

## BRIEF REPORT

# Firm Failure Causes in the Forest Sector: An Analysis of Bankrupted Estonian Firms

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## Abstract

This paper studies firm failure causes in the forest sector and is based on a thorough analysis of 50 bankruptcy cases from Estonia. The results indicate that in the forest sector in more than a half of the occasions firm failure was triggered by either only internal or external reasons. Namely, for 26 % of cases bankruptcy was caused by only internal reasons, for 30 % by only external reasons and for 44 % by both reasons. The most common causes noted in court judgments were concentration on only a few customers (resulting in cessation of cooperation or unpaid claims), unfavourable market developments (drop in demand or in product prices and increase in competition or in input factor prices), lengthy unprofitable activities, lack of working capital, too low share of equity or inability to find additional financial resources, and management errors.

**Keywords:** forest sector, firm failure, bankruptcy causes

## Introduction

Firm failure has been extensively studied for decades, but so far such research has been dominated by empirical studies about failure prediction. Studies about failure causes have been rather infrequent (see e.g. Altman and Narayanan 1997). Although there are numerous notions of firm failure (see e.g. Cochran 1981 for different definitions), this paper applies the most commonly used term, that is bankruptcy (permanent insolvency). Still, it should be acknowledged that failure causes in case of different definitions (e.g. failure in the sense of not achieving the expected rate of return) could differ from those common to bankrupted firms. Available studies outlining failure causes based on the data of bankrupted firms concentrate on larger industries (see e.g. Hall 1992, Baldwin et al. 1997) and there are no studies available specifically about the forest sector. In this study, the forest sector is considered in its classical meaning (see e.g. Lebedys 2004), namely the following International Standard Industrial Classification (i.e. ISIC; revision 4) divisions: a) 02 - forestry and logging, b) 16 - manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials, c) 17 - manufacture of paper and paper products. In the Estonian economy, the forest sector holds a prominent role because

of higher share of woodland cover compared to other European Union countries except for Sweden and Finland according to land cover and land use statistics (see Eurostat 2012) and long traditions in the industry. According to Statistics Estonia (2015), the share of the previously noted three industries (ISIC divisions 02, 16, 17) ranged from 3.0 % to 4.5 % of total Estonian GDP in 2000-2013, being the lowest in 2009 during the economic recession.

In the literature, there is no consensus whether firms fail mainly because of management deficiencies (i.e., internal causes) or unfavourable events in the environment. Therefore, a broad range of different theoretical streams (e.g. population ecology and strategic choice approaches) try to explain the root causes of firms' collapse, whereas more novel approaches focus on the interaction of different theories, that is, internal and external failure causes are considered simultaneously (Daily 1994). Correspondingly, Mellahi and Wilkinson (2004) have noted that collapse caused due to only internal or external reasons emerges only in extreme circumstances (e.g. management fraud or serious incompetence, some external shocks like *force majeure*). Most generally, external causes are defined as factors beyond the management control and internal causes as factors under the management's control (e.g. Boyle and Desai 1991: 34). As with theoretical approaches, a lot of fragmentation through findings can

also be found in empirical studies. Firstly, studies have relied on varying data sources, like interviewing management or owners (e.g. Gaskill et al. 1993), conducting questionnaires among trustees (e.g. Baldwin et al. 1997), and applying opinions from court documents (e.g. Hall 1992, Blazy and Chopard 2010). Of these approaches, the opinions of trustees or courts should be considered more reliable, as the assessments by the owners or management of bankrupted firms can be biased (Beaver 2003). Previous studies also show variation in the taxonomies of applied failure reasons. Although in most cases the taxonomies are more sophisticated than simple internal-external taxonomy, they can eventually be distilled into one. Generally, the internal failure causes as reasons of corporate collapse seem to be more frequent in empirical literature when compared with external failure causes (see e.g. Hall 1992, Gaskill et al. 1993). Still, the above could depend on whether in case of overly passive or active responses to environmental changes (see e.g. van Witteloostuijn 1998), the cause is marked to be internal or external. Literature provides little evidence about failure causes in the primary sector (including logging firms). Lukason (2014), for instance, found internal and external reasons of failure to be almost equally important on the example of agricultural firms. Laitinen et al. (2014) found that among European ISIC section A firms, the most common failure process was gradual worsening of financial situation through pre-bankruptcy years – a situation that according to a study by Lukason and Hoffman (2014) could be associated with multiple failure causes. There is more evidence about manufacturing firms, although in aggregated form, not for different divisions of ISIC section C. Baldwin et al. (1997) found that the most common external causes affecting more than a half of the manufacturing firms were the economic downturn, competition and customer difficulties, whereas from internal causes, general, financial and marketing management problems were characteristic for up to  $\frac{3}{4}$  of these firms. According to Hall's (1992) study, manufacturing firms were mostly bankrupted because of operational management (all internal reasons) and strategic (mainly external reasons) problems. In summary, the available evidence about why firms fail is divergent.

Indirect evidence about firm failure causes can be found in other streams of research. For instance, Hoff et al. (1997) found that being competitive in secondary wood products industry is not only hindered by classical causes as government regulations, resource (including labour) availability and price, but also by innovation in different domains like technology, strategic management and marketing. Laitinen (2007) noted the importance of both tangible and intangible resources for gaining success in woodworking industry. Thus, both internal and external factors have been found to influence firm vitality in the forest sector.

This study aims to be the first one to identify the causes of firm failures in the forest sector. The paper in the form of a brief report is structured as follows. The introductory part including a review of literature is followed by a section outlining methods and materials of the study. Then, main results are presented with their discussion, which is followed by conclusions.

## Materials and methods

For the current study, we apply Estonian bankruptcy cases from ISIC divisions 02 and 16 during the period 2002-2009, as for that period we possess registration numbers of court judgments about bankruptcies obtained from the Estonian Ministry of Justice. For all firms the exact ISIC class is known from the last annual report and has been presented in Table 1. ISIC division 17 is not applied, as no cases could be obtained for this division for the studied period. The Estonian bankruptcy law obliges trustees to note failure causes in a specific court judgment and therefore we downloaded all publicly available judgments based on their registration numbers for the given two ISIC divisions. In total, we obtained information about 50 bankrupt firms, which are small- and medium-sized enterprises (SMEs) with the following pre-bankruptcy (period  $t-2$ , where  $t$  denotes the year of bankruptcy) median values reflecting their size: 7 workers, assets of 187,000 Euros and sales of 246,000 Euros. In the viewed period 2002-2009, in total 57 firms belonging to ISIC division 02 bankrupted and the same figure for division 16 was 149, thus in total our data represent around 24 % of all bankruptcies in these two divisions. In ISIC division 17, there was only one bankruptcy in the viewed period. What concerns the statistics of active firms, then figures about the year 2012 from Statistics Estonia (2015) denote the number of firms with workers in forest sector as follows: ISIC 02 – 1,130 firms, 16 – 1,005, and 17 – 56. Thus, the bankrupt firms form a quite small proportion from all active firms in the forest sector.

The collection of court judgments was followed by the extraction of failure causes from them, which were provided there in a short summarized form, often accompanied by a more specific explanation of each cause. After the extraction of the failure causes, we processed them further to obtain a short list of causes to be presented in the current study. The list was composed by two researchers separately and then the results were compared in order to provide validity for the results. Then, the previous examples by Boyle and Desai (1991) and Baldwin et al. (1997) were used as benchmark taxonomies to attribute each detected reason to be either internal or external. Again, this was done separately by two researchers. Finally, for each case it has been noted in Table 1 whether the insolvency for this case was caused by at least one internal and/or external reason. This is achieved by noting a

mark “+” before each case in the relevant column in Table 1. Besides analyzing the specific failure causes, the previously described methodology allows us to apply three-component taxonomy in the further analysis: a) bankruptcy was caused only by internal reason(s), b) bankruptcy was caused only by external reason(s), and c) bankruptcy was caused by both internal and external reasons.

Our dataset of 50 firms breaks down as follows: 11 logging firms (ISIC 0220), 17 sawmilling and wood planing firms (ISIC 1610), 2 manufacturers of veneer sheets and wood-based panels (ISIC 1621), 13 manufacturers of builders’ carpentry and joinery (ISIC 1622), 4 manufacturers of wooden containers (ISIC 1623), 3 manufacturers of other wood products (ISIC 1629). In order to study whether the failure causes (as classified according to the previously given three-component taxonomy of causes) have significantly different association with different industries (the ISIC classes) and bankruptcy years, we will apply Fischer’s Exact Test (see e.g. Weinberg and Abramowitz 2008: 499). Due to the small number of observations in some groups, the classical test for such analysis – the Chi-Square Test – would not be appropriate.

## Results

The actual failure causes have been presented in Table 1. Although the description varies through court judgments, some common tendencies can be found. Firstly, many firms have concentrated on a single or few customers and cessation of cooperation with them or an inability to pay outstanding debt by customers has therefore been the trigger for the collapse. Secondly, on numerous occasions, unfavourable market developments have been noted: a drop in demand or in product prices and an increase in competition or in input factor (materials, labour) prices. Thirdly, as a regular collapse reason also found in the literature, lengthy unprofitable activities have been noted. Fourthly, different financial factors such as lack of working capital, a too low share of equity or inability to find additional financial resources have been frequently reported. Lastly, more or less severe mistakes by management also appear as very common collapse causes, sometimes even in the form of fraudulent activities. Thus, it can be seen that both internal and external reasons are very common contributors to collapses in the forest sector.

**Table 1.** Failure reasons for 50 forest sector firms (original reasons and also as classified into an internal-external taxonomy)

Class of ISIC rev 4	Year when bankruptcy was declared	Internal reasons	External reasons	Specific reasons given in the court judgment
0220	2002	+		Lack of working capital, mistakes made in accounting of taxes
0220	2003	+	+	Growth in competition, misuse of the firm’s cash
0220	2003	+	+	Cooperation ended with the only client, machinery breakdown halted the production process
0220	2003		+	Growth in competition, increased material prices
0220	2007	+		Grave errors in management
0220	2007	+	+	Changes in the tax law, employees left, cooperation ended with the main client
0220	2008	+	+	Growth in competition, increased costs, poor health of the manager
0220	2008	+		Lack of working capital, constant underuse of equipment and their too high costs, incompetence of managers
0220	2009	+		Grave errors in management (including embezzlement of the firm’s assets)
0220	2009		+	Economic recession, reduction of demand in the industry
0220	2009		+	Violation of contractual obligations by a foreign cooperation partner
1610	2002	+		Operating with constant losses, a weak business plan, insufficient analysis of activities
1610	2002	+		Too high rent costs, excessive leverage
1610	2003	+	+	Loss of major customers, investors were not interested in providing additional capital, failure of one investment project
1610	2003	+		Under-exploitation of production capacity, violation of various management obligations (including proper book-keeping, acting with good care)
1610	2004	+	+	Ongoing tax dispute, inability to sell goods due to an unfavourable market situation, working with a very low profit margin
1610	2005	+	+	Unrealized business plan, inability to find additional finance, lack of raw material, high competition
1610	2006	+		Inability to assess and forecast costs, low product quality

1610	2006	+		Too high labour costs, wrong cash flow forecast and assessment of risks
1610	2006	+		Too high labour costs, disagreement between owners
1610	2007	+	+	Failed projects abroad, the equipment was stolen
1610	2007		+	After enlargement, material prices increased more than product prices and demand also dropped
1610	2008	+	+	More unfavorable market situation than expected, constant unprofitable activities
1610	2008		+	Clients failed to pay for the products
1610	2008	+		Failed business plan
1610	2008	+	+	Too many unprofitable contracts, some debtors defaulted, poor health of the manager, the firm did not perform as planned since its foundation
1610	2008	+	+	Low quality due to old machinery, high competition, growth in input material prices, lack of qualified workforce
1610	2008		+	Problems with getting raw material, no additional investors could be involved
1621	2008	+	+	The main client was liquidated, new markets were not found, costs increased when prices remained unchanged, low work efficiency, no funds to reorganise the firm
1621	2009	+	+	Quick drop in demand in this sector, inability to reorganise activities, no credit possibilities and inability to find additional capital, defaulted debtors
1622	2002	+	+	Lack of working capital, failure of marketing policy, defaulted debtors, not managing accounts receivable
1622	2002	+	+	Increase in competition, no finance available for new investments, an incompetent business plan (did not account for the market situation), revenues lower than costs
1622	2003		+	Problems with a foreign cooperation partner, unsteady market situation
1622	2004	+		Weak business plan and too low share of equity
1622	2004		+	Defaults of foreign and local customers
1622	2007	+	+	Fire in the production facility, depreciated equipment, loss of cooperation with foreign clients, excessive dependence from the only local cooperation partner
1622	2007	+	+	Drop of demand in the region, revenues insufficient to cover costs, too low insurance compensation to buy new equipment after its breakdown
1622	2008		+	Lease surface agreement ended and no new place of activity was found, revenues became lower than costs
1622	2008	+		Low quality of export products, grave errors in management
1622	2008		+	Collapse of market, inability to pay in time by debtors
1622	2009	+	+	Increase in input prices, drop in product prices, drop in demand, low motivation by owners, inability to involve additional capital
1622	2009		+	Economic recession generally and at the market the firm was functioning, increase of loan interest rate by the bank
1622	2009	+	+	Drop in demand for products the firm was manufacturing and misunderstandings between the owners
1623	2003	+	+	Lack of necessary sense of duty, too old equipment, too small production volumes, low market prices, increase in competition
1623	2003		+	Loss of the main customer resulted in sales' drop and negative profit, strong competition and increase in raw material price
1623	2004	+	+	Excessive orientation on a few clients, constant drop of profitability in the sector, constant performance with losses
1623	2006		+	The main client quit the contract
1629	2007		+	Increase in production costs and decrease in the number of customers lead to unprofitability
1629	2007		+	Bankruptcies of customers resulting in non-payment for goods
1629	2009	+	+	Very low level of working capital, non-payment of clients on time

Notes: The ISIC rev 4 codes have the following meaning – 0220 logging, 1610 sawmilling and planing of wood, 1621 manufacture of veneer sheets and wood based panels, 1622 manufacture of builder's carpentry and joinery, 1623 manufacture of wooden containers, 1629 manufacture of other wood products. Although included in ISIC rev 4 1629 description, none of the firms in the current analysis dealt with manufacture of articles of cork, straw and plaiting materials.

It can be seen that in less than a half of the cases in the sample (44 %) bankruptcy is caused by both reasons (internal and external) contributing to the collapse. This finding varies through ISIC classes (see Table 2). Namely, only in two classes (1621 and 1622) the collapse because of both reasons is the most common, whereas in two classes (0220 and 1610) bankruptcies caused by either only internal or by both reasons are equally important. In one class (1623) failures because of only external reasons or both reasons are equally important, whereas in class 1629 external causes are the most frequent. The specific results by classes can be followed in Table 2. Still, Fisher's Exact Test's  $p$ -value is 0.554, indicating that the association between failure causes and specific industrial classes is not statistically significant. In other words, firms in various industrial classes of the forest sector do not collapse because of remarkably different reasons. Table 3 shows the breakdown of failure causes through different bankruptcy years. Similarly with industry classes, for different years the distribution of failure causes varies, but Fisher's Exact Test does not indicate significant differences ( $p$ -value 0.622). The robustness of both tests was checked by excluding either industry classes or years with a low number of observations, but that did not alter the test results.

## Discussion

The most frequent failure causes found in the current study coincide with those noted in the available literature. As in case of many ISIC 02 and 16 firms the business process is set up to service only a few clients (see e.g. D'Aveni and Ilinitich 1992), the importance of this failure cause is logical. Fluctuations in timber prices have been common in the studied period (see Sirgmetts et al. 2012), justifying the high frequency of input or output price dynamics as a collapse reason. Lengthy unprofitable activities have been found to be an especially important contributor to firm failure in previous studies (see e.g. *revenue financing failure firms* in Laitinen 1991). Through numerous bankruptcy models established for manufacturing firms, financial variables noted in the results section

of this study (e.g. lack of working capital or a too low share of equity) have been very common predictors of collapse (see e.g. the literature review by Dimitras et al. 1996). What concerns grave errors in management, then in the study by Lukason (2013) various fraudulent activities (e.g. embezzlement of firm's resources, tax fraud, usage of fake invoices) accompanying firm bankruptcies have been noted to be relatively common in Estonia. What concerns the distribution of causes through bankruptcy years (see Table 3), it cannot be concluded that the share of external causes would have risen especially during the economic recession characterizing the last years in the current analysis (according to Statistics Estonia (2015) in the year of 2009 Estonian GDP fell around 17 %, therefore affecting most of the industries).

There are also several studies which on the example of other sectors have found a similar set of the most important failure reasons, when compared with those established in the current research on the example of only forest sector firms. In Hall's (1992) study, the three most common reasons were undercapitalization, poor management of debt and lack of demand for products. In Baldwin et al.'s (1997) study, the most prominent external causes were economic downturn, competition and customer difficulties, whereas for internal reasons the most frequent were different general management and financial management problems. Thus, it can be concluded that failure causes reported in case of bankrupt Estonian forest sector firms coincide with those brought out in previous studies for different sectors and countries.

This research also challenges studies (e.g. Melahi and Wilkinson 2004), which propose that for most of the firm collapses, both internal and external causes contribute. According to this study, on less than a half of the occasions bankruptcy was triggered by both types of causes simultaneously. Moreover, as shown in Table 2, for some forest sector classes, the bankruptcies caused by both reasons were not the most frequent group at all. Table 2 also shows that for logging, sawmilling and wood planing firms, internal causes were more frequent than external, whereas for manufacturers of wooden contain-

**Table 2.** Frequencies of re-classified failure causes through industry classes

Industry class \ Cause	Only internal causes present	Both causes present	Only external causes present
0220	4	4	3
1610	7	7	3
1621	0	2	0
1622	2	6	5
1623	0	2	2
1629	0	1	2
Total	13	22	15

**Table 3.** Frequencies of re-classified failure causes through bankruptcy years

Bankruptcy year \ Cause	Only internal causes present	Both causes present	Only external causes present
2002	3	2	0
2003	1	4	3
2004	1	2	1
2005	0	1	0
2006	3	0	1
2007	1	4	3
2008	3	5	4
2009	1	4	3
Total	13	22	15

ers, builders' carpentry and joinery firms, external causes were more frequent. Therefore the results allow us to hypothesize that in case of more sophisticated products, the role of external forces (including market developments) could alter the destiny of forest sector SMEs more than internal decisions. This at least partially lends support to the conclusions in Hoff et al.'s (1997) study focusing on U.S. forest sector firms.

## Conclusions

Firm failure has been studied extensively, but empirical research reporting actual failure causes is rather infrequent, whereas there are no studies available about forest sector firms. Both theoretical and empirical studies have emphasized the importance of internal and external causes in contributing to firm failure. Therefore, this study also aimed to study the role of internal and external causes in the failure of forest sector firms.

The sample in the current study consisted of 50 forest sector firms (from ISIC divisions 02 and 16) that became bankrupt during 2002-2009 in Estonia. The analysis of court judgments, where the failure causes are reported, indicated that in the majority of cases (56%) firms failed because of only internal or external reasons, which in turn were similarly represented (26% and 30%, respectively). The common causes for failure were relying on a few customers or cooperation partners, unfavourable market developments, lengthy unprofitable activities, different financial causes and (severe) management faults. The study also showed that although the shares of different failure causes varied through industrial classes of the forest sector, there was no statistically significant association between different classes and causes. This study could be elaborated by applying a larger sample, by focusing more on specific cases and also by studying the interconnection of failure causes and values of firms' financial indicators.

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