

Backward Firm-Failure Prediction: A longitudinal analysis of profitability as measure of efficiency

Adriaan Willem Vincent Breukel and Albert Jolink
Erasmus Center for History in Management and Economics
Erasmus University Rotterdam

Abstract

Early 20th century management literature was very decisive about the role of efficiency; it was the ‘one best way’-criterion for organizational decision-making. This paper shows by means of a backward prediction that efficiency was indeed an important measure for organizations in the early 20th century. In this paper we view profitability as an indicator of the efficiency of a firm. It is suggested that positive efficiency in relation with the development (i.e. growth) of a firm contributes to survival, and that negative efficiency in relation with a drop in size predicts bankruptcy. This result supports the insight of early management literature, and offer a research design to repeat comparable studies for present companies.

This result is also in line with several studies that measure a range of variables (profits, sales figures, shareholder value) of a certain year to predict future viability of a firm. Our research adds to this snapshot method a longitudinal insight that offers an explanation for a firm’s slide into bankruptcy where others may survive.

Introduction

In the literature on finance and accounting, a 35 years long tradition studies the prediction of firm bankruptcy through profitability indicators. The profitability ratio of earnings per invested asset (EBIT/TA)¹ often serves as a measure for efficiency (Brealy and Myers, 1991; Van Horne, 1989).

In an authoritative article, Altman stated “profitability is a measure of productivity, abstracting for tax or leverage factor” (1968: 595). In 1968, Altman demonstrated that a set of financial ratios was “extremely accurate in predicting bankruptcy correctly...with 95 per cent of all firms in the bankrupt and non-bankrupt groups assigned to their actual group classification.” (1968: 609). The ratios were primarily selected because they were popular in the literature of that time. The discriminant function was a ratio of capital, earnings and sales with respect to total assets.² The profitability ratio EBIT/TA ranked as the largest contributor to group separation. The ratio was found to have a predictive value up to two years prior to firm failure. The accuracy decreased after the second year. Altman’s 1968-study was followed by

¹ Earnings before interests and taxes / total assets

² More specifically, the function was determined as $Z = .012X1 + .014X2 + .033X3 + .006X4 + .999X5$, where $X1$ = working capital/total assets, $X2$ = retained earnings/total assets, $X3$ = earning before interest and taxes/total assets, $X4$ = market value equity/book value of total debt, $X5$ = sales/total assets, Z = overall index

many duplicative studies in different countries³. Skogsvik for instance found that the financial ratio's "performed well 3 years before failure..., but rather poorly 6 years before failure" (1990: 154).

Several authors have commented on these kinds of analyses. Bijnen and Wijn (1996) state that also other factors than financial data are required for a better understanding of the development towards bankruptcy, e.g. the size of the firm. Dimitras et al. (1996) conclude that, although the profitability ratios are important for assessing the viability of the firm, the research trend is on using non-financial variables.

Another problem is that the interdependence, such as a causal structure, or a mutual relation, between ratios of profitability, size and other relevant data for firm survival is not unambiguous. This muddles explanations of how the firm slides into bankruptcy. Although this discriminant method takes historical financial figures into account, the development of the firm in time stays out of sight because "the variables of the (discriminant) function have almost always consisted of values representing a snapshot of a situation at the end of a given period" (Appetiti, 1984: 269).

In this paper, we empirically study the importance of efficiency for firm survival in a Dutch context. This paper suggests, firstly, that profitability is a relevant efficiency criterion for firm success, but can only be established once success and failure of firms is known; secondly, the article concludes on the basis of empirical data that the development of the firm (i.e. growth) is a crucial element in the impact of efficiency on firm survival.

The structure of the paper is as follows. Firstly productivity and profitability are elaborated because of the major position of these indicators of efficiency in the field of management studies. In this section, the impact of the institutional context these two indicators is also discussed. Accordingly the relation between profitability and firm development is discussed, as basis for the hypothesis that is tested in the study.

Productivity and profitability as indicators of efficiency

The concept and importance of efficiency⁴ has been dealt with in the literature of management studies for a long time. Efficiency in terms of productivity was a major theme in the days of Frederic Taylor at the start of the management discipline and it remained so a long time until the second half of the 20th century under influence of behaviorists notions of bounded rationality and satisficing (March and Simon, 1958).

Taylor's idea of scientific management is that it results in a system that is "so much more efficient than the old plan" (1911: 37). Gilbreth searches for standard practices that "will enable the worker of the future to attain still higher efficiency and output" (1911: 42). Wren (1994) refers to Taylor and his discipline as the efficiency-movement. Twenty years later, Gulick still states, "the fundamental objective of the science of administration is the accomplishment of the work in hand with the least expenditure of man-power and materials. Efficiency is thus axiom number one in the value scale of administration" (1937: 192).

³ Overviews are give by Altman (1984), Barnes (1987), Dimitras et al. (1996) and Taffler (1984).

⁴ Efficiency refers to the proportion of the outputs to inputs (Simon 1976). The efficiency "criterion requires that results be maximized with limited resources" (1957: 197) Productivity and profitability are among the most well-known measures of efficiency.

At present times, the importance of the subject shows a fragmented image. On the one hand, economic scholars such as Chandler, Williamson and Kendrick maintain that efficiency (in terms of productivity) is the dominant criterion for firm success in the 19th and 20th century US economy and has had many economic and social merits (Drucker, 1991). For Chandler (1990), the motive for the spread of large firms is rooted in their ability to create a higher productivity, first by means of economies of scale and later through economies of scope. “It was the development of new technologies and the opening of new markets, which resulted in economies of scale and scope and in reduced transaction costs, that made the large multiunit industrial enterprise come when it did, where it did, and in the way it did” (1990:18). For Williamson, “Economizing is the best strategy”, meaning that organizations are successful if they are designed to handle transactions in the most efficient way in order to lower the earlier mentioned transaction costs. Kendrick acknowledges that “profit rates depend not only on productivity but also on “price recovery”-the changes in prices charged in relation to prices paid” (1984: 16) but he stresses that “no matter how skillful management is in these areas, unless its productivity increases are in line with those of its competition over the long run, the firm will eventually be a casualty of the impersonal forces of the market” (1984: 16).

On the other hand, several authors with sociological backgrounds put less emphasis on productivity and consider the control over laborers and markets as the relevant factor for organizational success (e.g. Marglin 1974; Perrow, 1986). They claim that the power to restrict the volume of market output in order to increase the market price does not increase firm’s productivity, which is in line with the monopoly explanations of competitive advantage in the field of industrial organization (Rumelt et al. 1991). In the field of Organizational Ecology, Hannan and Freeman (1989) are not convinced of the importance of efficiency (they mean: productivity) for firm survival. They “think that efficiency in productions and marketing, defined broadly, is only one of the relevant dimensions...we think that it is unwise to assume that selection process in organizational populations favor efficiency” (1989: 37). According to the latter, the organization’s legitimacy towards customers is the decisive factor of survival and firms need to be stable as a condition to deliver that legitimacy. Carroll and Hannan find that “the strong assumption of historical efficiency can be very problematic and misleading” (2000: 400). They refer to March and Olsen who introduce historical efficiency in 1989 as the assumption “that institutions and behavior are thought to evolve through some sort of efficient historical process” (2000: 395). According to Carroll and Hannan, historical efficiency is not at all self-evident in all institutional contexts.

With respect to importance of productivity, the field of institutional evolutionary economics takes a position in between. Institutions are the formal and informal rules of the game that provide a structure of exchange to reduce uncertainty in human behavior, a structure in which each member (coalition) tries to seize opportunities to contribute to their goals (North 1990). They “consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior” (Scott, 1995: 33), and represent the power structure and aligning incentives of the various parties. These institutional structures imbed the economic behavior of firms and control transaction costs (North, 1990).

North and Thomas (1973) emphasized the importance of efficiency (also meaning: productivity) by assigning it as the cause of the rise of the Western world, in

line with Alchian who in 1950 stated that over time inefficient institutions will be replaced by efficiency ones. In 1990, however, North however disagrees with this earlier point of view. According to him, history matters for institutional developments; in some developing economic contexts, various stakeholders are not able to create institutions in order to control growing transaction costs arrangements in order to remove market imperfections. Therefore poor development paths stay possible. Economic historians such as Landes (1993) and evolutionary economists (Nelson & Winter, 1982; Nelson and Sampat, 2001) argue that organizations in the Western context grew more productive through technological innovations and managerial solutions to enable labor division⁵. This view is supported by Nelson, but “it is absurd to argue that processes of institutional evolution “optimize”; the very notion of optimization may be incoherent in a setting where the range of possibilities is not well defined, even if the issue of different interests could be resolved in this terminology... (H)owever, there seem to be forces that stop and turn around particular directions of institutional evolution that, pursued at great length, would be disastrous” (1995: 83). Historical paths seem to restrict large efficiency improvements. Technological-based productivity improvements are limited because of sunk costs, learning effects of old technologies, the low pay-off in the early stages of the new technology, the investment risks and institutional conditions (see also Landes 1993).

The different perspectives on the importance of efficiency invited some conceptual specification. Basically efficiency is the term for the quotient of outputs and inputs. This raises the question how outputs and inputs are measured. Simon noticed that efficiency could be viewed in various ways because different organizational stakeholders have different ends, and hence define organizational output differently. Simon distinguishes three major stakeholders, namely customers, entrepreneurs and employees. More groups can be added. Entrepreneurs for instance can be divided in shareholders and managers. Besides, various sorts of creditors are present. Finally governmental and non-governmental organizations have their ends concerning firm performance.

The question of ‘what efficiency’ is therefore a question about ‘what efficiency is in the eyes of the beholder’. Customers define efficiency in terms of highest value against the lowest price, a measure close to productivity. Productivity is the highest output (a measure of added value) against the lowest costs and represents the customers’ point of view in so far as the costs advantages are transferred to the customers through lower prices because of competitive reasons. From the point of view of the entrepreneur the efficiency-measure is profitability. Profitability is the common entrepreneurial organizational goal in the Anglo-Saxon society (Conner, 1991). Employees especially value goals such as high wages and tenure⁶.

⁵ Contingency theory gives many examples of adaptations of firm (such as Burns and Stalker’s example of the transition from mechanistic to organic organizations) in order to gain higher results (Donaldson, 2001). Performance is a relevant managerial design criterion for strategy, structure and technology (Miles and Snow, 1994; Simon 1967).

⁶ These goals are preset for the stakeholders as if they are objective. In social constructionists approaches, it is stated that values are subjective; they are the results of cognitive processes during the behavior of and interaction between several stakeholders (Scott, 1995). In this paper, the objective approach is followed because the values of stakeholders in the Western institutional context are reasonably comparative.

Fligstein (1990) relates efficiency, productivity and profitability. In his view, efficiency is profitability, realized in whatever way. He explains how the institutional context (defining the nature of the markets and the incentive structure for entrepreneurs) prescribes how firms are profitable (see also Baumol 1990). He concentrates on the position of firms during the end of the 19th and first half of the 20th century. In markets controlled by large firms at the end of the 19th century, profitability was enhanced by output restrictions without the need for risky investments for increasing productivity. Conner (1991) refers to these companies as the so-called Baines-type IO.

In a discussion with Perrow, Chandler (1988, see also 1977) accepts the oligopolistic behavior of early firms, but maintains that productivity was the causal factor for large scale and profitability already in the end 19th century American context. Without scale advantages, the concentrated industries would not have been possible at all.

Fligstein (1990) however argues that only since the introduction of anti-trust legislation productivity came forward as the major motive for the design of firms. The position of the customers increased in a competitive situation, and interests of customers and entrepreneurs approached each other; both stakeholders were now focused on high added value against low costs and prices. Profitability and productivity run parallel in a competitive environment. Kendrick explains that if “a firm sells its outputs at the same prices as do its competitors and pays the same wage rates and other inputs prices, its profit margins... will be higher only... if its productivity is higher” (1984: 51).⁷

It can be seen after the anti-trust legislation, the stage was set for a focus of firm on productivity, and firms were ready to separate “the influence of relative changes in prices of outputs and inputs on product margins... from changes in productivity.” (Kendrick, 1984: 17). Daems and Cuypers (1980) find that large firms in 1935 were more productive, but only where industrial conditions enabled economies of scale. Kendrick further states that company productivity measurement was however slow to spread. Until the 1950s, profit statements were the main indicators of firm’s efficiency, although the pioneering studies of Taylor had already taken place.

Profitability and firm development

In the previous section we have shown that profitability is an overall important measure for firm behavior, and we have related it with firm size.

On the one hand, growth is a condition for profitability. Chandler (1990) has argued that profits were the motive for the growing administrative coordination, hence offering productivity advantages. Others agree that growth enables profitability, although not through productivity rise, but by means of market control (Perrow 1988). Furthermore, growth creates a buffer for needed investments that can be used in times of adversity. In the latter situation, the size of the firm may be a way to support the survival the firm.

On the other hand, firm’s development (growth) is also a consequence of profits (Simon)⁸. Profits add directly to the equity, but also offer room for investments to further profitability.

⁷ Profitability = productivity * price recovery (Kendrick)

⁸ An other way to grow is because of new investments through more equity or loans

A firm's development is threatened if the performed efficiency measures do not live up to the perceived efficiency measures. Hence, from the point of view of the creditor, if firms are not able to fulfill their obligations towards creditors anymore, this would be perceived as low efficiency; from the point of view of customers, a relative low value compared to competitors would be unattractive. Without organizational change, sales will come under pressure; from the perspective of entrepreneurs, low profitability would make the firm unattractive for new investments. Besides that, the assets of a loss-making firm will decrease if the situation does not change so that the room for investments (needed to change) becomes smaller. Entrepreneurs will lose interest in a loss-making firm and disinvest.

Therefore, profitability is not only needed in the short-term for entrepreneurs and shareholders, but also for development in the long run, to be able to keep the performance in line with the perception of efficiency of creditors and customers.

Hypothesis development

In the last sections it has been suggested that profitability is a relevant efficiency criterion for firm success⁹. In addition, firm size is viewed as a relevant research variable to understand efficiency's impact. In line with Altman we expect to find that a positive EBIT/TA relates to successful organizations. This study adds firm size as an independent research variable. We also expect that the coincidence of low efficiency and declining assets predicts bankruptcy: organizations face difficulties to meet their liabilities and it will become less interesting for entrepreneurs and financial institutions to make more investments. It will also become less feasible for the firm to offer the same output to customers against lower prices.

The above has led us to formulate the following proposition:

Decreasing total assets, in combination with relatively low efficiency, will result in a firm's bankruptcy.

Low EBIT/TA itself is not crucial, if it does not remain too long, and also a drop in assets is not decisive; organization will be able to parry declining assets as long as efficiency is sufficient.

Method of study

Sampling

We have looked at the importance of profitability for firm survival in the context of an early 20th century Dutch market situation. The study follows the development of the firm from year to year to be able to understand the mutual effect of efficiency and firm size on firm survival.

⁹ Productivity is naturally the other candidate for efficiency study. Craig and Harris (1973) and Kendrick (1984) propose methods for measuring them on firm level. Our study however will further concentrate on profitability in line with the work of Altman.

In this research, firms have been selected on their status of surviving vs. bankrupt. Four surviving companies (= successful) have been compared with four companies that have gone bankrupt (= non successful) during the first part of the 20th century in the Netherlands. The companies are listed below. They are all small to medium sized (between 500.000 and 10 million guilders) single business unit production companies that were not able to control the market volumes so that the levels of productivity and profitability may be expected to run parallel.

We have dubbed this method “backward prediction” because it pre-selects the successes and failures. This pre-selection is subsequently used as a term of reference. When a chronologically previous situation is used as a reference, the prediction is referred to as forward prediction. In our case the reference point is a future situation, hence the prediction is referred to as backwards prediction.

The assets, net profits, interests, taxes, reservations and dividends of each company have been denoted to calculate total assets and EBIT (profits before interests and taxes) of each year. The original annual reports were the source of these financial data, starting with the first available annual report of the specific company until the time of its bankruptcy or until the 1960s.

Based on these criteria, we have found the following eight companies (see table 1) that have been studied during the indicated years.

Survivors:	Period	Bankrupt:	period
Lijm Delft	1893-1970	Twents bont: Tabak	1896-1926
Ketjen zwavelzuur	1899-1960	Ribius	1917-1938
Romenholler	1899-1966	Indisch hout	1895-1925
Trioboek	1898-1967	Berg emballage	1921-1934

Table 1

Measurement

We computed the average EBIT/TA in a minimal three-year period of dropping assets to exclude accidental negative efficiencies.

We have adopted the following terminology: A drop in assets indicated that the amount of total assets decreases under the level of a base year and finally rises over that level after a minimal period of at least three years (for instance: the situation in which the total assets of 1905-1906-1907 are below the assets 1904, and the total assets of 1908 are again over 1904, indicates a three year drop). An end-drop indicates that a company could not recover from the dip in efficiency. A semi-drop means that after a large drop the level of assets have increased, but that the firm could not recover to the old level of assets. A non-drop situation refers to a three or more year period in which the assets did not fall.

Source

There are several sources available for to obtain financial company data. Most of them contain detailed financial company information (PIMS, Worldscope, Dunn & Breadstreet). However, their statistics go back over period of only approximately 10 years.

Historical research can often not use data from those agencies but has to collect and compute them from long running sources such as Moody's, Fortune, the Wall Street Journal and departmental (Trade, Labor) and official data (Census of Manufacturers; US Bureau of the Census; Handbook of Industrial Statistics; Historical Statistics of the United States)¹⁰. In this study, we have used the annual reports from the 'Bedrijfseconomisch Archief' (Business economics archive), a 90-year-old archive that has been set up to collect and manage annual reports in the Netherlands¹¹. It is managed by the Erasmus University Rotterdam.

Results

A first result is a clear difference between the over-all averages EBIT/TA of the B-firms (bankrupt) and the surviving S-firms (see appendix). The averages range from -1,98 to 4,63 for the B-firms, whereas the S-firms have average EBIT/TA starting with 4,41 until 10,53.

This result suggests a relation between low efficiency and failure, but requires a larger sample to fully substantiate it. Instead, the research focused on the comparison between the development of efficiency in time of respectively surviving and bankrupt firms and changes of their total assets (in particular their decline). This is the basis for the following table.

	Total	Bankrupt	Survivors	Added ¹² (bankrupt)
Drop of assets				
Lower positive EBIT/TA	11: III	1 *	9	1 *
Higher positive EBIT/TA	4: V	1 *	3	
End-drop of assets:				
Negative EBIT/TA	4	4: I		

¹⁰ In the Netherlands the "Centraal Bureau voor de Statistiek" (Central Bureau of Statistics) is a major source.

¹¹ Comparable with Accounting Trends and Techniques for the American Institute of Certified Public Accountants.

¹² In a later stage, also two new bankrupt cases were studied to search for companies that went bankrupt very fast without a previous drop in assets:

Spokane: 1905-1922

Schoenen Schijndel: 1917-1930

Semi-drop of assets				
Lower positive EBIT/TA	2: III	1 *	1	
Non-drop of assets				
Lower positive EBIT/TA	12: IV	1 *	10	1
Negative EBIT/TA (non-drop and not based on a 3-year average)	4	2:V *		2: II

Table 2

* these firms survived at that time; later they went bankrupt in an end-drop

The table suggests that:

- bankruptcy relates to the combination of a negative three-year average EBIT/TA; a decline of the company (drop in total assets) relates with bankruptcy (I). Exceptions are formed by the two firms that underwent bankruptcy within three years after heavy losses, due to changing markets (II).
- firms were able to recover from the combination of drops of their total assets and low (but non-negative) efficiency (III).

The data also show examples of non-drop firms with poor minimal three-year average (IV) or even (single) negative EBIT/TA (V) that did not slide into bankruptcy. Poor performance seems especially dangerous in drop-of-assets situations, and of course when losses have been very severe (II)

The last result is the observation of a relation of lower earnings with a drop in assets (III). Even when this relation is not always the case (IV, V), it is an important observation, because in a situation of declining assets the company could find itself in a dangerous situation if negative EBIT/TA would occur.

Summarizing: the following pattern is suggested: bankrupt firms were not able to counter poor (negative) earning in periods of declining assets whereas non-declining firms could counteract to their low earnings and survive.

Conclusions

In this paper, we have empirically demonstrated efficiency's importance for firm survival in a Western context, especially in the first part of the 20th century when the literature was decisive about the relevance of. This supports the then prevailing literature with regard to their efficiency focus, but it show some limitations.

We hypothesized a relation between low efficiency/dropping assets and bankruptcy but the results demonstrate a relation between negative efficiency/dropping assets and bankruptcy. So although the direction of the hypothesis is confirmed, the impact of efficiency was overestimated. Most important however is that not negative efficiency nor dropping assets themselves are predictors for bankruptcy; their combination is the decisive factor for firm failure.

The results need to be tested with a larger, aselect sample, and could be verified with productivity as an efficiency measure¹³. In addition, firms of the latter half of the 20th century will be studied on their dependence of efficiency. This should exemplify if efficiency is still an important managerial criterion, or only one of the several factors for managerial decision-making.

The conclusion supports the institutional literature stating that efficiency has been a relevant (but not exclusive) criterion for organizational success in Western societies. The effect is moderated by firm size, and not very strong; low efficiency is not sufficient to predict firm failure; EBIT/TA has to be negative over a period of at least three years to generate any effect.

Even more, the conclusion is also in line with the financial literature that showed that efficiency is one of the leading predictors for bankruptcy. Besides, it adds a longitudinal view on the development of firms towards success or failure.

Discussion

The need for the relevance of this efficiency (measured in terms of profitability) lies in the fact that low profitability would make these firms unattractive for new investments from an entrepreneurial point of view. Besides that, the assets of the unprofitable organization will drop if the profit situation does not change, the more so because the room for investments (needed to change) becomes smaller. Entrepreneurs will loose interest in a loss-making firm and disinvest. In addition, we indicated that in a free-market situation profitability and productivity are related; lower productivity (resulting in lower output-values compared with the competitors against similar prices) would be unattractive from the point of view of customers.

A final point related to the ability of organization to change in order to survive may be added. The need for these changes is the pursuit for higher performance, and a way to realize this is the use of “the given resources as effectively as possible in the light of the organization objective” (Simon 1976:120). The other option is to adapt goals to conform to new customer preferences (or even create new preferences). Whereas Chandlerian, evolutionary and contingency approaches claim that organizations react to changes in their environment and change their structures accordingly, population ecology approaches state that organizations are inert, and changes takes place on population level. The results presented here indicate that four firms survived over 60 years, and were obviously able to react successfully. More study to changes in firm strategies, structures and production processes will be needed to verify the claim that change is indeed a managerial option.

¹³ The fact that Kendrick, Kuznets, Maddison and others have demonstrated a growth in productivity in those times (North, 1990) suggests that also (firm) productivity as a measure of efficiency would be a relevant managerial criterion.

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Appendix

In this appendix aggregate information about the eight firms is provided. The raw data are available from the first author

EBIT: Earnings before interests and taxes

TA: total assets (2002: 2,2 guilders = 1 euro)

D# = number of the drop

S# = number of the semi-drop

E# = number of the end-drop

R# = number of non-drop

Bankrupt companies

“Twents bont”: 1896-1926

Average EBIT/TA: -1,98

Pattern EBIT/TA: dropping

Average TA: 1.037.125 guilders

E1:

Average EBIT/TA in end-drop 1923-1926: -6,97

“Tabak Ribius”: 1917-1938

Average EBIT/TA: -0,43

Pattern EBIT/TA: dropping

Average TA: 626.716 guilders

S1:

Average EBIT/TA in semi-drop 1923-1928: -2,88

E2:

Average EBIT/TA in end-drop 1929-1938: -2,50

“Indisch hout”: 1895-1925

Average EBIT/TA: 3,16 (without outlier)

Pattern EBIT/TA: inverse U-shape

Average TA: 5.573.470 guilders

D1:

Average EBIT/TA in drop 1897-1907: 2,47

R1:

Average EBIT/TA in non-drop 1916-1918: 1,56

E3:

Average EBIT/TA in end-drop 1919-1925: -0,23 (without outlier)

“Berg emballage”: 1921-1934

Average EBIT/TA: 4,63

Pattern EBIT/TA: dropping

Average TA: 8.112.629 guilders

D2:

Average EBIT/TA in drop 1922-1924: 6,93

E4:

Average EBIT/TA in end-drop 1931-1934: -0,43

Later added bankrupt companies

“Spokane”: 1905-1922

Average EBIT/TA: 7,34

Pattern EBIT/TA: fluctuating

Average TA: 1.640.674 guilders

Two-year negative EBIT/TA 1921-1922: -24,25; -5,11

“SchoenenSchijndel”: 1917-1930

Average EBIT/TA: 6,12

Pattern: fluctuating

Average TA: 1.711.449 guilders

D3:

Average EBIT/TA in drop 1920-1925: 0,19

R2:

Average EBIT/TA in non-drop 1927-1930: 0,90

One-year negative EBIT/TA 1930: -11,15

Survivors

“Lijm Delft”: 1893-1970

Average EBIT/TA: 4,41

Pattern EBIT/TA: fluctuating

Average TA: 5.394.471 guilders

S2:

Average EBIT/TA in semi-drop 1920-1934: 0,43

D4:

Average EBIT/TA in drop 1935-1956: 3,46

D5:

Average EBIT/TA in drop 1966-1969: 4,81

R3:

Average EBIT/TA in non-drop 1904-1906: 1,75

R4:

Average EBIT/TA in non-drop 1910-1914: 1,12

“Ketjen zwavelzuur”: 1899-1960

Average EBIT/TA: 8,10

Pattern EBIT/TA: fluctuating

Average TA: 10.368.425 guilders

D6:

Average EBIT/TA in drop 1903-1908: 5,40

D7:

Average EBIT/TA in drop 1918-1928: 8,36

D8:

Average EBIT/TA in drop 1930-1941: 6,67

R5:

Average EBIT/TA in non-drop 1899-1903: 2,79

R6:
Average EBIT/TA in non-drop 1910-1914: 5,94

“Romenholler”: 1899-1966
Average EBIT/TA: 9,72
Pattern EBIT/TA: Fluctuating
Average TA: 5.733.908 guilders

D9:
Average EBIT/TA in drop 1902-1918: 5,71

D10:
Average EBIT/TA in drop 1930-1940: 14,28

D11:
Average EBIT/TA in drop 1944-1952: 3,68

R7 :
Average EBIT/TA in non-drop 1899-1901: 4,08

R8:
Average EBIT/TA in non-drop 1920-1923: 6,17

R9:
Average EBIT/TA in non-drop 1953-1956: 7,25

“Trioboek”: 1898-1967
Average EBIT/TA: 10,53
Pattern EBIT/TA: rising
Average TA: 416.249 guilders

D12:
Average EBIT/TA in drop 1902-1906: 7,30

D13:
Average EBIT/TA in drop 1921-1927: 10,15

D14:
Average EBIT/TA in drop 1929-1944: 8,25

D15:
Average EBIT/TA in drop 1956-1959: 11,79

R10:
Average EBIT/TA in non-drop 1898-1901: 5,67

R11:
Average EBIT/TA in non-drop 1908-1913: 7,75

R12:
Average EBIT/TA in non-drop 1950-1953: 7,66