Managing Financial Distress: Insight into the Dynamics of Insolvency Proceedings and Retrenchment in Small Businesses

Rachid ACHBAH

University Lyon 2, France

rachid.achbah@univ-lyon2.fr

Abstract

This study delves into the complex landscape of business restructuring, focusing on the significant challenges posed by bankruptcy, particularly for small and medium-sized enterprises (SMEs). Retrenchment, a crucial strategy in existing literature, involves cost-cutting measures and employee downsizing, while insolvency proceedings provide a legal avenue for comprehensive financial restructuring. Using a bivariate probit model, our Analysis explores the interdependence of these strategies and their impact on firm survival. Drawing on a dataset from firms in the Rhône-Alpes region, the study reveals consistent negative associations between sales, profitability, and availability with the initiation of both insolvency proceedings and retrenchment. Supplier liabilities, on the other hand, exhibit a positive association with both strategies. The Analysis identifies shared explanatory variables, confirming the correlation between insolvency proceedings and retrenchment. Moreover, the study unravels a reciprocal causal relationship between these strategies, providing valuable insights for navigating the intricate landscape of business restructuring.

Keywords: Insolvency proceedings, Retrenchment, Restructuring, Bivariate probit, Seemingly unrelated bivariate probit.

1. INTRODUCTION

In the realm of business, bankruptcy stands as an essential challenge, especially for small and medium-sized enterprises (SMEs), jeopardizing their operational continuity and overall existence. Addressing this critical issue involves a spectrum of strategies, with retrenchment emerging prominently in existing literature as a pivotal approach (Haynes, Thompson, and Wright 2003; Tangpong, Abebe, and Li 2015; Barbero, Di Pietro, and Chiang 2017). Retrenchment entails cost-cutting measures and employee downsizing through departures or layoffs.

Simultaneously, a legal avenue in the form of insolvency proceedings exists to facilitate the restructuring of financially distressed firms. Managers navigate between discrete restructuring and prompt initiation of insolvency proceedings, seeking court protection or opting for a hybrid strategy. Unraveling the intricate relationship between insolvency proceedings and retrenchment holds significant promise for advancing the field of restructuring bankrupt firms.

The primary objective of this study is to evaluate the impact of retrenchment and insolvency proceedings on the probability of firm survival. Utilizing a bivariate probit model, we aim to jointly model the initiation of both strategies and shed light on their interdependence. The dataset for this Analysis combines information from a sample of firms in the Rhône-Alpes region tracked from 2005 to 2015 and the Bodacc database.

Results from both the bivariate probit and seemingly unrelated bivariate probit models reveal a consistent negative association between explanatory variables (such as sales, profitability, and availability) and the initiation of insolvency proceedings and retrenchment. Notably, supplier liabilities exhibit a positive association with both strategies.

Delving into the antecedents of retrenchment and insolvency proceedings, this study refrains from theorizing the relationship between these strategies, choosing instead to investigate their intricate interplay empirically. The objectives of this Analysis encompass scrutinizing the factors influencing the initiation of insolvency proceedings and retrenchment strategies and exploring the dynamic relationship between these strategies to discern whether one triggers the other.

2. BACKGROUND AND LITERATURE REVIEW

Sooner or later, the firm's financial difficulties led to its bankruptcy. A firm is considered bankrupt when it cannot meet its current obligations as they become due. According to Basel II criteria, a firm is considered bankrupt when its scheduled payments are more than 90 days late. In such a situation, the bankrupt firm and its creditors must find a solution. There are essentially two different approaches to resolving financial difficulties. First, based on stakeholder negotiation, private restructuring attempts to achieve an informal restructuring of the firm's corporate capital structure. This usually involves reducing existing debts or deferral to a future date. Second, formal proceedings consist of the opening of insolvency proceedings in which the firm may apply for either liquidation or reorganization under the supervision of a bankruptcy court. For instance, in the French context, a firm may file for a safeguard, reorganization, or liquidation. In the first two cases, the firm files a reorganization plan that must be accepted by creditors and approved by the Court.

According to Haugen and Senbet (1978), Roe (1983), and Jensen (1989, 1991), since informal restructuring is less costly than formal bankruptcy proceedings, distressed firms and their creditors have incentives to choose private restructuring to minimize losses. Empirical studies by Gilson et al. (1990) and Betker (1997) reinforce this prediction. These costs are less than the direct costs usually associated with insolvency proceedings (Fisher and Martel, 2005).

Private restructuring is usually confidential and private to preserve the firm's continued business operations and goodwill. Nevertheless, insolvency proceedings are public, which can have a negative impact on the firm's reputation and its relationships with all its stakeholders. Informal negotiations guarantee confidential treatment of the firm's financial difficulties and maintain the confidence of creditors and the firm's image among investors and the public. Finally, it is acknowledged that private restructuring is quicker than insolvency proceedings, so informal negotiations also involve lower indirect costs.

2.1 THE CHOICE BETWEEN INSOLVENCY PROCEEDINGS AND RETRENCHMENT

The study by Morrison (2008) discussed the importance of non-bankruptcy proceedings in the United States. The article theoretically and empirically studied the conditions under which a firm chooses legal insolvency proceedings rather than private restructuring. Jostarndt and Sautner, 2010 in Germany have examined the factors that influence the restructuring choices of firms in financial difficulty. These studies focused on two of the most important European legal systems, the Common Law and the German Civil Law. Nevertheless, there are important differences between the two systems, particularly concerning the structure of their respective bankruptcy codes. Remarkably, no study has been made of French civil law's functioning, which has inspired other critical legal systems in continental Europe, such as those of Belgium and Luxembourg. This research contributes to the restructuring literature by investigating the decisions between informal (private) restructuring and formal insolvency proceedings for a sample of French firms in bankruptcy.

2.2 SELF-RESTRUCTURING THROUGH RETRENCHMENT

A firm's life cycle has its ups and downs, and its situation can deteriorate significantly due to mismanagement, corporate strategy, and financial crises. Without a quick and effective reaction from managers, the situation may continue to deteriorate until the firm suspends

payments, corresponding to the state of a firm justifying the initiation of insolvency proceedings. As a result, firm managers take a series of self-restructuring decisions to save the firm and avoid the suspension of payments.

However, retrenchment is the most common self-restructuring strategy for improving a firm's economic situation, especially during an economic downturn (Cascio & Young, 2003; Datta, Guthrie, Basuil, & Pandey, 2010; De Meuse, Bergmann, Vanderheiden, & Roraff, 2004; Luan & Tien, & Chi, 2013; Tsai & Shih, 2013). This is one of the most frequently adopted measures firms take in times of financial difficulty (Tsai & Yen, 2013), and therefore, in a situation of failure, given that the economic slowdown is among the exogenous causes of failure. Financial difficulties are the first signs that appear at the beginning of the failure process. Previously, retrenchment was seen as an indicator of organizational decline; today, it is seen as a formal strategy for restructuring an entire organization (McKinley et al., 1995).

Retrenchment is often applied reactively. However, this strategy is not only typical for firms in crisis or recession. Still, it can be implemented early when integrated into a broader restructuring strategy that prepares them for future threats and business downturns (Lee, 1997). Indeed, the retrenchment strategy improves the firm's performance by transforming the reduced cost structure into a comparative advantage (Mentzer, 1996). Studies attest a positive correlation between retrenchment, financial performance, and market reaction. Wayhan and Werner (2000) found that retrenchment significantly improves financial performance. Thus, retrenchment is assumed to affect firm survival positively and increases the probability of survival of failing firms.

2.3 RESTRUCTURING THROUGH INSOLVENCY PROCEEDINGS

The opening of insolvency proceedings aimed at continuing the firm's business activity via a reorganization plan begins with a six-month observation period, which is renewable twice

and theoretically allows the firm to reconstitute its cash flow and establish a repayment plan for its liabilities or to establish a disposal plan through which a third party takes over the firm's assets, without its liabilities. This period ends with a judgment of the Commercial Court. During this period, the firm is under legal protection: before the opening judgment, creditors may not pursue the business or carry out seizures to be paid. The firm then only reimburses potential debts incurred after the opening decision. Therefore, the non-repayment of only part of the debt allows the firm to have more tangible resources (raw materials, financial resources, etc.) and to reduce the pressure exercised by all the stakeholders, specifically the creditors. As a result, and in terms of resources, a firm that is in default in the context of insolvency proceedings has more advantages than a firm in the same default situation and is not subject to insolvency proceedings.

The insolvency proceedings allow the failing firm to reconstitute its cash position, reorganize it, and, if necessary, prepare a repayment plan for its creditors, which may last up to 10 years. The recovery plans organize the repayment of creditors in stages according to the firm's capacity. The court-appointed representative consults the creditors so that they can give their opinion on the plan, and based on their responses, the Court authorizes (or does not) the plan. Indeed, the reorganization plan within the framework of the insolvency proceedings allows the company to repay in installments. This constitutes a comparative advantage in terms of resources for the firms that are the subject of insolvency proceedings, given that they have more resources at their disposal and, therefore, more chance to restructure the firm's global situation. Given that the significant problem of a firm in bankruptcy is its resources and given that recovery through insolvency proceedings allows the firm to have more resources at its disposal with less pressure from all stakeholders, in this regard, we can presume that insolvency proceedings increase the chances of survival of failing firms.

However, initiating insolvency proceedings may harm the image of the general management and, by extension, the firm's whole image. Indeed, the stigmatization by the label of the insolvency proceedings further undermines the viability of a defaulting firm, which worsens the situation. Adverse reactions from all stakeholders increase the already high probability that a failing firm will experience organizational death. The risks of firm liquidation increase due to the loss of valuable relationships, poor quality participation by all stakeholders and less favorable trading relationships directly reduce the firm's resources, performance, and chances of survival.

In addition, the publication of the opening of insolvency proceedings can directly impact the company's resources. Given that it reduces the information asymmetry between the firm and its stakeholders, it allows external actors to re-evaluate the firm based on its new situation. Especially banks, which have a fundamental role in financing firms, seek all the information they can to reduce information asymmetry and be better informed about the firm's actual situation (Diamond, 1984). However, in the case of a firm that is the subject of insolvency proceedings, the banks will be less inclined to grant credit to these firms. Similarly, the publication of court judgments increases all rumors about the firm's situation, which encourages stakeholders to leave a firm under insolvency proceedings and discourages new stakeholders from participating in its relations with the firm. This will result in fewer resources for these firms and more difficulties in restructuring.

Indeed, stakeholders are increasingly putting their reputations first, and working with companies in insolvency proceedings can negatively impact their reputation, credibility, and future interests. For example, Ozkan, A. (2010) demonstrates that banks with a weak reputation have the desire to build a reputation as complex banks with failing firms. Although banks with a strong reputation always choose to push the firm towards liquidation, as this minimizes their losses, by selling the firm's assets. This behavior can be justified by the risk of loss associated

with financing a failing firm and by the fact that the bank gives more importance to its reputation, which can negatively impact the financing of failing firms. As a result, this reduces the sources of resources available to failing firms.

Stigmatization through insolvency proceedings has a negative impact on the reputation of firms and their managers. At the same time, all the stakeholders change their behavior towards these firms, especially the banks, which are also interested in reputation and, therefore, put more pressure on them, pushing them towards liquidation. Moreover, the etiquette of insolvency proceedings makes it challenging to establish new relationships that can help save a failing firm. Based on this reasoning, it is assumed that the insolvency proceedings accelerate the death of the failing firm.

This empirical paper investigates the paths leading to the resolution of financial distress for a sample of small and medium-sized French firms in default, focusing in particular on the impact of insolvency proceedings and retrenchment on the firm probability of survival and the manager's decisions between both strategies.

Dichotomous choices, such as out-of-court ("retrenchment") and in-court (" Insolvency") choices, are the main strategies discussed in the restructuring literature. The determinants of the likelihood of such a strategy generally include - using appropriate variables - quantitative information on the financial situation of the defaulting firm. This is usually determined by an individual selection process in which the perceived reputation, the costs of the proceedings, the firm's financial situation, and the leader's profile play a significant role. This involves a self-selection of the firm's managers based on observable and unobservable attributes.

3. SAMPLE AND DATA

To estimate our models, we used two sources. The first is the DIANE NEO database-Bureau Van Dijk and the second is the Bodacc database (Official Bulletin of Civil and Commercial Announcements). The firms were selected in the Rhône-Alpes region, from those providing complete accounting data for 2005 to 2014. It was merging the DIANE and Bodacc databases to have all historical information about the firm's bankruptcy. This region is France's second-largest economic region and presents a high variety of businesses and activities. By far, a heavyweight that counts at the European level, with a GDP equivalent to that of Denmark and higher than countries such as Finland, Portugal, or Greece. The region is not chosen at random, although it is the one that records the highest number of insolvency proceedings each year after the Île-de-France region.

3.1 VARIABLES AND MEASUREMENTS

Table 1: Variable definitions

Variable	Definition	Measure
Endogenous	Insolvency_proceedings	1 if the firm experienced insolvency proceedings during 2013 or after; otherwise, 0
Endogenous	Retrenchment	1 for retrenchment (20% reduction in personnel costs or firm's assets), otherwise 0
Exogenous	Turnover	Log of turnover in thousands of euros
Exogenous	Profitability	Measured by the ratio of net profits over total assets
Exogenous	Liquidity	Log of liquidity (in thousands of euros)
Exogenous	Cash_2009	Log of cash (in thousands of euros)
Exogenous	Trade receivables/turnover	Measured by the ratio of trade receivables over turnover
Exogenous	Supplier liabilities	Log of supplier liabilities (in thousands of euros)

Exogenous	Financial debts/Assets	Measured by the ratio of debt over total assets
Exogenous	Age	2005 less year of foundation
Exogenous	Industry	10 dummies correspond to the sectors: agriculture and fishing, transport and logistics, hotels and restaurants, construction, trade, industry, health and education, information and communication, financial and insurance activities other services.

Table 2: Summary statistics

	Modalities	**Freq.**	**Percent**	**Cum**
Insolvency_proceedings	0	41927	98.11%	98.11
	1	809	1.89%	100.00
Retrenchment _at_all	0	12060	28.22%	28.22
	1	30676	71.78%	100.00
Retrenchment_before	0	19726	46.16%	46.16
	1	23010	53.84%	100.00
Retrenchment_after	0	23128	54.12%	54.12
	1	19608	45.88%	100.00

Table 1 provides the definitions of the study variables. We present the summary information for all study variables in Tables 1 and 2. Within the 42736 firms, 809 have started a formal restructuring process through insolvency proceedings, representing 1.89 % of the sample. However, 71.78 % of the firms in the sample have initiated a private restructuring process through a retrenchment strategy, representing 30676 firms. To test the relationship between the two strategies, we investigated two different retrenchment strategies: retrenchment before initiating an insolvency proceeding and retrenchment after initiating insolvency proceedings. In our sample, 53.84% of the firms have initiated a retrenchment strategy before opening insolvency proceedings. However, 45.88% of them started to retrench after initiating

insolvency proceedings. To perform the preliminary Analysis, we will use several firms' information such as turnover, profitability, liquidity, cash, trade receivables/turnover, supplier liabilities, financial debts/assets, age, and industry. Table 3 summarizes all the variables employed in the Analysis with introductory statistics.

Table 3: Descriptive Statistics of all variables

Variable	Obs	Mean	Std.Dev.	Min	Max
Insolvency_proceedings	42736	.019	.136	0	1
Retrenchment _at_all	42736	.718	.45	0	1
Retrenchment_before	42736	.538	.499	0	1
Retrenchment _after	42736	.4588169	.4983069	0	1
Turnover_2011	42670	2434.261	7833.215	0	843000
Turnover_2012	42198	2495.4	7963.938	0	886000
Eco_profitability_2011	41643	-20.067	2432.621	-452000	1460.78
Eco_profitability_2012	41071	-58.875	7886.988	-1570000	239.59
Financial debts_2011	38358	187.91	1532.414	0	122000
Financial debts_2012	38488	195.538	1577.24	0	134000
Trade receivables_2011	38205	35.647	847.429	0	122000
Trade receivables_2012	38312	42.129	908.738	0	122000
Cash_2011	41704	191.48	761.88	0	51437
Cash_2012	41203	197.717	777.88	0	57779
Supplier_liabilities_2011	41913	333.515	1311.112	0	143000
Supplier_liabilities_2012	41388	331.005	1272.176	0	143000
Liquidity_2011	41891	2.472	4.308	0	99.6
Liquidity_2012	41355	2.553	4.587	0	99.73
Age	42736	21.763	12.992	8	99

Table 3 is a summary of all the variables employed in the paper, each of them being described in the following paragraphs.

3.2 THE ANTECEDENTS OF INSOLVENCY PROCEEDINGS AND RETRENCHMENT STRATEGIES.

3.2.1 Correlation test

The decision to initiate insolvency proceedings or a retrenchment strategy is supposed to be correlated, given the financial situation of firms in difficulties. Thus, to investigate the antecedents of both strategies, we start our Analysis with a Chi-square test of association. The results indicate that the two variables are associated (Pearson chi2(1) = 234.8170 P = 0.000).

Next, we used a correlation test to verify the relationship between our explanatory variables and the two treatments (insolvency procedure and retrenchment). The correlation test results indicate that turnover, cash, liquidity, and age are negatively associated with insolvency proceedings and retrenchment. Economic profitability is positively associated with insolvency proceedings and negatively associated with retrenchment. Supplier liabilities and financial debts are negatively associated with retrenchment.

Before fitting our probit model, we verified the relationship between the explanatory variables and the two treatments (insolvency procedure and retrenchment) using the correlation test. Thus, we can see if the selected explanatory variables are related to the two treatments, and if they are, they share the same explanatory variables. The results of the correlation test are then presented in Table 4. We observe that turnover, trade receivables, cash, liquidity, and age are negatively associated with insolvency proceedings and retrenchment. Economic profitability is negatively associated with insolvency proceedings and positively associated with retrenchment. Supplier liabilities are associated negatively with retrenchment.

Table 4. Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Insolvency_proceedings	1.000									
(2) Retrenchment	0.340***	1.000								
(3) Turnover	-0.040***	-0.295***	1.000							
(4) Eco profitability	-0.041***	0.028***	-0.197***	1.000						
(5) Financial debts	-0.001	-0.054***	0.168***	0.050***	1.000					
(6) Trade receivables	-0.012**	-0.045***	0.077***	0.026***	0.135***	1.000				
(7) Cash	-0.099***	-0.234***	0.491***	0.102***	0.085***	0.099***	1.000			
(8) Suppliers' liabilities	0.005	-0.260***	0.823***	-0.231***	0.185***	0.094***	0.398***	1.000		
(9) Liquidity	-0.089***	-0.041***	-0.051***	0.231***	0.100***	0.077***	0.310***	-0.161***	1.000	
(10) Age	-0.048***	-0.122***	0.323***	-0.069***	0.057***	0.078***	0.268***	0.313***	0.162***	1.000

**** p<0.01, ** p<0.05, * p<0.1*

3.2.2 UNIVARIATE ANALYSIS

Univariate probit regression is estimated for insolvency proceedings and retrenchment to see the effect of each explanatory variable when fitted with other explanatory variables and compare their effects on retrenchment and insolvency proceedings separately. The results of the univariate models are discussed in the next section.

Univariate Analysis for Insolvency Proceedings

The insolvency proceeding strategy is fitted with all the independent variables to investigate the factors that affect the initiation of insolvency proceedings by firms in difficulty. Table 5 presents the results with all the variables included using a probit model.

Table 5. Probit regression for insolvency proceedings

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Insolvency proceedings							
Turnover	-0.046	0.046	-0.99	0.001	-0.136	-0.044	***
Eco profitability	-0.087	0.024	-3.58	0.000	-0.134	-0.039	***
Financial debts	0.022	0.014	1.52	0.008	-0.006	-0.050	***
Trade receivables	-0.037	0.034	-1.10	0.272	-0.104	0.029	
Cash	-0.167	0.018	-9.09	0.000	-0.203	-0.131	***
Suppliers liabilities	0.137	0.037	3.69	0.000	0.064	0.210	***
Liquidity	-0.814	0.098	-8.34	0.000	-1.006	-0.623	***
Turnover_var	-0.269	0.087	-3.08	0.002	-0.440	-0.098	***
Trade receivables_var	0.024	0.050	0.48	0.630	-0.075	0.123	
Cash_var	-0.138	0.021	-6.52	0.000	-0.179	-0.096	***
Supplier liabilities_var	0.042	0.056	0.76	0.450	-0.068	0.152	
Liquidity_var	-1.395	0.144	-9.69	0.000	-1.678	-1.113	***
Financial debts_var	-0.002	0.022	-0.09	0.932	-0.044	0.040	
Eco profitability_var	0.000	0.000	1.06	0.291	0.000	0.001	
Age	0.002	0.002	0.65	0.515	-0.003	0.006	
Constant	-1.540	0.187	-8.21	0.000	-1.907	-1.172	***
Industry dummies	Yes						

Mean dependent var	0.007	SD dependent var	0.084
Pseudo r-squared	0.167	Number of obs	29607.000
Chi-square	414.363	Prob > chi2	0.000
Akaike crit. (AIC)	2094.795	Bayesian crit. (BIC)	2227.527

*** p<0.01, ** p<0.05, * p<0.1*

Table 5 shows that turnover, economic profitability, cash, and liquidity are negatively and significantly associated with initiating insolvency proceedings. The same result was found with the correlation test of association. In addition, there are also supplier liabilities and financial debts, which are positively associated with the initiation of insolvency proceedings. When fitted with other variables, they become significant.

Univariate Analysis for

retrenchment

Retrenchment is fitted with all the explanatory variables to identify the likelihood of initiating a retrenchment strategy from firms in difficulty using a probit model. Results are presented in Table 6.

Table 6. Probit regression for retrenchment

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Retrenchment							
Turnover	-0.411	0.014	-29.45	0.000	-0.438	-0.384	***
Eco profitability	-0.022	0.008	-2.72	0.007	-0.038	-0.006	***
Financial debts	0.012	0.004	3.04	0.002	0.004	0.020	***
Trade receivables	0.004	0.008	0.53	0.593	-0.011	0.019	
Cash	-0.051	0.006	-9.03	0.000	-0.062	-0.040	***

Suppliers liabilities	0.094	0.011	8.90	0.000	0.073	0.115	***
Liquidity	0.006	0.021	0.28	0.781	-0.035	0.047	
Turnover_var	-0.563	0.035	-16.23	0.000	-0.631	-0.495	***
Trade receivables_var	0.004	0.014	0.30	0.760	-0.023	0.031	
Cash_var	-0.035	0.007	-4.84	0.000	-0.049	-0.021	***
Supplier liabilities_var	0.024	0.016	1.49	0.136	-0.008	0.056	
Liquidity_var	-0.017	0.038	-0.44	0.661	-0.091	0.058	
Financial debts_var	0.007	0.006	1.17	0.244	-0.005	0.019	
Eco profitability_var	-0.002	0.001	-2.51	0.012	-0.004	0.000	**
Age	0.000	0.001	-0.71	0.475	-0.002	0.001	
Constant	3.115	0.062	50.11	0.000	2.993	3.237	***
Industry dummies	Yes						

Mean dependent var	0.667	SD dependent var	0.471
Pseudo r-squared	0.101	Number of obs	29607.000
Chi-square	3818.905	Prob > chi2	0.000
Akaike crit. (AIC)	33882.816	Bayesian crit. (BIC)	34015.548

**** p<0.01, ** p<0.05, * p<0.1*

The result of the univariate Analysis of retrenchment in Table 6 shows that turnover, economic profitability, and cash are negatively associated with the initiation of retrenchment. However, this result also indicates that supplier liabilities and financial debts are positively related to the initiation of retrenchment when fitted with other variables.

3.2.3 Bivariate Analysis for insolvency proceeding and retrenchment

A bivariate probit model is used to simultaneously model the initiation of insolvency proceedings and retrenchment. The decision between private and insolvency proceedings is supposed to be correlated since both variables concern firms with financial difficulties. The bivariate model is commonly used to estimate linked decisions. We first modeled the data using a bivariate probit model and then fitted them using the seemingly unrelated bivariate probit model. Since we used the same explanatory variables for both equations, the results are the

same for both methods. Table 7 presents the bivariate Analysis of insolvency and retrenchment using the bivariate probit model. Table 8 shows the seemingly unrelated bivariate probit test.

Tables 7 and 8 show that the explanatory variables, turnover, profitability, and cash, are negatively associated with initiating insolvency proceedings and retrenchment. However, financial debts and supplier liabilities are positively associated with both strategies. Consequently, we can say that, as expected, insolvency proceedings and retrenchment share the same explanatory variables.

Table 7. Bivariate probit regression

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Insolvency proceedings							
Turnover	-0.043	0.046	-0.93	0.002	-0.133	-0.048	***
Eco profitability	-0.082	0.024	-3.40	0.001	-0.130	-0.035	***
Financial debts	0.023	0.014	1.60	0.009	-0.005	-0.051	***
Trade receivables	-0.031	0.034	-0.91	0.363	-0.097	0.036	
Cash	-0.169	0.018	-9.23	0.000	-0.205	-0.134	***
Suppliers liabilities	0.129	0.037	3.47	0.001	0.056	0.202	***
Liquidity	-0.789	0.096	-8.20	0.000	-0.978	-0.601	***
Turnover_var	-0.257	0.086	-3.00	0.003	-0.425	-0.089	***
Trade receivables_var	0.032	0.048	0.66	0.507	-0.063	0.127	
Cash_var	-0.138	0.021	-6.52	0.000	-0.179	-0.096	***
Supplier liabilities_var	0.045	0.056	0.81	0.420	-0.064	0.154	
Liquidity_var	-1.328	0.141	-9.39	0.000	-1.605	-1.051	***
Financial debts_var	0.000	0.021	0.01	0.989	-0.041	0.042	
Eco profitability_var	0.000	0.000	0.99	0.322	0.000	0.001	
Age	0.002	0.002	0.66	0.511	-0.003	0.006	
Constant	-1.546	0.188	-8.23	0.000	-1.914	-1.177	***
Industry dummies	Yes						
Retrenchment							
Turnover	-0.410	0.014	-29.41	0.000	-0.437	-0.383	***
Eco profitability	-0.021	0.008	-2.67	0.008	-0.037	-0.006	***

Financial debts	0.012	0.004	3.04	0.002	0.004	0.020	***
Trade receivables	0.004	0.008	0.53	0.597	-0.011	0.019	
Cash	-0.052	0.006	-9.12	0.000	-0.063	-0.041	***
Suppliers liabilities	0.094	0.011	8.90	0.000	0.073	0.115	***
Liquidity	0.007	0.021	0.33	0.741	-0.034	0.048	
Turnover_var	-0.562	0.035	-16.24	0.000	-0.630	-0.494	***
Trade receivables_var	0.004	0.014	0.30	0.767	-0.023	0.031	
Cash_var	-0.035	0.007	-4.93	0.000	-0.049	-0.021	***
Supplier liabilities_var	0.024	0.016	1.50	0.135	-0.008	0.056	
Liquidity_var	-0.016	0.038	-0.41	0.682	-0.090	0.059	
Financial debts_var	0.007	0.006	1.17	0.242	-0.005	0.019	
Eco profitability_var	-0.002	0.001	-2.28	0.022	-0.004	0.000	**
Age	0.000	0.001	-0.70	0.481	-0.002	0.001	
Constant	3.109	0.062	50.06	0.000	2.987	3.230	***
Industry dummies	Yes						
athrho	0.399	0.054	7.33	0.000	0.292	0.505	***
rho	0.378	0.046			0.284	0.466	***

Mean dependent var	0.667	SD dependent var	0.471
Number of obs	29607.000	Chi-square	3714.364
Prob > chi2	0.000	Akaike crit. (AIC)	35914.172

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

The sub-parameter rho measures the correlation of the residuals of the two models. The two equations are strongly correlated, rho = 0.378, which is very significant (chi-square = 65.4387, p =0.000). The parameter athrho is the same as rho. The difference is that athrho does not directly estimate the correlation between the error terms but rather the Fischers' rho z-transformation. This transformation is also significant and is at the same level as the parameter rho.

Table 8. Seemingly unrelated bivariate probit

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Insolvency proceedings							
Turnover	-0.043	0.046	-0.93	0.003	-0.133	-0.048	***
Eco profitability	-0.082	0.024	-3.40	0.001	-0.130	-0.035	***
Financial debts	0.023	0.014	1.60	0.050	-0.005	-0.051	**
Trade receivables	-0.031	0.034	-0.91	0.363	-0.097	0.036	
Cash	-0.169	0.018	-9.23	0.000	-0.205	-0.134	***
Suppliers liabilities	0.129	0.037	3.47	0.001	0.056	0.202	***
Liquidity	-0.789	0.096	-8.20	0.000	-0.978	-0.601	***
Turnover_var	-0.257	0.086	-3.00	0.003	-0.425	-0.089	***
Trade receivables_var	0.032	0.048	0.66	0.507	-0.063	0.127	
Cash_var	-0.138	0.021	-6.52	0.000	-0.179	-0.096	***
Supplier liabilities_var	0.045	0.056	0.81	0.420	-0.064	0.154	
Liquidity_var	-1.328	0.141	-9.39	0.000	-1.605	-1.051	***
Financial debts_var	0.000	0.021	0.01	0.989	-0.041	0.042	
Eco profitability_var	0.000	0.000	0.99	0.322	0.000	0.001	
Age	0.002	0.002	0.66	0.511	-0.003	0.006	
Constant	-1.546	0.188	-8.23	0.000	-1.914	-1.177	***
Industry dummies	Yes						
Retrenchment							
Turnover	-0.410	0.014	-29.41	0.000	-0.437	-0.383	***
Eco profitability	-0.021	0.008	-2.67	0.008	-0.037	-0.006	***
Financial debts	0.012	0.004	3.04	0.002	0.004	0.020	***
Trade receivables	0.004	0.008	0.53	0.597	-0.011	0.019	
Cash	-0.052	0.006	-9.12	0.000	-0.063	-0.041	***
Suppliers liabilities	0.094	0.011	8.90	0.000	0.073	0.115	***
Liquidity	0.007	0.021	0.33	0.741	-0.034	0.048	
Turnover_var	-0.562	0.035	-16.24	0.000	-0.630	-0.494	***
Trade receivables_var	0.004	0.014	0.30	0.767	-0.023	0.031	
Cash_var	-0.035	0.007	-4.93	0.000	-0.049	-0.021	***
Supplier liabilities_var	0.024	0.016	1.50	0.135	-0.008	0.056	

Liquidity_var	-0.016	0.038	-0.41	0.682	-0.090	0.059	
Financial debts_var	0.007	0.006	1.17	0.242	-0.005	0.019	
Eco profitability_var	-0.002	0.001	-2.28	0.022	-0.004	0.000	**
Age	0.000	0.001	-0.70	0.481	-0.002	0.001	
Constant	3.109	0.062	50.06	0.000	2.987	3.230	***
Industry dummies	Yes						
athrho	0.399	0.054	7.33	0.000	0.292	0.505	***

Mean dependent var	0.667	SD dependent var	0.471
Number of obs	29607.000	Chi-square	3714.364
Prob > chi2	0.000	Akaike crit. (AIC)	35914.172

*** $p<0.01$, ** $p<0.05$, * $p<0.1$*

After fitting the different tests, we summarize the results in Table 9. The results indicate that the estimated coefficients are almost identical in the different models. The results are the same for the signs of the coefficients. Specifically, sales, profitability, and availability are significant and have a negative effect on the initiation of insolvency proceedings and cost reduction in all tests. However, supplier liabilities positively impact the probability of initiating insolvency proceedings and retrenchment. Concerning the variable loans, the coefficient is positively significant and only affects the retrenchment strategy in all tests. For the liquidity level, the coefficient is negative and only impacts the insolvency proceedings in all tests. However, for variable trade receivables, it is insignificant in all tests, except for the correlation test. Furthermore, the Rho parameter is highly significant, leading us to conclude that the insolvency proceedings and the retrenchment are correlated. Therefore, we can say that the two restructuring strategies have the same explanatory variables, which may explain the correlation between them.

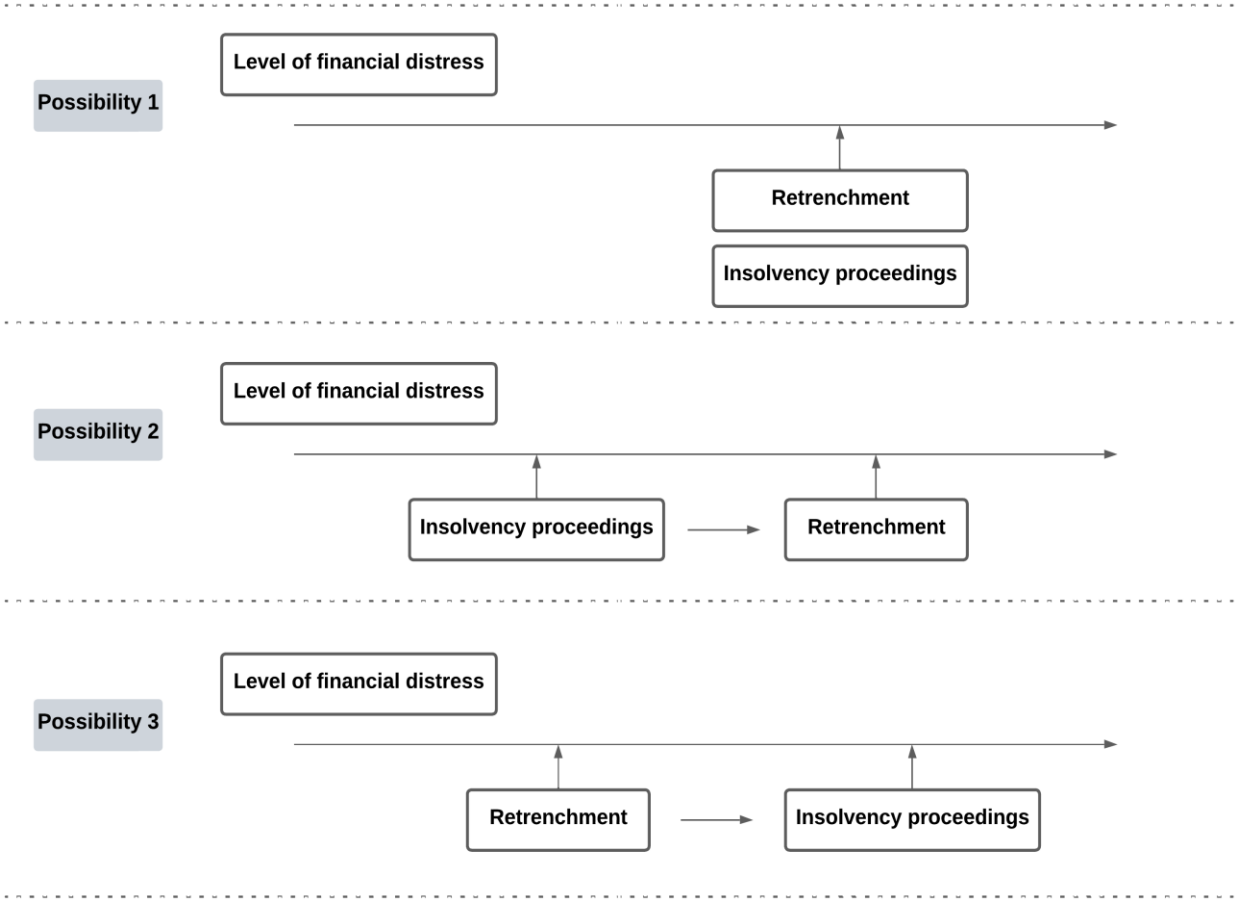
Table 9. Comparison between the different tests

Independent variables	Correlation test		univariate probit		Bivariate or seemingly unrelated probit	
	IP	Ret	IP	Ret	IP	Ret
Turnover	-0.015***	-0.089***	-0.046***	-0.411***	-0.043***	-0.410***
Profitability	0.001***	-0.012**	-0.087***	-0.022***	-0.082***	-0.021***
Financial debts	-0.005	-0.011*	0.022***	0.012***	0.023***	0.012***
Trade receivables	-0.005	-0.006	-0.037	0.004	-0.031	0.004
Cash	-0.017***	-0.057***	-0.167***	-0.051***	-0.169***	-0.052***
Supplier liabilities	-0.005	-0.260***	0.137***	0.094***	0.129***	0.094***
Liquidity	-0.034***	-0.041***	-0.814***	0.006	-0.789***	0.007
Age	-0.030***	-0.122***	0.002	0.000	0.002	0.000
athrho					0.399***	
rho					0.378***	

3.2.4 Investigating the causal relationship between insolvency proceedings and retrenchment strategies

The second objective of the Analysis is to investigate the potential causal relationship between the two strategies, namely the insolvency proceedings and retrenchment. The precedent analysis showed that the two treatments share some explanatory variables. However, we may ask which provokes the other: Does retrenchment increase the chances of initiating insolvency proceedings or the reverse. Figure 1 highlights three possible causalities:

Figure 1. The different relationship between insolvency proceedings and retrenchment



4. DISCUSSION

The recursive bivariate probit analysis yields compelling insights into the reciprocal relationship between retrenchment and insolvency proceedings, shedding light on the intricate dynamics of these restructuring strategies. Table 12 indicates a notable positive and significant effect, with retrenchment exerting a considerable influence on initiating insolvency proceedings (b=2.936, p=0.000). Conversely, Table 13 reveals a similarly significant impact in the opposite direction, where insolvency proceedings positively affect the initiation of retrenchment (b=2.463, p=0.000). These findings substantiate the simultaneous causalities between the two strategies, suggesting a mutual influence—retrenchment can prompt insolvency proceedings

and vice versa. This mutual influence underscores the complexity and interdependence of these restructuring mechanisms, addressing the endogeneity concerns raised throughout the study.

These results align with the premise that firms facing financial distress often adopt a comprehensive approach, simultaneously considering both retrenchment and insolvency proceedings as viable strategies for survival. The positive and significant coefficients affirm that initiating one strategy substantially increases the likelihood of triggering the other, highlighting a dynamic interplay between retrenchment and insolvency proceedings.

Practically, these findings offer valuable guidance for managers and policymakers dealing with financially distressed SMEs. Acknowledging the interdependence of retrenchment and insolvency proceedings, decision-makers may need to adopt a holistic approach that considers the potential cascading effects of one strategy on the other. Moreover, understanding the simultaneous causality between these strategies emphasizes the need for nuanced and comprehensive interventions to navigate financial distress successfully. This discussion reinforces the significance of considering restructuring strategies' broader context and interconnectedness when formulating effective policies for distressed SMEs.

Table 10. Recursive bivariate probit

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Insolvency proceedings							
Retrenchment	2.936	0.202	14.56	0.000	2.541	3.332	***
Turnover	0.345	0.032	10.76	0.000	0.282	0.407	***
Eco profitability	-0.013	0.015	-0.85	0.050	-0.043	-0.017	**
Financial debts	0.000	0.007	0.02	0.007	-0.013	-0.014	***
Trade receivables	-0.012	0.014	-0.88	0.379	-0.040	0.015	
Cash	-0.014	0.021	-0.67	0.505	-0.056	0.028	
Suppliers liabilities	-0.028	0.026	-1.07	0.286	-0.080	0.024	
Liquidity	-0.273	0.095	-2.87	0.004	-0.459	-0.086	***

Turnover_var	0.367	0.078	4.68	0.000	0.214	0.521	***
Trade receivables_var	-0.004	0.024	-0.17	0.867	-0.051	0.043	
Cash_var	-0.018	0.019	-0.95	0.340	-0.055	0.019	
Supplier liabilities_var	-0.012	0.026	-0.46	0.647	-0.063	0.039	
Liquidity_var	-0.462	0.163	-2.83	0.005	-0.781	-0.142	***
Financial debts_var	-0.009	0.009	-0.99	0.320	-0.027	0.009	
Eco profitability_var	0.000	0.000	-0.15	0.883	0.000	0.000	
Age	0.001	0.001	0.90	0.371	-0.001	0.003	
Constant	-5.661	0.286	-19.79	0.000	-6.222	-5.100	***
Industry dummies	Yes						
Retrenchment							
Turnover	-0.408	0.014	-29.36	0.000	-0.436	-0.381	***
Eco profitability	-0.025	0.008	-3.17	0.002	-0.041	-0.010	***
Financial debts	0.012	0.004	3.08	0.002	0.004	0.020	***
Trade receivables	0.004	0.008	0.50	0.614	-0.011	0.019	
Cash	-0.050	0.006	-8.80	0.000	-0.061	-0.039	***
Suppliers liabilities	0.093	0.011	8.86	0.000	0.073	0.114	***
Liquidity	0.009	0.021	0.43	0.667	-0.032	0.050	
Turnover_var	-0.550	0.034	-16.09	0.000	-0.617	-0.483	***
Trade receivables_var	0.001	0.014	0.08	0.933	-0.025	0.028	
Cash_var	-0.034	0.007	-4.72	0.000	-0.048	-0.020	***
Supplier liabilities_var	0.021	0.016	1.30	0.194	-0.011	0.053	
Liquidity_var	-0.008	0.038	-0.21	0.832	-0.082	0.066	
Financial debts_var	0.006	0.006	1.02	0.306	-0.006	0.018	
Eco profitability_var	-0.004	0.001	-5.44	0.000	-0.006	-0.003	***
Age	0.000	0.001	-0.77	0.442	-0.002	0.001	
Constant	3.095	0.062	49.80	0.000	2.973	3.217	***
Industry dummies	Yes						
athrho	-2.204	0.435	-5.06	0.000	-3.057	-1.351	***

Mean dependent var	0.667	SD dependent var	0.471
Number of obs	29607.000	Chi-square	4384.950
Prob > chi2	0.000	Akaike crit. (AIC)	35888.312

**** p<0.01, ** p<0.05, * p<0.1*

Table 11. Recursive bivariate probit

	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
Insolvency proceedings							
Turnover	-0.025	0.044	-0.56	0.058	-0.112	-0.062	*
Eco profitability	-0.087	0.024	-3.65	0.000	-0.133	-0.040	***
Financial debts	0.019	0.014	1.37	0.051	-0.008	-0.047	**
Trade receivables	-0.050	0.034	-1.49	0.137	-0.116	0.016	
Cash	-0.163	0.018	-9.06	0.000	-0.198	-0.127	***
Suppliers liabilities	0.127	0.036	3.51	0.000	0.056	0.198	***
Liquidity	-0.843	0.096	-8.77	0.000	-1.032	-0.655	***
Turnover_var	-0.303	0.088	-3.43	0.001	-0.476	-0.130	***
Trade receivables_var	0.010	0.051	0.21	0.837	-0.089	0.110	
Cash_var	-0.137	0.021	-6.60	0.000	-0.178	-0.096	***
Supplier liabilities_var	0.029	0.055	0.52	0.604	-0.080	0.137	
Liquidity_var	-1.453	0.144	-10.11	0.000	-1.735	-1.171	***
Financial debts_var	-0.009	0.021	-0.43	0.666	-0.051	0.033	
Eco profitability_var	0.000	0.000	1.17	0.242	0.000	0.001	
Age	0.001	0.002	0.54	0.588	-0.003	0.006	
Constant	-1.603	0.184	-8.69	0.000	-1.965	-1.242	***
Industry dummies	Yes						
Retrenchment							
Insolvency proceedings	2.463	0.226	10.89	0.000	2.020	2.906	***
Turnover	-0.406	0.014	-29.04	0.000	-0.434	-0.379	***
Eco profitability	-0.018	0.008	-2.25	0.024	-0.034	-0.002	**
Financial debts	0.011	0.004	2.75	0.006	0.003	0.019	***
Trade receivables	0.004	0.008	0.53	0.599	-0.011	0.019	
Cash	-0.043	0.006	-7.59	0.000	-0.055	-0.032	***
Suppliers liabilities	0.089	0.011	8.41	0.000	0.068	0.110	***
Liquidity	0.021	0.021	0.98	0.325	-0.020	0.062	
Turnover_var	-0.547	0.035	-15.79	0.000	-0.615	-0.479	***
Trade receivables_var	0.003	0.014	0.24	0.812	-0.023	0.030	
Cash_var	-0.028	0.007	-3.94	0.000	-0.042	-0.014	***
Supplier liabilities_var	0.023	0.016	1.44	0.150	-0.008	0.055	
Liquidity_var	0.019	0.038	0.49	0.627	-0.056	0.094	
Financial debts_var	0.007	0.006	1.11	0.267	-0.005	0.019	
Eco profitability_var	-0.002	0.001	-2.09	0.036	-0.003	0.000	**

Age	-0.001	0.001	-0.83	0.405	-0.002	0.001	
Constant	3.040	0.064	47.78	0.000	2.915	3.165	***
Industry dummies	Yes						
athrho	-0.674	0.148	-4.54	0.000	-0.964	-0.383	***

Mean dependent var	0.667	SD dependent var	0.471
Number of obs	29607.000	Chi-square	4000.955
Prob > chi2	0.000	Akaike crit. (AIC)	35891.064

*** *p<0.01, ** p<0.05, * p<0.1*

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