structure, due to their major role as drivers of growth in SMEs (Storey, 1985), are detailed in 20 different additional ratios, calculated both in 1995 and in 1998, and the average annual growth rate of each of these 20 items between 1995 and 1998 is finally computed.

Statistical methodology

As a result, we dispose of a large financial database, containing, for our 6.215 Belgian SMEs, values of 175 ratios computed both in 1995 and 1998 and including 20 specific assets and capital structure growth rates (370 variables).

First, to deal with the problem of high correlations between numerous variables and to allow a further use of discriminant analysis, we apply cluster analysis on our raw data. The joining clustering method uses a matrix of dissimilarities (based on correlations) between variables and our amalgamation rule is based on Ward's method (Hartigan, 1990) ; one ratio (the most correlated to the others) is then selected within each cluster with a linkage distance less than 1. So, we select 63 complementary and less correlated ratios from our original database⁵.

Second, to focus our attention on ratios really discriminating between failing and non failing firms, we apply a discriminant analysis. First, we compute the average value of our dependent variable, EARTA, on the 1995-1998 period (to reduce dependence on abnormal values for some specific years) and we sort our SMEs on this average measure by descending values. Firms are then classified into three groups with equal size and firms belonging to Group 2 (the intermediate one) are temporarily eliminated (to really focus our attention on SMEs presenting either low or high efficiency in terms of Economic Added Results reported to Total Assets). We apply then a backward stepwise discriminant analysis to our 63 standardized selected ratios, discrimination being built between firms with high efficiency (Group 1) and low efficiency (Group 2) : such a methodology allows to deal with all statistical assumptions underlying discriminant analysis, which are often violated when using financial ratios (Eisenbeis, 1977) (Jennrich, 1977). Our final discriminant function contains 18 discriminating ratios (see Table 1) ; if it delivers interesting information on which ratios are the most affected by high or weak EARTA and on the global direction of this relation, however it doesn't provide information on some potential specific behavior characterizing subgroups of SMEs in our database.

So, it seems interesting to supplement our statistical methodology by applying a correspondence analysis (Hill, 1977) to a reduced database containing, for each of our 6.215 SMEs, EARTA as a supplementary variable and the 18 ratios selected by our discriminant analysis as active explanatory variables. As correspondence analysis (also referred as a generalized chi-square approach) applies only to discrete variables, original values of our ratios are ranked and sorted by deciles ; these deciles are then used to realize our correspondence analysis that allows us to get a descriptive graph (see Graph 1) providing information on which subgroups of SMEs, for each of our selected and ranked ratios, are really associated with the 10 subgroups of EARTA.

RESULTS AND DISCUSSION

A combined analysis of Table 1 (especially analysis of means of canonical variables and analysis of standardized coefficients of canonical variables) and Table 2 (which gives coordinates of both the 10 deciles of the supplementary variable, EARTA, and coordinates of the 10 deciles of each active variables on the two first main dimensions of correspondence analysis graph, allowing to detect which are the subgroups of each active variable associated with the different states or deciles of EARTA) shows that SMEs with low values of EARTA (thus with a small part of added value retained within the firm during the 1995-1998 period compared to total assets, which is a synonym of high failure risk if we accept Assumption 1) are characterized by the following elements :

- They are strongly undercapitalized, due essentially to a lack of bank liabilities which reflects both in a high cash flow ratio to total liabilities (V15) (which is due mainly to the low level of bank debts) and in a low level of total debt ratio (V9) : this may be explained by the fact that these SMEs create relatively few added value and consequently added result, being then considered as risky by banks and having then little access to bank liabilities.

- This difficult access to bank liabilities explains then that such SMEs rely essentially on shareholder's equity and, more globally, on equities to finance their activities. Once activity is becoming too risky, these shareholders hesitate to invest more in the company, but still accept to lend additional funds to the firm ; this explains why business failure risk increases when the amount of funds lent by the owner / manager to his SME increases (V10).

- The fact that most of the capital structure in the most risky SMEs is coming from their equities also explains why failure risk increases when working capital to total assets ratio (V13) ⁶ increases : due to a difficult access to short-term bank funds, long-term funds (then essentially equities) are dedicated to finance first fixed assets, but also need of working capital and cash (this explains the presence of the need of working capital ⁷ to total assets ratio (V11) and the presence of the cash to total assets ratio (V12)). But simultaneously, the more important the amount of cash to total assets (V12) and the more important the permanent need of working capital induced by operations (and thus the more important the activity level of the company) (V16 and V11), the less important the risk of business failure.

- Risky SMEs suffer from a continuous weak liquidity, low values of acid-test ratio in 1995 (V14) being reflected in low values of current ratio in 1998 (V1). Their capital structure presents also some specificities : the more risky a SME, the more important the amount of debts due to Fiscal Authorities, Social Security Authorities and employees (V2) and the more important the amount of accounts payable to finance total assets (V8). Furthermore, the more important the amount of taxes compared to added value, the more risky a SME (V3).

- As economic added result is defined as the amount of added value that stays within the company once it has paid its internal and external resources, it is not surprising that the less important the amount of economic added result resulting from added value, the more risky a SME. And the magnitude of the risk is logically far more important if added value is initially negative (V4).

- As added value is defined as the difference between revenues from operations and cost of sales, it is logical that failure risk increases when the amount of purchases compared to cost of sales (V5), the cost of external services (V6) and the residual costs (V7) increase (such an increase reflects in a decrease of added value). The presence of these three indicators reinforce the fact that, be the EARTA high or low, added value (and thus value creation) is the most important early warning financial signal to watch in Belgian SMEs.

- At least, growth appears to be a factor that globally increases business failure risk in a SME (the more important the growth in fixed assets and equities, the more important the risk of failure), especially when an increase in fixed assets (V17) is not financed by a proportional increase in equities (V18).

When comparing these results with facts emphasized in the bankruptcy literature (Altman, 1996) (Morris, 1997) (Ooghe et al., 1995) or in the SME-focused finance literature (Keasey, Watson, 1991), we notice the following elements :

- Three of the five elements emphasized by the Altman's function (1968) as predictors of failure (lack of liquidity and insufficient current and past profitability) are also present in our descriptive analysis. Furthermore and not surprisingly, assets turnover is replaced by the volume of added value, a concept largely ignored in the finance literature when Altman's

function was published and linked both to the level of activity and to its efficiency. But the fact that solvency doesn't play a role as clear in our model as in the Altman's model (i.e. the more solvent the company, the less important its failure risk) is more interesting and tends to prove that the problem of difficult access to bank funds once value creation reduces or even before (which results both in solvent but undercapitalized SMEs) induce that an external analyst may not limit his investigation to solvency and liquidity analysis (even these two factors are those taken into account by most national legislations to define legal bankruptcy).

- The main financial ratio emphasized by Beaver (1966) is also influenced by this consideration: while big companies are generally wealthy when their cash flow to total debts ratio is continuously high, this is not necessarily the case when analyzing SMEs with small positive cash flows and simultaneously extremely small (if not absent) debts.

Results inferred from this descriptive research show thus that :

- First of all, financial and intrinsic specificities of SMEs (especially the true structure of their capital and the reasons of such a structure) have to be integrated when searching for a financial early warning and SME-focused model.
- Second, more globally, a high continuous added result which derives from a high continuous added value and which opens on a high liquidity and solvency, an efficient cost structure, an ability to generate important cash flow compared to debt and a balanced growth in fixed assets and equities, is the main factor that decreases failure risk in Belgian SMEs, once ignored specific problems of undercapitalized SMEs.

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NOTES

1. For multiple reasons, amongst which financing of these researches by major banks is not the less important.
2. Belgian SMEs have the right to deliver their financial statements in a short format if they don't occupy more than 50 people, if their total assets is less than about 2.5 Mio Euros and their turnover is less than about 4 Mio Euros, one of these three criteria may be however exceeded. Information disclosed in a short format don't include data on turnover, on detailed cost structure, on detailed financial revenue and on exceptional results, which reduces interest of such information for scientific purposes.
3. This specific ratio may only be used when reviewed SMEs have to deliver detailed accounting data, which depends essentially on national accounting legislations.
4. These ratios are computed by using definitions proposed by Bernstein and Wild (1998) and / or adapted for the Belgian accounting legislation by Ooghe and Van Wymeersch (1996).

5. Detailed and complete results or variable definitions may be obtained, upon request, from the first author.
6. In the French conception, working capital is computed by considering first long-term financing funds and is defined as the amount of long-term capital (equities and long-term debt) that exceeds net fixed assets and which is thus available (if positive) to finance cash and short-term net assets induced by operations.
7. This ratio is computed as the total amount of accounts receivable and inventory that are not financed by accounts payable and have thus to be ideally financed by working capital, most of this amount being considered as a long-term need of financing funds (Ooghe, Van Wymeersch, 1996). The financing equation appears thus as Working Capital = Need of Working Capital + Cash.

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Table 1.

Classification matrix, discriminant function analysis summary and standardized coefficients for canonical variables.

Classification Matrix				Means of Canonical Variables	
Rows: Observed classifications				G_1: 1	-0,6014657
Columns: Predicted classifications				G_2: 3	0,56848478
Percent	G_1:1	G_2:3			
Correct	p=,48591	p=,51409			
G_1:1	75,5216293	1484	481		
G_2:3	76,1423798	496	1583		
Total	75,8407516	1980	2064		

Discriminant Function Analysis Summary					
Step 45, N of vars in model: 18; Grouping: PERCENTI (2 grps)					
Wilks' Lambda: ,74510 approx. F (18,4025)=76,496 p<0,0000					
	Wilks' Lambda	Partial Lambda	F-remove 1,4025	p-level	Std. Coeff. for Can. Var.
V1 (LIQSL98)	0,74724102	0,99714112	11,5400877	0,00068772	-0,14641327
V2 (D45_AT98)	0,77354419	0,96323484	153,62793	0	0,40906668
V3 (CFSCVA98)	0,74978209	0,99376172	25,2667046	5,2096E-07	0,24202378
V4 (RAJVA98)	0,74801797	0,99610537	15,737051	7,4051E-05	0,1931556
V5 (C60CTV98)	0,76238334	0,97733605	93,3379211	7,5978E-22	0,46060637
V6 (SBDCTV98)	0,74983954	0,99368554	25,5771465	4,4398E-07	0,23866682
V7 (AUTCTV98)	0,74853545	0,99541676	18,5324669	1,7101E-05	0,13420041
V8 (FOU_PT98)	0,75978392	0,98067975	79,2960587	7,938E-19	0,27983695
V9 (TD_PT98)	0,75480479	0,98714894	52,3989372	5,3986E-13	-0,33717376
V10 (CCP_PT98)	0,75550115	0,98623902	56,1607056	8,1648E-14	0,28781015
V11 (BFR98)	0,74710506	0,99732262	10,8054876	0,00102068	-0,23414494
V12 (T98)	0,74735487	0,99698919	12,1552143	0,00049474	-0,25998193
V13 (FRN_PT98)	0,7748214	0,96164709	160,527222	0	0,67664468
V14 (LIQSST95)	0,74776816	0,99643815	14,387804	0,00015095	-0,28199685
V15 (CFTCF95)	0,81472534	0,91454715	376,085175	0	0,63165146
V16 (BFR_PT95)	0,75347579	0,98889005	45,2199097	2,0087E-11	-0,25010642
V17 (EAI98)	0,75126368	0,99180192	33,2700577	8,6234E-09	0,21455291
V18 (EFP98)	0,75920892	0,98142254	76,1897202	3,7133E-18	0,22659995

Table 2.

Correspondence analysis - Column coordinates and contribution to inertia for supplementary variable (Deciles of EARTA) and some of the explanatory variables⁵

Column Coordinates and Contributions to Inertia					
Input Table (Rows x Columns): 171 x 171 (Burt Table)					
Total Inertia=8,5000					
Row Number	Coordin. Dim.1	Coordin. Dim.2	Mass	Quality	
LIQSL98:1	1	-1,54009338	1,53603074	0,00551533	0,55199596
LIQSL98:2	2	-1,12409344	0,15659828	0,00553321	0,15278152
LIQSL98:3	3	-0,72657225	-0,40454165	0,00547957	0,10630537
LIQSL98:4	4	-0,36836408	-0,65254526	0,00545276	0,06886645
LIQSL98:5	5	-0,10392595	-0,7145083	0,00576562	0,06077508
LIQSL98:6	6	0,18334871	-0,56028176	0,00512202	0,04234224
LIQSL98:7	7	0,52092187	-0,36606885	0,00558684	0,10414295
LIQSL98:8	8	0,81937161	-0,17634505	0,00597122	0,13379297
LIQSL98:9	9	0,96344741	0,14958755	0,00552427	0,11017808
LIQSL98:10	10	1,29152927	1,01661413	0,00560472	0,40039547
D45_AT98:1	11	0,4351133	0,11680661	0,00495218	0,09791304
D45_AT98:2	12	-0,0071766	-0,1881323	0,00529186	0,04459166
D45_AT98:3	13	-0,23524209	-0,31965247	0,00404934	0,03049162
D45_AT98:4	14	-0,20175222	-0,26511269	0,00685617	0,02316164
D45_AT98:5	15	-0,12766367	-0,19718042	0,00446947	0,00924299
D45_AT98:6	16	-0,15415991	-0,25293852	0,00529186	0,00923937
D45_AT98:7	17	-0,14576473	-0,23003736	0,00605167	0,01538386
D45_AT98:8	18	-0,00958958	-0,14314678	0,00588183	0,01096102
D45_AT98:9	19	0,015568	0,06077647	0,00567623	0,01905879
D45_AT98:10	20	0,3490545	1,08573074	0,00703495	0,3314371
...					
EFP98:1	171	0,35498652	0,27664902	0,00556003	0,02289684
EFP98:2	172	-0,07710229	0,10727076	0,00555109	0,00285627
EFP98:3	173	-0,17955434	-0,0574179	0,00555109	0,00898604
EFP98:4	174	-0,30375475	-0,10873947	0,00555109	0,01688828
EFP98:5	175	-0,3615907	-0,07505867	0,00556003	0,015931
EFP98:6	176	-0,25687591	-0,17754009	0,00555109	0,0113557
EFP98:7	177	-0,21849784	0,00090985	0,00556003	0,00545377
EFP98:8	178	-0,07565585	-0,15442399	0,00555109	0,00713775
EFP98:9	179	0,18559341	-0,12252063	0,00556003	0,01387926
EFP98:10	180	0,93101614	0,31024274	0,00556003	0,11762471
DECILES:1		-0,58852536	0,31270271		0,05771384
DECILES:2		-0,57481415	0,11656801		0,04301935
DECILES:3		-0,39134611	-0,14214474		0,01748381
DECILES:4		-0,21432231	-0,26517423		0,01481151

