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**Is customer profitability
related to solvency of customers?**

by

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0. ABSTRACT¹

Firms have to consider various ways to analyse their business. However, by many firms it is often asserted that the customers are most important. The sales to customers are generating the cash flows that make the firms able to meet their financial commitments. Furthermore, without customer profitability a firm is not able to generate positive cash flows in the long term. Images of Customer Profitability (ICPs) may be divided into two groups: (1) descriptive; and (2) causal images. Previous to the discussion of the measurements of customer profitability (descriptive CPIs), there is a need for a theoretical understanding of this concept as well as some related theoretical elements or dimensions. These theoretical elements can be divided into four: (1) measures of profitability (i.e. relevant revenues and costs); (2) time; (3) uncertainty; and (4) context. The risk elements are usually divided into three main groups: (1) commercial risks, (2) economic risk, and (3) political risks. The focus of this working paper is on the commercial risks of companies with large exports, and in particular the financial capacity of their customers is addressed (i.e. their ability to pay). The solvency of customers or credit risks (rating codes) can be looked upon as one set of variables that are explaining variations in customer profitability. Furthermore, it can be assumed that the two concepts are closely related. The following hypothesis is tested; (H₁): The higher the credit risk of a customer, the higher the relative customer result is obtained. As expected, the findings (results) provide support for this hypothesis, and this implies that the exporting companies may increase customer profitability by increasing the credit risks. Thus, the managers are confronted with the following decision situation: (1) Obtaining high customer results by accepting high risks concerning cash flows; or (2) obtaining lower customer results, with more secure cash flows. Further managerial implications are addressed at the end of this working paper. Finally, some central problems and problem areas and suggestions for further research are presented.

1. INTRODUCTION

Deterministic approaches are generally used when estimating profitability. However, such models most often represent a simplification of the reality (Demski, 1997). Industries and firms are often confronted by uncertainty. Traditionally, volume and prices have been receiving most of the attention (Norstrøm, 1996). Of course, these factors have a lot to say for exporting companies, but with respect to international marketing one usually operate with many elements of risks. Generally, these elements are often classified into three main groups: (1) commercial risks, (2) economic risks, and (3) political risks (see e.g. Paliwoda, 1993; Deresky, 1997; Eiteman & al., 1998; Solberg, 1999). Regardless of the information which is provided, the estimation of cash flows is encumbered with vast uncertainty at the present time as well as in the future, and especially if the political situation is very complex and unstable. However, in this working paper only some of the uncertainties related to the financial capacity of the customers are considered. Credit risk or payment risk is usually perceived as being a

¹ This working paper is based on Helgesen (1999a), a dissertation for obtaining the degree doctor oeconomiae at the Norwegian School of Economics and Business Administration, Bergen. Some of the problems addressed in this working paper are among the topics that are addressed in the dissertation.

part of the commercial risk of a company. Consequently, only a small part of the risk elements are considered. Nevertheless, the relationships between customer profitability obtained (results with respect to customers) and the solvency of customers seem to have been very little studied (Helgesen, 1999a).

2. LITERATURE REVIEW

With respect to market-oriented managerial accounting and customer profitability analyses, there has been a growing interest during the last decade (see e.g. Ratnatunga & al., 1988; Ward, 1992; Foster & Gupta, 1994; Foster & Young, 1997). Most of the attention has been directed to customer accounting and customer profitability analysis (see e.g. Anandarajan & Christopher, 1987; Cooper & Kaplan, 1991; Storbacka, 1995; Foster & al., 1996; Ittner & Larker, 1997). This growing interest may be related to the increasing emphasis on customers as objects of analysis, which is reflected in the variety of concepts used, such as: customer needs; customer satisfaction; customer loyalty; customer profitability; customer values; customer relations, customer- and market-orientation; etc. Consequently there exists a large amount of both theoretical and practical/empirical contributions focusing on various customer-related concepts. Nevertheless, the insight in this area regarding customer accounting and customer profitability analysis can to a large degree be characterized as insufficient. Research in this area has been very limited, and only a few publications are dealing with customer accounting (see e.g. Foster & Young, 1997; Shields, 1997; Söderlund, 1997; Oliver, 1996; Hallowell, 1996; Foster & al., 1996; Storbacka, 1995).

Some of the existing contributions are mainly focusing on various practical ways of handling issues related to the concept of customer profitability, for example, various ways of analyzing customer segments (see e.g. Shapiro & al., 1987; Bellis-Jones, 1989; Tibbert, 1989; Pogue, 1990; Howell & Soucy, 1990; Reichheld & Sasser, 1990; Stuchfield & Weber, 1992). Other contributions are mainly focusing on problems that have to be solved to establish reliable customer accounting figures (see e.g. Anandarajan & Christopher, 1987; Selnes, 1992; Foster & Gupta, 1994; Connolly & Ashworth, 1994; Foster & al., 1996). The very few empirical contributions are related to banks, and these are mainly dealing with ways of analyzing customer profitability figures (Rust & Zahorik, 1993; Storbacka, 1995; Hallowell, 1996). Furthermore, in reality only a few contributions have been focusing on customer- and market

oriented approaches² when suggesting various profitability analyses (see e.g. Marple, 1967; Beik & Buzby, 1973; Kirpalani & Shapiro, 1973; Hulbert & Toy, 1977; Dunne & Wolk, 1977; Robinson, 1990; Cooper & Kaplan, 1991; Booth, 1994; Storbacka, 1995). In addition, most of these publications are only outlining a market oriented accounting framework and most of them are based on a contribution method (approach). Last, but not least, uncertainty is hardly taken into consideration in anyone of the studies. Thus, new empirical contributions related to customer profitability that are useful for businesses are highly requested (Foster & al., 1996; Oliver, 1996; Foster & Young, 1997).

3. SOME THEORETICAL ASPECTS

In order to increase the profitability of a business the decision makers need insight into the causes of profitability and primarily the variables that may explain differences:

“The first point that needs to be made and strongly emphasised is that attention must be concentrated on the variations which will result if a particular decision is taken, and the variations that are relevant to business decisions are those in costs and/or receipts. Whatever the character of the decision, one has to inquire into the variations in costs and receipts which will follow” (Coase, 1938; op. cit. Solomons, 1952; p. 106).

Thus, knowledge of cause- and effect relationships is a prerequisite for decision making resulting in increased customer profitability. The decision maker should therefore focus on variables or factors which are adjustable and also have a strong influence on the success of the business. Thus, there is a close relationship between decisions and proper adjustments to increase profitability.

To gain important insights concerning decisions that are related to customers, there is a need for valid and reliable figures for customer accounting. Furthermore, valid and reliable measures of customer profitability form the natural basis of various types of analysis of causal relations. Consequently, figures in customer accounting “Images of Customer Profitability” (ICPs) may be broadly divided into two groups: (1) descriptive; and (2) causal images of customer profitability. Causal ICPs, that is images indicating connections between causes and

² Such approaches can be implemented and used as a natural part of the system of managerial accounting for a business (Helgesen, 1999a).

effects, can only be estimated³ when descriptive ICPs are established. Furthermore, there is a need for registrations of potential factors⁴ explaining variations in customer profitability so that a causal analysis can be carried out.

Establishing reliable profitability figures for customer accounts or descriptive ICPs is not straightforward, cf. Helgesen (1999b) which is focusing on problems related to seven topics or problem areas: (1) theory basis, (2) cost basis and cost estimation methods, (3) market-hierarchy (a market oriented accounting framework), (4) separation of costs into main groups, (5) the understanding of assignment of costs to cost groups, (6) market based accounting concepts and models, and (7) analytical methods. The choices made for each problem area have practical implications.

Concerning the first topic, theory basis, Helgesen (1999b) suggests that four theoretical elements should be taken into consideration: (1) measures of profitability (i.e. relevant revenues and costs), (2) time, (3) uncertainty, and (4) context.

For a given decision situation it is optimal to choose the alternative that results in the highest customer revenues (extra revenues) compared with relevant costs (extra costs plus opportunity costs). If all alternatives are analyzed, this is just the same as choosing the alternative that is resulting in the highest margin of contribution, that is extra revenues minus extra costs⁵ since the calculations implicitly will take opportunity costs into consideration. A third decision rule that will result in optimal decisions is to leave one alternative in favor of another if the differential revenues are higher than the differential costs. This gives three equivalent decision procedures. In practice decision rule no. 1 is the most frequently used.

³ Many models can be used when analyzing the relationships between strategic revenue drivers and customer profitability (see e.g. Day & Wensley 1988; Narver & Slater, 1989; 1990; 1994; Kohli & Jaworski, 1990; 1993; Fornell, 1992; Anderson & al., 1994; Fornell & al., 1996). Analogously, there exists a lot of models or strategic cost drivers which are supposed to explain variances in costs that have a profound impact on profitability (see e.g. Lewis, 1987; Riley, 1987; Ghemawat, 1986, 1992; Shank & Govindarajan, 1989, 1992, 1993).

⁴ By establishing a database, various cause- and effect models or relationships can be analyzed. Over time this can give insight into the causalities under scrutiny, and thereby revealing the drivers that seem to have the strongest influence on the performance of the business. These variables may be perceived as key drivers of the performance of the business. Such strategic revenue and cost drivers may be disclosed for various aspects or perspectives of the business under consideration. By putting them together into a scoreboard, the decision makers get a multi-dimensional insight into the decision situation. Such a balanced scorecard can form a natural part of the managerial accounting information that is provided for the managers of a company (see e.g. Richardson & Gordon, 1980; Sloma, 1980; Globerson, 1985; Wisner & Fawcett, 1991; Kaplan & Norton, 1992, 1993, 1996a, 1996b; Lebas, 1996; Rucci & al., 1998).

⁵ In practice variable costs are often used as a substitute for extra costs (Bergstrand & Bjørnenak, 1995).

The time concept can be ambiguous and may be divided into various elements; the number of periods, points of time, direction (future - past), etc. The profitability of an object or cash flow can be judged beforehand (ex-ante) and afterwards (ex-post), i.e. when the project is terminated and the order transactions carried through and all requirements are fulfilled, etc. Ex-post profitability analyses are often needed to give insight for decisions in the future. While estimates of ex-ante profitability are based on budgets and prognoses, the estimates of ex-post profitability are based on already realized accounting numbers. However, this does not imply that it is easy to estimate the profitability for the actual object.

The cost of capital reflects the value of time, but other factors such as financial structure, inflation premium and perceived risk can also be decisive for the level of the cost of capital (see e.g. Brealey & Myers, 1988; Copeland & Weston, 1992; Bøhren & Michaelsen, 1995). The required compensation for risk varies according to the financial situation of the business under consideration and the alternatives confronted (see e.g. Rappaport, 1981; Ellis & Williams, 1993; Copeland & al., 1996). The requirements of the owners may also influence the cost of capital rather substantially (Mullins, 1982).

The context of the decision is related to the description of the decision problem depending on how the decision makers perceive the situation (Demski, 1997). Thus the framing of the decision is obviously subjective. Consequently, the apprehension of the situation is related to the theoretical and empirical insights of the decision makers. A lot of relations, factors and variables may be taken into consideration in a decision in order to establish additional information such as elements concerning: (1) relationship perspective; (2) externalities; (3) conditions; (4) competitive situation and surrounding variables; (5) strategic aspects; and (6) extraordinary circumstances (Helgesen, 1999b).

Analysis of uncertainty has traditionally been related to volume and prices (Norstrøm, 1996), but in connection to customers it is natural to take more risk elements into consideration, e.g. (1) commercial risks, (2) economic risks, and (3) political risks (see e.g. Paliwoda, 1993; Eiteman & al., 1998). The extent of uncertainty depends to a certain degree on the decision maker's insight with respect to the decision (Demski, 1997). Thus, increased insight may result in elimination of some parts of the uncertainty. Nevertheless, the attitudes of the

decision makers towards uncertainty may differ significantly (see e.g. Gottschalk & Wenstøp, 1988; Keeney, 1992; Keeney & Raiffa, 1993; Demski, 1997).

The managers ways of handling risk situations depend on various aspects related to the decision situation, such as the financial⁶ situation of own company, the credit policy of the company, the insights with respect to the decision situation, the general attitude towards risk, the objectives of the decision maker, the differences concerning the tradeoffs between the various sub-objectives (hierarchies of the preference models), etc. Different managers may have completely different views about the same decision situation and act differently (see e.g. Gottschalk & Wenstøp, 1988; Keeney, 1992; Keeney & Raiffa, 1993). The composition of the hierarchy of objectives and the selection of measures (indicators) of such an imaginary total utility function, may consequently differ from one decision maker to another, which may be related to differences concerning preferences or values (see e.g. Gottschalk & Wenstøp, 1988; Keeney, 1992). Some of the decision makers may mainly emphasize financial objectives (profits) of owners (the principals), while others may also consider objectives and measures related to other groups of stakeholders. Furthermore, the decision maker (the agent) may also focus on personal objectives (Baiman, 1982; 1990) when composing the preference model of the decision situation. In addition, the utility functions may have different forms (additive, multiplicative, multi-linear, etc.). Nevertheless, the behavior of the decision maker may be represented by a preference model (a utility function) with the superior objective that the decision shall result in maximum expected utility (Keeney & Raiffa, 1993). This does not imply that the decision maker always establish a preference model for each decision situation, but that he acts as if such a model exists (Demski, 1997).

Decision support for managers, such as calculations and analyses of profitability, is based on estimates of revenues and costs. Usually, such estimates are burdened with uncertainty because of simplifications of the reality. If all aspects of a decision situation should be analyzed down to the last detail, the work could usually not be done in a cost-effective way (see e.g. Edwards, 1937; Horngren, 1992; Demski, 1997):

“The principal question we have to ask is this : Out of the mass of interesting data which is available in any business, how much is worth collecting ? The answer would appear to be : Only that which can influence policy. Unless the information supplied enables the management to do something or refrain from doing something, its

⁶ A discussion of the influences of wealth effects on decision situations is found in Milgrom & Roberts (1992).

collection is not a business proposition. Costing fails in its object unless it adds more to net profit than the expense of running the system” (Edwards, 1937; op. cit. Solomons, 1952, p. 88).

Consequently, some aspects of a decision situation are usually not known in details:

“Not knowing something is modeled as uncertainty” (Demski, 1997; p. 5).

Thus, the concept of uncertainty can be related to a lot of risk elements. In this working paper the focus is on credit risk or payment risk which usually is perceived as being a part of the commercial risk of a business. An exporter may reduce or even eliminate this risk by way of prepayments, commercial letters of credit, cash against documents (CAD), and various arrangements of credit insurance⁷ (GIEK⁸, credit insurance companies, finance companies also offering credit assurances, etc.) (A synopsis is provided by Holt & al., 1998). Delayed remittances usually result in extra costs for a company. Insufficient payment or no payment usually⁹ results in direct losses.

The code for the solvency of a customer or the rating code of a customer may be perceived as a measure for the payment risk (the commercial risk) related to transactions with the actual customer. Credit reports inclusive rating codes¹⁰ are prepared by credit rating agencies and have various applications. These reports are used as the basis for applications for limits of credits (warranties) from the credit insurance companies and therefore also forms the basis for possible settlements of claims. If the credit reports say that a customer may be perceived as not creditworthy, the manager of exporting company usually tries to take precautions by way of prepayments, commercial letters of credit, cash against documents (CAD), etc. If the rating code of a customer is favorable, this indicates that the customer at least has the ability to pay. Consequently the rating codes may also be used to estimate the quality¹¹ of cash flows.

⁷ Usually, the export is then carried out on terms that may be called open accounts. However, the accounts receivable are either wholly or partly secured by various guarantee arrangements.

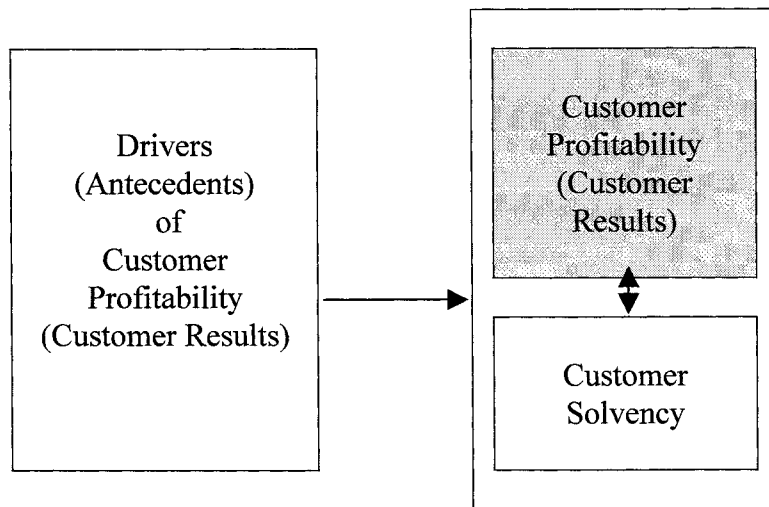
⁸ GIEK = Garantiinstituttet for Eksportkreditt (The Norwegian Institute for Export Credits). Similar export credit agencies are established in many other countries (see e.g. Paliwoda, 1993).

⁹ There exists guarantee arrangements which do ensure a settlement of 100 percent because of insufficient payment or no payment. However, those insurance policies do not usually cover political risks.

¹⁰ A rating code or a code for the solvency of customers may be perceived as giving very concentrated credit information, that is a synthesis of all the information gathered concerning the juridical person which is rated.

¹¹ The quality of the revenues of a given period may be estimated as a weighted average of the rating codes of all the customers, where the customer revenue of the respective customers for the period are used as weights. Analogous analyses of quality classes may be carried out for cash flows, and for various measures of profitability, such as absolute customer results which have been obtained during the period (Helgesen 1999a).

Exhibit 1. Customer profitability, solvency of customers, and drivers of profitability.



The solvency of customers or the credit risks (rating codes) can be looked upon as one set of variables that are explaining variations of customer profitability or as part of the concept of customer profitability, cf. exhibit 1. Nevertheless, the two concepts may be viewed as closely related.

4. PROBLEMS AND HYPOTHESES

For many industrial enterprises there may be several links in the distribution channels between the firm and the ultimate buyers, i.e. consumers or end users, e.g. importers, wholesalers and retailers, and thus various customer markets to take into consideration (see e.g. Kotler, 1992; Paliwoda, 1993; Tellefsen, 1995; Solberg, 1999). However, in this working paper the understanding of the customer concept is traditional. Thus, a customer is defined as the direct buyer of a firms products and/or services.

The starting point of the study is the following research question: Do relative customer results increase with increasing credit risks? This is the same as asking if customer profitability decline with higher solvency? According to common financial theory the answers of these two questions should be affirmative, which leads to the following hypothesis:

H₁: The higher the credit risk of a customer, the higher the relative customer result is obtained.

If the statistical results do support the formulated hypothesis, this implies that compensations for credit risks are included in the measures of customer profitability (customer results) which have already been addressed (Helgesen, 1999a; 1999b).

5. RESEARCH DESIGN, RESEARCH METHODS AND MEASUREMENTS

In order to answer the research questions and test the formulated hypothesis there is a need for empirical data, and in this study Norwegian exporters of klipfish and frozen fish are chosen as a context (sample). These types of products are based on groundfish as raw material. This part of the Norwegian fishing industry is characterized by almost worldwide export activities in various product markets (geographical areas). In each of these product markets a lot of actors participate both on the buyer side and the seller side. The products that are offered for sale may be perceived as generic and the trading patterns tend to show seasonal fluctuations. Usually, the importers buy products from several exporters that are often located in different countries. Repurchases often forms a crucial part of the picture of the trade with fish products. Consequently, the customers do have a lot of experience when judging the method of delivery and the quality of the products. Altogether, the part of the Norwegian industry that has been selected as a context for this working paper can be viewed as suitable. Nevertheless, it may correctly be asserted that the two groups of products are somewhat different; for example based on different methods of preservation or technologies. However, the two lines of business have so much in common (groundfish as their raw material, generic products, high level of competition, order-oriented marketing, distribution, etc.) that there could be no doubt that they belong to the same industrial sector.

The empirical data are collected from four Norwegian exporters and their customers. Two of the companies in the sample are exporting klipfish while the other two are exporting frozen fish/filets. Measured in annual revenues, their sizes vary from about 20 million NOK to about 200 million NOK (1996). Information has been collected by two¹² means:

¹² In order to answer all the research questions in Helgesen (1999a) more data were collected: (1) Market surveys (measurements of customer satisfaction, etc.) among the customers of the four Norwegian exporters; (2) Ex-ante views that the managers have of the profitability of individual customer accounts and of the solvency of some of the customers.

- Customer accounts (order accounts) and profitability analyses based on accounting information from the four exporting companies.
- Customer ratings (creditworthiness) including financial statements (furnished by customer rating agencies).

5.1. Customer profitability accounting and customer profitability

In order to estimate customer account profitability (CAP) at the individual customer-level a market-oriented accounting model had to be established (Helgesen 1999a; 1999b). Descriptive ICPs may be established by using different estimation methods: (1) full costing (the absorption method), (2) variable costing (the contribution margin method) or (3) activity based costing (the hierarchy-method). These methods will tend to result in different designs of the specified accounts. However, it is also important to remember that different approaches will result in different estimates of customer profitability. Consequently, arguments may be put forward to make use of various methods simultaneously. However, the ABC-approach is chosen since it has advantages compared with the two other methods (Helgesen, 1999a; 1999b).

Exhibit 2. Market hierarchy for order-handling marketing companies.

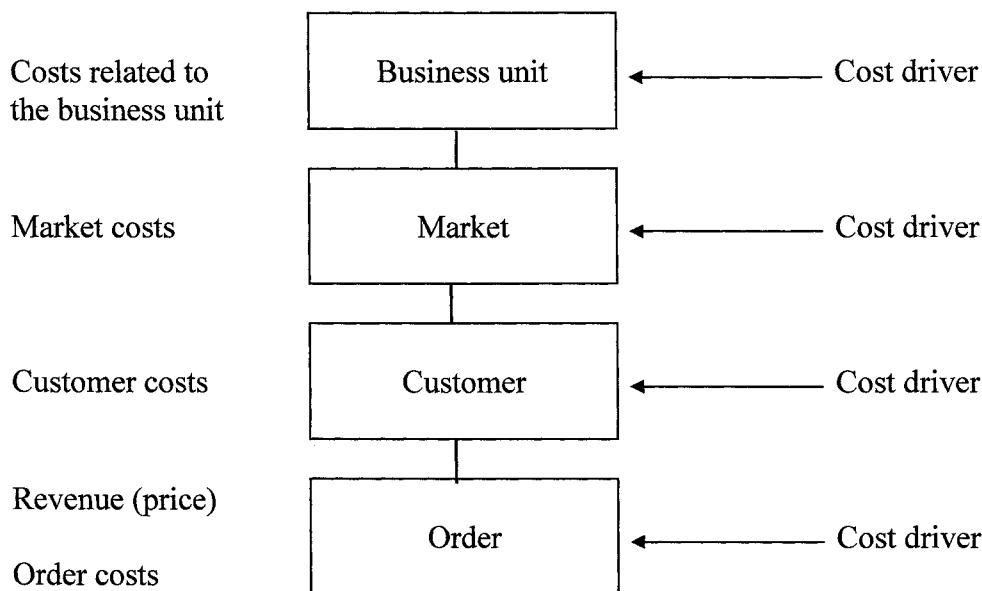


Exhibit 2 shows the market hierarchy¹³ chosen and illustrates the assignment of costs to different levels. It also reflects the chosen market-oriented accounting framework. Costs are

¹³ Accounts are on the transaction-level. Consequently, marketing activities may be related to different levels: Transaction, order-line, invoice, part order, order, customer, customer category, product market, market segment,

assigned to the level where they are incurred (orders, customers, markets, etc.). All the revenues are related to the order level. The costs of the orders are subtracted from the revenues from orders. In this way the results can be estimated for each order. Then revenues and costs from orders are transferred to the customer level. The customer result for a given period is the aggregate revenues from orders related to the actual customer less the aggregate costs related to the orders as well as the costs related to the customer. Then revenues and costs from the customers are used on the market level. The market¹⁴ result for a given period is the aggregate revenues from the customers that are related to the actual market less the aggregate customer and the market related costs. Analogously¹⁵ the result of the strategic business unit is estimated. This approach¹⁶ is consistent with the ABC-approach and the Nordic step analysis (Bjørnenak, 1994b).

During the period for the sample (the financial year of 1996), the total revenue of the four Norwegian exporting companies amounted to 350 million NOK. The sample of orders comprises revenues of about 180 million NOK, which is about 52 percent of their¹⁷ total revenue during the year. As a comparison the total Norwegian export of klipfish and frozen fish/filets for the same period was about 4,5 billion NOK, and the total Norwegian export of fish and fish products reached approximately 22,5 billion NOK (Norwegian Seafood Export Council, 1996). Thus, the lines of business used in the sample represent about 20 percent of the total Norwegian exports of fish products. And the sample itself, consisting of 564 orders related to 176 customer and 36 geographical markets, represents about 4 percent of the total Norwegian exports of products from these lines of business.

market area, distribution channel/value chain, agent area, etc. Thus, profitability images may be elaborated for various objects with respect to the market.

¹⁴ Markets can be categorised and segmented in various ways (Abell, 1980,1993; Shapiro & Bonona, 1984; Kotler, 1992). As long as descriptive ICPs are available the chosen approach makes it possible to estimate the profitability of various market segments based on the assumption that the costs related to the appropriate market segment level are handled according to the ABC-approach.

¹⁵ The outlined methodology makes it possible to establish designs for the specified accounts and for each level of the market hierarchy (Helgesen, 1999a; 1999b).

¹⁶ The approach is also consistent with propositions formulated by Kaplan, referred to in Robinson (1990). The principle objective of Kaplan's speech was related to product costs, but he also touched on customer accounts and distribution channels : "Another way to look at operating expenses focuses on customers and distribution channels. We can compute the margins earned by each customer or distribution channel by summing the product-level margins of the products sold to each customer or through each channel and than subtracting expenses incurred for individual customers or channels. We need to find out what causes expenses to vary and at what level of the organization, but expenses need not and should not be allocated below the level at which they are incurred" (Kaplan/Robinson, 1990; op. cit. p. 13).

¹⁷ The sample sizes vary from about 37 percent to 100 percent.

None of the four exporting companies had earlier worked out customer accounts or customer profitability analyses in a systematic way. But all of them had well arranged systems of managerial accounting. Two of the companies had for some time had the intention to carry through customer profitability analyses. Thus, some of the necessary information such as the revenues and the easily traceable parts of the costs were recorded. This basic work contributed to facilitate the work. Nevertheless, all the accounts and all the vouchers had to be thoroughly revised. By means of various ways of recording this information (data bases and cross tables) all the accounting information was reregistered and assigned to profitability objects according to the chosen procedure. Later on all the accounts were balanced with the ledger. The job was time-consuming, but the insight acquired clearly justified the chosen method of approach.

Revenues were assigned to the order-level and the costs were traced and assigned to the various levels of the market hierarchy. In this way about 98,5 percent of the total costs were traced and assigned directly to the cost objects. Thus, only 1,5 percent of the costs (indirect costs) had to be accumulated into cost pools and allocated to the various cost objects according to the¹⁸ ABC-approach. The proportion of direct costs was much higher than expected. The chosen approach allowed for the use of accounts and profitability analysis for various market objects according to the market-oriented models that had been established (Helgesen, 1999a; 1999b).

Exhibit 3 presents descriptive statistics for the customer relationship sample. Rating codes were furnished for 144 customers, cf. the discussion below. Consequently, this number of customers is the sample in this study. Relative customer results (customer revenues minus all direct and indirect costs as a proportion of customer revenues) (“KRESIPRO”) are used as measures of customer profitability. It appears like the average customer is¹⁹ unprofitable, but the variation is rather high (for further information see Helgesen, 1999a; 1999b).

The rearrangement of the accounting figures was worked out in close collaboration with the marketers, accountants and managers of the four exporting companies. There was no disagreement concerning the results that were elaborated. The orders included in the sample

¹⁸ Cost drivers representing causalities were used to assign the indirect costs to the objects. In this way the complexities of the transactions (number of product lines per order, number of batches per order, etc.) were taken into account.

¹⁹ This does not imply that the customers on the average are unprofitable.

were selected at random in such a way that several succeeding orders were analyzed in order to simplify the balancing work. However, it should be mentioned that the selected exporting companies are looked upon as being in the vanguard of the industry. This was one of the reasons for choosing them as working partners, and this choice appears to have been successful. Consequently, it may be questioned whether the sample is representative. The established sample is analyzed at the market level, comparing the market-revenue figures for the four exporters with the total Norwegian export for these lines of business for the period under consideration for each of the 36 geographical markets. The analysis shows a strong and significant correlation ($r=0,804$; $p<0,001$). In addition, the 20-25 most important geographical markets for this part of the Norwegian fishing industry are represented in «the sample revenue». Thus, it can most likely be asserted that the sample is not non-representative of the population.

5.2. Credit reports – customer rating codes (solvency)

The classification of credit risks or the rating of customers may be carried out in various ways. However, most emphasis is usually placed on the financial aspects as liquidity, solidity, profitability and financial structure. But other aspects such as market opportunities and the ability and qualifications of managers are also considered. Even if the classification work with respect to the solvency of customers is based on objective criteria, obviously the rating codes are subjective²⁰ judgements. The measurements are carried out on an ordinal scale. In this case the customers are divided into four risk groups according to an increasing degree of solvency (decreasing credit risks): (1) not solvent (2) solvent, (3) more solvent and (4) very solvent.

The credit reports were received from Dun & Bradstreet Norge AS²¹ and FactoNor AS. Dun & Bradstreet Norge AS is a credit rating agency that is belonging to a world-wide company with representatives almost all over the world. Consequently, when preparing the credit reports Dun & Bradstreet Norge AS could get the necessary information from sister

²⁰ Usually the decisions related to rating codes (risk classes) for customers and credit limits are made by credit committees (based on reports prepared by credit analysts). Generally a credit committee consists of 3 to 5 co-workers with appropriate education and experience. The composition of the committee and the procedures carried through concerning the decisions should ensure that the rating codes and the credit limits are reliable.

²¹ Dun & Bradstreet Norge AS, Oslo, is a daughter company of the Dun & Bradstreet Corporation. The group of companies offers various services such as credit reports with respect to various countries and business enterprises. The group of companies are currently updating credit information for about 120 countries and about 40 million business enterprises in more than 200 countries.

companies in the country where the actual customer is operating. FactoNor AS²² is a Norwegian financial service company that has been specializing in factoring (both domestic and foreign) for many years. The company is one of very few financial companies in Norway that offers factoring inclusive credit ratings and guarantees. Thus, both of the companies should be highly qualified for working out credit reports and classify the customers according to credit risks.

Out of the 176 customers in the profitability sample only 150²³ were randomly rated with respect to creditworthiness. For six of these customers enough information was not available. Thus, the customer credit sample consists of 144 customers, which is about 82 percent of the profitability sample. The customers that are not rated have been treated as a separate group of customers and compared with the other four groups. Differences that are statistically significant are not found between this customer group²⁴ and the other groups. Consequently, it can not be maintained that the customer credit sample is non-representative of the population (the profitability sample). The customers are situated in 32 countries. The geographical areas of the profitability sample which are not represented, are of minor importance both for the four Norwegian exporting companies, for their lines of business, and for the Norwegian fishing industry.

The risk classification of the customers was worked out during the period²⁵ between August and October 1997. Thus, the judgements concerning credit risks were worked out about one year after the orders were carried out. Even if the credit reports were based on accounting data of the customers for the same period of time as the orders were carried out, the time sequence may be questioned. Usually, credit reports are used to judge credit risks related to transactions in the future. But, obviously such reports may also be used for ex-post analyses.

²² FactoNor AS, Ålesund, is a Norwegian finance company with experience and long tradition concerning factoring. The company offers "complete factoring", that is administration of accounts receivable, financing, supervision of customer credits, credit guarantees, and administering estates. The company is member of an international chain of financing companies, Factors Chain International (FCI), which has members in more than 60 different countries on all continents.

²³ Preferably all customers should have been classified. However, for financial reasons the number of customers was limited to 150. It should be mentioned that a credit report usually costs about 800 NOK.

²⁴ This is found both for analyses of variances where these 32 customers are compared with all the other 144 customers, and analyses where this customer group is treated as one of five groups (group No. «0»).

²⁵ Accounting figures for the financial year of 1996 are used for the larger part of the customers, that is figures from the same period of time as the prepared customer accounts (analyses of customer profitability) of the four Norwegian fishing exporting companies. For some of the customers the figures from 1995 are used. Besides some companies operate with a diverging financial year.

However, this does not imply that the credit reports reflect the credit risks the exporting companies were confronted with at the actual point in time, but rather the credit risks the fish exporters were confronted by in the future. Nevertheless, during a period of about a year the rating codes are usually quite stable. Besides, when the classification of the customers are based on only four risk categories, it may be supposed that the rating codes would have been much the same if the credit reports had been worked out about one year earlier. Nevertheless, the credit reports should ideally have been estimated in advance of the orders or preferably along with the deliveries.

6. FINDINGS

In order to answer the formulated research questions (i.e. to test the formulated hypothesis) various statistical methods may be used. In this study correlation analysis and analysis of variance are used. At the end of this part of the working paper regression analyses are also referred to.

Exhibit 3 presents descriptive statistics for the four risk classes into which the customers are classified. The exhibit shows that the arithmetic mean of the customer results are declining with increasing solvency. This indicates the possibility of a negative correlation between solvency and customer results obtained, which in accordance with the formulated research questions (hypothesis). However, the exhibit also shows that the variation is great. Consequently, no conclusion may be drawn until the appropriate statistical analyses have been carried out.

Exhibit 3. Descriptive statistics for the customer results of four customer groups classified according to solvency (creditworthiness).

	Number of observations (N)	Arithmetic mean	Standard deviation
Group No. 1 (Rating code "1").	20	0,612	9,139
Group No. 2 (Rating code "2").	62	0,026	4,936
Group No. 3 (Rating code "3").	48	-3,441	11,798
Group No. 4 (Rating code "4").	14	-4,600	11,115
The mean of all groups	144	-1,498	9,078

The formulated hypothesis is based on the supposition that increasing customer results do covary negatively with decreasing credit risks. This shows the supposed direction between the two variables, that is between the rating codes ("KREDKOD") and the relative customer results ("KRESIPRO"), which implies that judgments related to the significance of the (linear) correlation coefficients should be based on a one-tailed test (see e.g. Dickinson Gibbons, 1993a; Wenstøp, 1991).

Owing to the fact that one of the variables ("KREDKOD") is measured on an ordinal scale and the other ("KRESIPRO") on a ratio scale, Kendalls tau-b is chosen as measure of association (see e.g. Hildebrandt & al., 1977; Liebetrau, 1983; Dickinson Gibbons, 1993b). Kendalls tau b is here estimated to -0,097 ($p < 0,064$). Even if the magnitude of the coefficient is not high or statistically significant at the 0,05-level, the analysis still seems to indicate²⁶ a negative correlation between credit risks and relative customer results. It seems as if customers that are more creditworthy than other customers on the average are less profitable (measured as relative customer results) than customers that are less creditworthy. This may be further analyzed by way of analyses of variances.

The One-Way ANOVA procedure produces a one-way analysis of variance for a quantitative dependent variable by a single factor (independent) variable. Such an analysis is often used to determine if the observed differences for the sample mean(s) can be attributed to just natural variability in the same population or if there is reason to believe that the sample(s) come from populations that have different means (e.g. Bray & Maxwell, 1985; Iversen & Norpoth, 1987). This technique examines the variability of the observations within each group as well as the variability between the group means. Based on these two estimates of variability, one can often draw conclusions about the population means. The customer credit sample was divided into risk classes. Therefore it is natural to analyse the variances of the variable "KRESIPRO" according to such a classification of the customers.

It appears from exhibit 3 that the arithmetic mean of the variable "KRESIPRO" is decreasing with increasing creditworthiness. Therefore, an appropriate question is whether this is attributable to natural variations, that is variations which may be expected with four samples

²⁶ The estimated level of significance ($p < 0,064$) is close to the minimal level that is often used to reject the zero-hypothesis (see e.g. Henkel, 1976).

from the same population, or variations that are so great that it is reason to believe that the observations are coming from different populations.

The ANOVA procedure requires that the observations are independent random samples of normally distributed variables with equal variances. More precisely the conditions may be formulated in this way: (1) independent observations, (2) the dependent variable is normally distributed, and (3) the variances of the four groups are equal. Previous to the presentation of the results, these conditions are discussed.

The observations in the customer profitability sample are based on accounting numbers (calculations) taken from a random sample of invoices which are aggregated to the customer level (see part five of this working paper). This indicates no connection between observations (customers). Whether the variable "KRESIPRO" is normally distributed can be analysed and tested in several ways. Often the Lilliefors-test (which is a modified Kolmogorov-Smirnov-test) is used. Using this test resulted in the value of 0,217 (with 144 degrees of freedom and a level of significance of 0,001). This indicates that this variable is not normally distributed, which is often the case when such an analysis is done:

"It is almost impossible to find data that are exactly normally distributed. For most statistical tests, it is sufficient that the data are approximately normally distributed. Thus, for large data sets, you should look not only at the observed significance level but also at the actual departure from normality" (SPSS, 1993; p. 191).

With such a starting point a more detailed examination and evaluation was carried out for the variable and the set of data. This included various charts (histogram, stem and leafplot, Q-Q-diagram, etc.), as well as various statistical²⁷ analyses (comparing the median and the mean as well as the interquartile range and the standard deviation, estimates of skewness and kurtosis,

²⁷ From exhibit 3 it can be seen that the average of "KRESIPRO" is the value - 1,498. A first test of normality is to compare the mean with the median (Hamilton, 1992). The median has the value of 0,127. This implies that the distribution is negatively skewed. This can also be found with the help of direct estimation of skewness that shows the difference from the normal distribution with respect to breadth. A positive value implies that the distribution is positively skewed and a negative value that it is negatively skewed. This statistic has the value of -3,326, which implies negative skewness. The interquartile range (IQR) is found as the difference between the 75. percentile and the 25. percentile. The normality of symmetrical distributions can be estimated by comparing the standard deviation with IQR/1,35 (Hamilton, 1992). IQR is here 4,293. IQR divided by 1,35 is therefore somewhat lower than the standard deviation, cf. exhibit 3. The kurtosis shows if the distribution is higher than a normally distribution (>0) or lower than a normal distribution (<0). The kurtosis has the value of 19,286, which implies that the "bell-shape" of the distribution is much higher than it is for a normal distribution. In an attempt to make the distribution more normal, some observations far from the average (beyond three standard deviations) were gradually removed from the set of data while testing the improvement in normality. This did not result in more satisfactorily test-values related to the normality of "KRESIPRO".

etc). The analyses showed that compared with a normal distribution the variable "KRESIPRO" has a much more peaked distribution with somewhat longer and thinner tails. Despite being somewhat skewed to the left, the distribution can be viewed as relatively symmetric. Based on these results and the fact that the distribution indicate that transformations not provide any good solution for achieving normality, it can be concluded that all the observations are kept and estimates are completed without any adjustments:

"For practical purposes, symmetry (with no severe outliers) may be sufficient. Transformation are not a magic wand, however. Many distributions cannot even be made symmetrical" (Hamilton, 1992; p. 23).

It should be noted that some observations have been removed in order to achieve approximate normality without achieving this goal. On the other hand it can often be an advantage to keep all observations when working out statistical analyses :

"After the outliers have been identified, profiled, and categorized, the analyst must decide on the retention or deletion of each one. There are many philosophies among analysts as to how to deal with outliers. Our belief is that they should be retained unless there is demonstrable proof that they are truly aberrant and not representative of any observations in the population. But if they do represent a segment of the population, they should be retained to ensure generalizability to the entire population. As outliers are deleted, the analyst is running the risk of improving the multivariate analysis but limiting its generalizability" (Hair & al., 1995; p. 60).

There is nothing that indicates that any of the observations not are representative for segments of the population. The observations are controlled and checked by accountants from the four firms. It can therefore be claimed that all of the observations reflect segments of the population.

One should also remember that the selected statistical method can be regarded as both strong and solid. This implies that these methods are often used even if some of the assumptions are not meet (see for example, Hair & al., 1995; Iversen & Norpoth, 1987).

In order to test if the variances could be the same for all the samples, the Levenes-test for homogeneity-of-variances is often used. In our case the F-value was estimated as 2,610 ($p > 0,05$; with 3 and 140 degrees of freedom). This implies that it could not be concluded that the variances are not equal (i.e. there seems to be an approximately similar level of variance for the four samples).

The One-Way ANOVA procedure results in a F-value of 2,281 ($p < 0,082$). This indicates that no differences in profitability are indicated for the four groups if a level of significance of 0,05 is used. This implies that the zero-hypothesis not can be rejected in general, that is that there are not statistically significant differences in the level of profitability between the four groups of customers (level of significance of 0,05).

The One-Way ANOVA procedure also offers special tests called post hoc multiple comparisons. Pairwise multiple comparisons test the differences between each pair of means and yield a matrix where asterisks indicate significantly different group means at a significance level of 0,05. (Besides the exact significance levels are also shown.). Based on this information another analysis was carried out where the credit sample was divided in two groups: (1) One group for the rating codes 1 and 2 (group A); and (2) one group for the rating codes 3 and 4 (group B). Group A will be called the least solvent group of customers, and group B will be called the most solvent group of customers.

Exhibit 4. Descriptive statistics for two customer groups classified according to solvency (creditworthiness): (A) least solvent customers; and (B) most solvent customers.

	Number of observations (N)	Arithmetic mean	Standard deviation
Group A (Rating code "1" or "2").	82	0,169	6,164
Group B (Rating code "3" or "4").	62	-3,703	11,578

In exhibit 4 there is an overview of the groups as well as descriptive statistics for the relative customer results, i.e. for the variable "KRESIPRO" for the two groups of customers (A and B). Group A consists of 82 customers which (as mentioned earlier) are assigned the rating codes 1 and 2, and group B consists of 62 customers which (as mentioned earlier) are assigned the rating codes 3 and 4. The average relative customer results for group A is approx. 0,17 percent and for group B approx. -3,70 percent. In order to test if there are differences in profitability between the groups the spread of the observations within the groups should be taken into consideration (i.e. the estimated standard errors in the estimates of the means for the two groups). In this case the hypothesis is tested with a two-sample t-test.

The Levenes-test for equality of variances has a F-value of 6,525 ($p < 0,012$). This can therefore not be provided as support for equality of variances. But even if the prerequisite for equality of variances is broken in this case, this is still not an obstacle for carrying out the analysis like intended. This is due to several circumstances. It has been proved that analysis of variance is rather solid even when deviations from intended occur, with the exception of extreme situations (see e.g. Hair & al., 1995). Furthermore, 144 observations divided into two samples are used, i.e. relatively large samples where the largest sample is not more than 1,5 times larger than the smaller sample, which makes it possible to neglect the demand about equality of variances (Hair & al., 1995). In addition there are tests that are based on the assumption that the variances are not equal (Iversen & Norpoth, 1987).

In this case non-equality of variances is assumed, which gives the following result for the test of the hypothesis (one-side test): $t = 2,390$ ($p < 0,01$; 86,9 degrees of freedom). A level of significance of 0,01 makes it possible to conclude that the zero-hypothesis can be rejected. The most solvent customers, i.e. group B (rating codes 3 and 4), are less profitable than the least solvent customers, i.e. group A (rating codes 1 and 2).

By comparing the solvency (using rating codes) and relative customer profitability for the 144 customers in the credit sample, diminishing customer profitability is found with increasing solvency. The reduction in the relative customer profitability is on average rather large. Because of large variations in the data set, differences in profitability that are not significant (on the 0,05 level) are discovered by using one-way analysis of variance based on a division of the sample in four parts based on rating codes for solvency. An analysis of variance where the data set is divided in two groups with rating codes 1 or 2, i.e. for the least solvent customers which results in the highest customer profitability, the differences from the other customers, i.e. the most solvent customers (rating codes 3 and 4), are statistically significant on the 0,01-level. The result of the various analyses of variances can be interpreted as if the zero-hypothesis can be rejected while the alternative hypothesis is kept. Consequently, it can be claimed that the relative customer results are increasing with increasing credit risks. Analogously, it can be claimed that relative customer profitability is decreasing with decreasing credit risk.

The estimates²⁸ that were carried out can also be viewed as estimates of the risk compensation the exporters require or receive because of increased bankruptcy risk. By accepting customers from risk class 3 instead of only customers from risk class 4, the results indicate an average²⁹ increase in the customer profitability of approx. 1,2 percent (see exhibit 3). The result indicates an even larger increase in customer profitability by accepting customers that are assigned to risk class 2. Compared with customers from risk class 4, the results indicate that an increase in relative customer results of approx. 4,6 percent is likely. If the risk is increased even further by accepting customers assigned to risk class 1 the results indicated that the relative customer profitability is increased by 5,2 percent. The average order size for the entire sample of customers is approx. NOK 320,000 (Helgesen, 1999a). Based on the estimates above the average result per customer can be increased by almost NOK 15,000 if the transactions are carried out with customers assigned to risk class 2 instead of the most solvent customers which are classified as belonging to risk class 4. If a compensation for the increased risk of approx. NOK 15,000 provides satisfactorily coverage of the increased credit risk is of course dependent on many circumstances (see. e.g. part 3 of this working paper where some central arguments are discussed/mentioned).

An interesting observation is that the analyses seem to reveal that there may be relatively greater differences in relative customer results from credit class 4 to credit class 2 (and to credit class 1) than to credit class 3. With respect to the relative level of customer profitability the groups 3 and 4 seem to be relatively closely connected. The same can be said about the groups 1 and 2. Therefore it appears as if the four groups have such properties that they are

²⁸Instead of using analysis of variance the formulated hypothesis can be tested with the use of regression analysis. By using dummy-variables the relative customer results can be compared for different risk classes. This can be done in several ways (see e.g. Schroeder & al., 1986; Hamilton, 1992; Hair & al., 1995). It is natural to start the comparisons of relative customer profitability by using different risk classes (rating codes) and a reference group (i.e. coding by using indicators). In order to separate the credit sample in two groups one dummy can be used, and for separating the credit sample into four groups three dummies can be used. The customers with the highest level of solvency can be chosen as a reference group. The chosen approach implies that coefficients that are not standardised, are expressed in the same entity as the dependent variable (i.e. expressed in percent). Such regressions can be solved with ordinary least squares (OLS). The values of the coefficients are of course the same as those that can be estimated using exhibit 3 and exhibit 4, i.e. by assuming that the most solvent customers is the reference group in both of the two analyses. For more information the readers can turn to the section of this working paper where the relative differences in profitability between risk classes of customers are discussed. The statistical levels of significance of the models are similar with those presented in the different analyses of variance. However, it is found that the variations in solvency only can explain about 5 percent of the total variations ($R^2_{adj.}$) in relative customer results.

²⁹ It should be mentioned that the statistical analyses not have uncovered differences in profitability between the four risk classes if the required level of significance is 0,05. On the contrary, such differences in profitability are

closely connected two by two. This sharp division in customer profitability between customers classified as 2 and 3 can have practical implications both for the credit companies and for the fish exporters.

7. DISCUSSION AND MANAGERIAL IMPLICATIONS

The whole credit sample of 144 customers is used for statistical analyses, i.e. all the credit classified customers in the customer profitability sample. This is done among other things in order to make the analysis more representative and thereby the ability to receive results that can be true in general. To increase the external validity even further the data was divided into random groups and similar statistical analyses were carried out. In these analyses no result indicated that the presentation should be changed. The external validity can be increased even further by repeating the analysis or by carrying out similar tests for other industries or in different settings.

The statistical analyses and evaluations indicate that the hypothesis can be accepted; (H_1): "The higher the credit risk of a customer, the higher the relative customer result is obtained". This can be described as follows:

- Generally speaking higher solvency seems to be negatively correlated with increasing relative customer results. Increasing credit risks (commercial risk) seem to be compensated by increasing relative customer results.
- In one analysis of variance (t-test), the credit sample of 144 customers is divided into two groups: (1) 82 customers are given the credit rating codes 1 and 2 (group A); and (2) 62 customers are given the rating codes 3 and 4 (group B). In this analysis differences in customer profitability are found that are statistically significant at the 0,01-level. The differences in relative customer results between group A and group B is on average 3,9 percent.
- In another analysis of variance (ANOVA), the credit sample is divided into four groups: (1) 20 customers are given the rating code 1; (2) 62 customers are given the rating code 2; (3) 48 customers are given the rating code 3; and (4) 14 customers are given the rating code 4.

uncovered when the credit sample is separated into two groups. Nevertheless, the discussion is related to all the four risk classes in the credit sample.

In this analysis differences in customer profitability are also found, but these are not statistically significant at the 0,05-level ($p < 0,082$).

- The estimated compensation for additional risk can be expressed as follows: (1) For transactions with customers that are classified with rating code 3, there is a compensation for additional risk of 1,2 percent compared with similar transactions with customers that are classified with rating code 4. (2) For transactions with customers that are classified with rating code 2, there is a compensation for additional risk of 4,6 percent compared with similar transactions with customers that are classified with rating code 4. (3) For transactions with customers that are given the rating code 1, there is a compensation for additional risk of 5.2 percent compared with similar transactions with customers that are classified with rating code 4.
- With respect to customer profitability it seems like the four groups of customers with different solvency have the property that two and two of them appear to be connected. Furthermore, it appears like the largest difference in customer results is between customers with the rating codes 2 and 3.

Especially the last two points in this list of findings can have large practical and managerial implications. It appears like the market³⁰ provides a risk premium or some kind of economic compensation when the customers are less able to pay their debts. This implies that the exporters of cod (klipfish, salt fish or frozen fillet in this working paper) have a difficult trade off³¹ to make between profitability and credit risk. Somewhat simplified it can be said that a Norwegian exporter of fish faces the following situation: (1) Aim for higher customer profitability despite the larger credit risk that this will imply, or (2) try to select more solvent customers even if this is expected to result in lower customer profitability. Based on this line of thinking the exporters of fish can select a portfolio of customers that reflect their attitude toward risk. In connection with this way of reasoning, every order or every customer can be regarded like a separate project in the total portfolio of customers that the company has. Different companies can have different opinions about how big the compensation for risk

³⁰ As pointed out earlier none of the four exporting companies had earlier worked out customer accounts or customer profitability analyses in a systematic way. Besides, analyses of surveys of management's ex-ante perceptions of the profitability of individual customer accounts and of the solvency of some of the customers revealed that the managers' insight into this business relationships may be said to be rather insufficient (Helgesen, 1999a).

³¹ This is in agreement with theories that indicates that a creditor shall price the credit risk by increasing the price and thereby receive higher contribution margins for sale to less solvent customers.

should be. This depends on a number of aspects such as the customers economic conditions, the economic situation of the exporter, the decision situation (e.g. if there are many alternative customers), the attitude toward risk by the companies, etc. Some additional information is provided in part 3 where some other arguments also are put forward.

8. LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

The analyses above indicate that the exporters appear to receive higher profitability in compensation for increased credit risk. Thus, customer profitability is increased with higher credit risks. The population in this case is Norwegian exporters for fish and fish-products that are marketing their products (groundfish) in international markets with competition. Of course, the estimates in this working paper only represent this part of the Norwegian Fishing Industry and fish exports, i.e. specific results that can not be generalised to account for the entire industry before they are confirmed by similar studies for other part of the fishing industry. Furthermore, similar studies might also provide interesting and useful results with respect to other industries.

Classification of risk can also be done for different geographical areas (e.g. countries). Thus, classification of risk for countries can also be included in such analyses. For instance, is there a positive relationship between increased country-risk and increased customer profitability? Is it from such an analysis possible to say something about the distribution of compensation of risk for customers and markets (countries)?

A different area that deserves attention is the relationships between order sizes, terms of payment, terms of delivery and the solvency of customers (creditworthiness) (Helgesen, 1999a). For instance, what is the relationship between order sizes and credit risks? Is it the case that the average size of the orders from customers with a low level of solvency is smaller than for customers with a high level of solvency? Do the terms of payment differ with respect to the solvency of the customers? Do the terms of delivery differ with respect to the solvency of the customers? What combinations of means are used in an attempt to secure both payments and deliveries in future?

As indicated so far, the exporters have to make a trade off between profitability and credit risk. This trade off can be further analysed by using the methods of analysis used in finance (see e.g. Brealey & Myers, 1988; Copeland & Weston, 1992; Bøhren & Michaelsen, 1995; Bøhren & Gjørnum, 1997). However, in order to include such a dimension into customer base management there is a need for further research. First of all there has to be established a vocabulary (“constructs”) and theoretical models that indicate relationships between constructs. These models can then be used for analysing relationships, thus, contributing to increased insight into this field of customer economics.

9. CONCLUSION

Firms have to consider various constituencies. However, it may be asserted that the customers are most important. The customers are generating the cash flows which make the firms able to meet their financial obligations which is a necessity for their existence in the long term. Furthermore, without customer profitability a firm is not able to earn money.

Images of Customer Profitability (ICPs) may be broadly divided into two groups: (1) “Descriptive” and (2) “Causal images of customer profitability”. Previous to the discussion of the measurements of customer profitability, there is a need for a profound theoretical understanding of the concept. This includes the theoretical elements or dimensions – that may be divided into four: (1) Measures of profitability, i.e. relevant revenues and costs; (2) time; (3) uncertainty; and (4) the context. With this understanding one may reach a decision about which of the dimensions one wants to emphasize. It is highly unlikely that a managerial accounting system will furnish all relevant information for any decision in any situation that may occur. Consequently, the natural practical implication is to choose as a starting point a managerial system of accounting which can produce reliable information about customer revenues (extra revenues) and relevant customer costs (extra costs plus opportunity costs) for the chosen time horizon. In addition, the chosen approach should correspond with the chosen strategic planning period for the firm. If they are economically feasible (cost effective), factors and conditions related to uncertainty and context may be incorporated into the approach. At least the aim should be to arrange the managerial system of accounting in such a way that the most important problems of a market strategy can be easily analyzed. After gaining experi-

ence, the system can be gradually extended. Such an approach should contribute to better insight into various market situations. This will make it possible for a business to make optimal decisions based on the understanding of factors and conditions related to uncertainty and context which are treated as correctives to the images of profitability which have been established. For instance, the risk classification of customers, i.e. the rating codes for customers can at first be looked upon as supplementary information to such a managerial system. Later on customer rating codes and quality class analyses may form an integral part of the system of managerial accounting (Helgesen, 1999a).

Customer credit codes, that is the solvency of customers, can therefore be included as a natural part in descriptive ICPs. However, before entering customer risk into the analyses and the management of customer profitability, it is obviously necessary to start using deterministic models in the managerial accounting of a business. Thus, decisions related to the balancing of customer results and credit risks may be perceived as an amendment of a market-oriented system of managerial accounting.

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