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AN EXAMINATION OF THE RELATIONSHIP BETWEEN FIRM SIZE AND EXPORT ACTIVITY IN THE NEW ZEALAND LUMBER INDUSTRY

A thesis presented in partial fulfilment of the requirements

for the degree of

Master of Philosophy

in Development Studies

Massey University

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1993

ABSTRACT

This thesis explores the relationship between export activity and firm size, with specific reference to New Zealand's lumber industry. The main purpose of this investigation is to identify firm characteristics which link firm size to export behavior. This task basically involves exploring the literature to identify possible linking variables and conducting tests to determine whether or not these characteristics actually link export activity and firm size in New Zealand's lumber industry.

Two major areas of research were drawn upon to produce the hypotheses of this study: determinants of export activity and firm size-related variables in the lumber industry. The former body of literature is well-defined and very extensive. A great deal of empirical research has been done on firm-level export behavior (though unfortunately very little theoretical study has been done to link export behavior back to microeconomics. The second area of research is not very well-defined. Inferences on the relationship between various characteristics and firm size are drawn from the literature on lumber production in New Zealand. These inferences are supplemented by scattered pieces of research on the linkage between firm size and firm characteristics, as well as by sensible guesses as to how certain characteristics are associated with firm size. Using these two areas of research, hypotheses were drawn as to how firm size and export activity are linked.

Based upon these two areas of study then, nine characteristics were identified as possible links between firm size and export activity: proximity to a city, product quality, production cost, legal structure, foreign ownership, managerial experience and education, marketing skill, export-related information, and managerial attitudes and ambition. It was decided to test these hypotheses by conducting a survey of New Zealand's lumber industry. This particular industry was selected because it was felt that a greater understanding of the export dynamics of this sector would assist policymnakers in stimulating New Zealand's economy. In all, 26 lumber mills (out of 40 that were contacted) agreed to participate in the survey.

On the whole, it was found that some characteristics do link firm size to export activity. Specifically, legal structure, managerial experience and education, and managerial attitudes and ambition were found to be significantly related to both export activity and firm size. These results suggest that firm size can be indirectly linked to export activity. However, researchers should be aware that the nature of this link could possibly vary with industry, place and time. Hence, using firm size as a predictor of export activity should be avoided until more research is conducted.

ACKNOWLEDGEMENTS

I am grateful for the assistance and encouragement of several people in the execution of this thesis project. First, I would like to acknowledge the support of my supervisors, Dr. Anton Meister of the Department of Agricultural Economics and Ms. Anne DeBruin of the Department of Economics, for their valuable assistance and comments on my research. Also, I would like to thank Dr. A. Crosbie Walsh of the Institute for Development Studies for his personal attention to the administrative matters of my thesis, and Ms. Dianne Te Nana for her help in preparing the survey mailing.

I also gratefully acknowledge the financial and logistical support of the New Zealand-United States Educational Foundation and its director, Mr. Laurie Cox. Without their assistance this project would not have been possible.

Finally, I am deeply indebted to my friend and colleague, Ms. Miriam Janett, for her assistance with the layout of the graphs and appendix 1 and for giving advice and encouragement above and beyond the call of duty. Her support made the burden of this project much easier to bear.

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CHAPTER ONE

INTRODUCTION

1.1 Purposes and Approach

It is without dispute that a greater understanding of the nature of economic development will prove to be beneficial, both to developing and developed countries. It is for this reason that the field of economic development has received a great amount of attention by scholars in the post World War II period. One area which has been extensively researched has been the significance of export activity in the development process. Though the debate continues, it appears that higher levels of export activity often stimulate economic growth, which is an essential component of economic development.

A greater understanding of the determinants of export activity would thus be beneficial to development researchers and government policymakers. Extensive research has been done in this area since the 1960s. However, one important aspect of this topic, namely the significance of firm size as a predictor of export activity, has been neglected. This oversight in the literature is surprising.

Several researchers have empirically tested for a relationship between firm size and export activity (see for example Aaby and Slater, 1989). Also, firm size has been widely employed by government export promotion programs as a

criterion for identifying export-prone firms. Yet, very little has been written to explain how firm size is specifically related to export activity (Reid, 1985). This study represents an attempt to correct this oversight. The basic objective of this thesis then is to determine how firm size is related to export activity.

A number of steps are involved in meeting this objective. First, it is necessary to explore the literature to find out what other researchers have found about firm export behavior. Of particular interest are the speculations of other researchers about the role firm size plays in determining export behavior. These topics are discussed later in this chapter. From this review basic ideas are formulated as to how firm size affects export activity.

As it happens, the leading theory on how firm size and export behavior are related contends that firm size is linked to other variables which have a direct effect on export activity. Hence, the literature review is extended in chapters two and three to consider nine variables which possibly link export activity to firm size. Based on these results, hypotheses are formulated as to how firm size and export activity are linked.

Finally, these hypotheses are tested, using New Zealand's lumber industry as a case study. A methodology for testing these hypotheses is proposed in chapter four, and results from an empirical analysis are presented in chapter five. In this way, a clear picture emerges as to how firm size and export activity are related in New Zealand's lumber industry. Also,

these results should provide some insight into the reliability of firm size as a general predictor of export activity. These conclusions are elaborated in chapter six.

1.2 The Determinants of Firm Export Behavior

The literature examining the export behavior of firms is extensive but very uncoordinated. Researchers in this area generally seek out correlations between various indicators of export activity and a number of variables that could influence the export decisions of the firm. However, in most cases the authors make little attempt to explain why the variables they choose to examine might be expected to be related to export activity. Also, they tend to neglect to explain why they ignore other variables possibly related to export behavior. Consequently, numerous articles have been published describing various influences on export behavior at the firm level, but no clear picture has emerged as to which factors are important and why they are important.

This lack of coordination is largely the result of the fact that researchers have not adopted a common model of firm export behavior. From the standpoint of economics, the most reasonable approach to take in formulating such a model is to base it on the profit maximization theory of firm behavior. In fact, this is the approach adopted by Hirsch and Adar (1974), who have made an important contribution to the understanding of firm export behavior. The Hirsch and Adar analysis chiefly deals with applications of the discriminating

monopolist model. Shipping and marketing costs are assumed to be deducted from the appropriate demand curves. In this model, the firm acts to maximize its profits by price discriminating between the imperfectly competitive home market and a perfectly competitive foreign market. As a result, the firm's export behavior is determined by its cost function, the domestic demand function which the firm faces, and the foreign price level, and thus is explainable in terms of variables which influence these three factors.

Since it is based on the theory of the profit-maximizing firm, the Hirsch and Adar approach is a reasonable one to use in making hypotheses about export behavior. However, the ability for firms to price discriminate between home and foreign markets has been curtailed in recent years because of General Agreement on Tariffs and Trade (GATT) rules on anti-dumping. The spirit of the Hirsch and Adar approach remains unchanged by this, as does the central conclusion, that firm export behavior is determined by its cost function, the level of domestic demand, and the foreign price level. Nevertheless, a new model must be developed with the restriction that a firm which exports cannot charge a higher price in the domestic market than it charges in the foreign market. In the case of a firm that is perfectly competitive abroad but imperfectly competitive at home, this essentially means that if the firm exports, it must charge the same price in the home and foreign markets.

1.3 A Model of Firm Export Behavior

On the basis of the profit maximization theory of firm behavior, it may be argued that the export behavior of the firm is governed by how much profit it can make by exporting. In the case where a single-product firm cannot price discriminate between the home and foreign market, the firm faces two distinct options, with two different levels of welfare: exporting or not exporting. The situation is illustrated in Figure 1. If the firm supplies only the domestic market, it maximizes profits by producing quantity q_h^* and charging price p_h^*, earning producers surplus ABCD in the process. If the firm supplies both the domestic and foreign markets, and cannot engage in price discrimination, then it maximizes profits by charging price p_f in both markets and producing quantity Q^*. It can sell up to q_x on the home market[1], and $Q^* - q_x$ on the foreign market. In this case it earns a producers surplus of EGD. Consequently, the firm will export if the area of region EGD is larger than the area of region ABCD, and will not export if the area of ABCD is larger than the area of EGD. Obviously then, a firm's export behavior at any given time is determined by the firm's supply curve, the domestic demand curve that it faces, and the foreign price level.

It is appropriate to emphasize at this point that foreign price level (denoted as p_f) throughout this paper is taken to refer to the cost-adjusted foreign price level. That is, p_f is the price level in the foreign market, minus the per unit cost

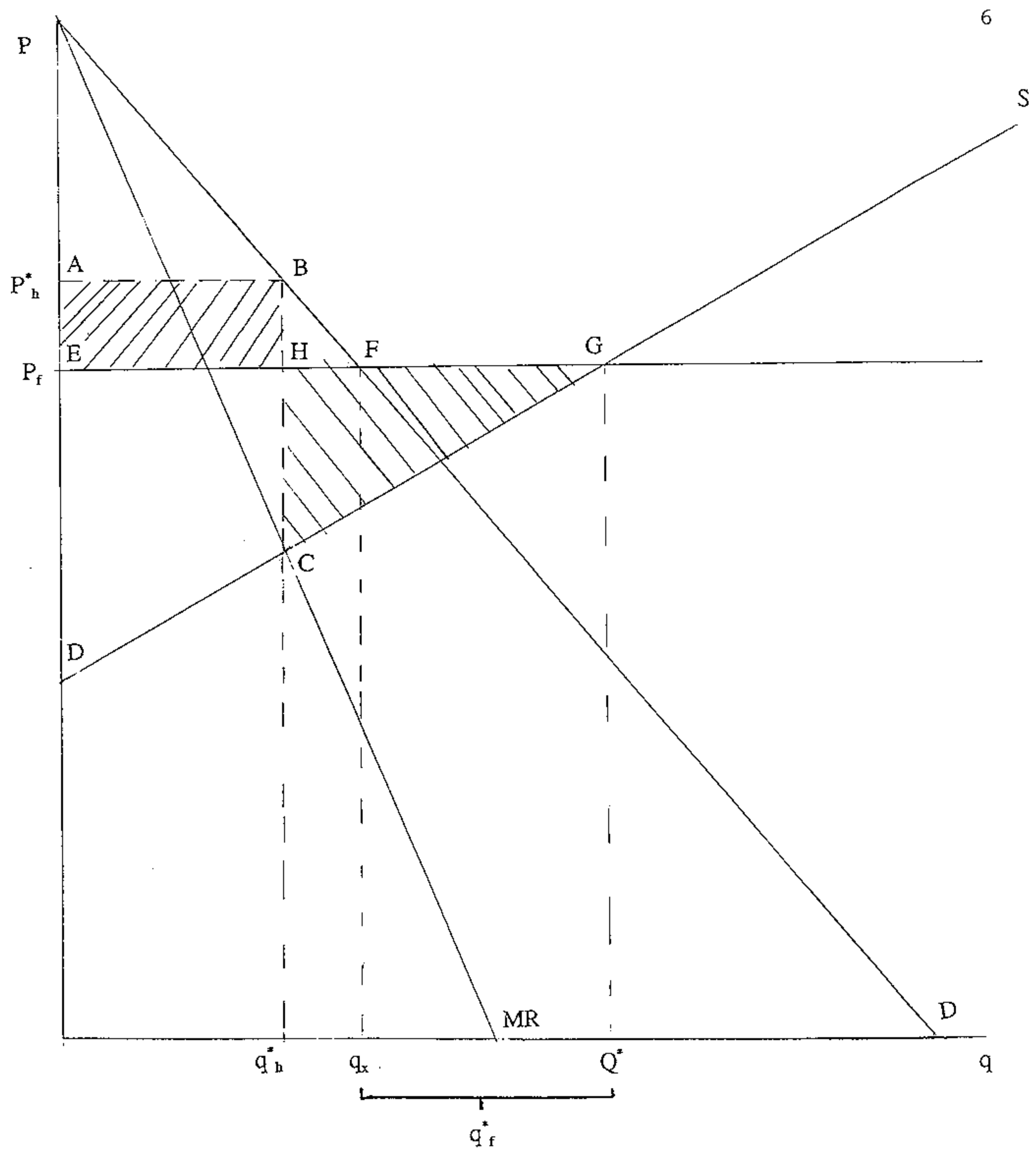

FIGURE 1 : Exporter surplus. Exporter surplus (denoted as X) is the difference between the area of EGD and the area of ABCD. Since the two areas share EHCD in commom, X reduces to the area of HGC minus the area of ABHE.

for a firm in the home market to ship and market its product in the foreign market. These costs include such things as transport costs, marketing costs and the costs of obtaining information that are above and beyond those the firm would face in selling to established domestic customers. These costs may vary considerably from firm to firm, thereby creating differences between firms in the level of p_f that they face. Thus, p_f cannot be treated as a given constant in this paper, but rather must be considered as a possible source of variation between firms in export behavior. As will be discussed in chapter two, a number of firm characteristics may influence exporting costs, thereby affecting p_f and the export behavior of the firm.

Changes in the domestic demand curve, the supply curve and the foreign price level can produce changes in the firm's export behavior by changing the relative amounts of producers surplus to be earned from exporting and from not exporting. Defining the difference between producers surplus from exporting and producers surplus from not exporting as the exporter surplus and denoting it as X, it follows that if $X > 0$, then the firm will export, and if $X < 0$ then the firm will not export. In this way, export behavior is determined by the level of exporter surplus.

In addition, it can be shown that under many circumstances exporter surplus decreases as domestic demand increases, that it increases as firm supply increases, and that it increases as p_f increases. Consequently, export behavior is directly affected by shifts in the supply and

domestic demand curves, and by changes in p_f. These results are detailed in appendix 1.

Clearly then, the firm's supply and domestic demand curves and the foreign price level determine the magnitude of exporter surplus at any given time. Therefore, any factor that causes a shift in the supply curve, demand curve, or foreign price level has an influence on the firm's export behavior. With this in mind, an analysis can be made as to how firm size is related to export activity.

1.4 Firm Size and Export Behavior

One factor examined extensively (but little understood) in the literature on export behavior is firm size. Firm size stands out from other variables in that it seems to attain significance through association with other factors, rather than having a direct influence over exporter surplus. A large number of studies have tested the significance of firm size as a predictor of export activity, but few have examined this variable in much detail. In particular, little has been written explaining why this variable should be significant. Moreover, empirical results on the explanatory power of firm size have been mixed. Hence, if public policy is to address the problem of stimulating exports by small-sized firms, much more research on the role which firm size plays in determining the export behavior of firms is needed.

1.4.1 Literature Review

A good starting point in examining the role of any variable in determining export behavior is to review the literature on it. A large number of empirical tests have been done on the significance of firm size, but interpretation of these results and speculation on the role firm size plays in exporting is lacking. In his survey of British hosiery manufacturers, Tookey found that larger firms tended to enjoy more success in exporting, owing to their "greater financial resources" (1964, 54). Bilkey and Tesar (1977) however, found that firm size was an insignificant factor after intercorrelation with management quality was considered. Bilkey (1978) indicates that just as many studies have found correlations between firm size and exporting as those that have not. Cavusgil *et al.* (1979) found that a significant differentiating factor between exporters and nonexporters was whether annual sales were greater than a million dollars. Moreover, Cavusgil and Nevin (1981) found sales volume to be a statistically significant determinant of exporting.

On the other hand, Kirpalani and Macintosh (1980) found no correlation between export success and a firm's number of employees. Also, Czinkota and Johnston (1983), in their study focusing primarily on the significance of firm size, concluded that no significant relationship existed with exporting. Empirical results from Cavusgil (1984) tend to confirm Czinkota and Johnston's conclusions.

Despite these findings, Yaprak (1985) found that both in terms of sales volume and number of employees, firm size was

correlated with exporting, at least for medium-sized firms. Burton and Schlegelmilch (1987) indicate that in a majority of studies firm size was shown to be significant to exporting, and conclude from their analysis that firm size is significantly related to export behavior. Burton and Schlegelmilch also found a high degree of correlation between the two variables commonly used to measure firm size, sales volume and number of employees. Further, Kau and Tan (1989) conclude that firm size is significantly correlated with exporting. Finally, Yang *et al.* (1992) concluded that firm size is a significant predictor of export intentions. Thus, as Aaby and Slater (1989) noted, it is difficult to come to any conclusions about the significance of firm size as a predictor of export behavior based upon the literature that exists today.

Many researchers have commented on the inconclusiveness of the literature on the statistical significance of firm size (see for example Aaby and Slater, 1989; Yaprak, 1985; Cavusgil, 1984; Bilkey, 1978; Czinkota and Johnston, 1983; Burton and Schlegelmilch, 1987). Despite this, few explanations have been offered as to why this is the case. Bilkey (1978) hypothesized that firm size is correlated with exporting only over certain size ranges, particularly middle-sized firms. Bilkey also implies that a certain minimum size is needed for any firm to export, and that very large firms have other options in foreign markets besides exporting (e.g. foreign investment) (Yaprak, 1985). Results from Yaprak tend to confirm this hypothesis. Cavusgil (1984) hypothesizes that

firm size may affect entry into the export market, but not a firm's volume of exports. On the whole, though, the literature has not actively sought an explanation for the contradictory results obtained by various empirical analyses.

1.4.2 Theoretical Extensions

One possible reason for the paucity of discussion on empirical results related to firm size is that no widely accepted view on how firm size is connected to export behavior exists. Little discussion has taken place on why firm size should, in principle, have an influence over the inclination of a firm to export. Reid in particular notes that the lack of an explanation as to how firm size should affect export behavior inhibits research on this point (Reid, 1985). Czinkota and Johnston (1983), in their study focusing directly on sales volume, make no effort to discuss why firm size might be considered a significant factor in the first place (for a full critique, see Reid, 1985). Other researchers have dealt with firm size only in a cursory way. Suffice it to say then, the literature has not given thorough attention towards explaining how firm size is related to exporting, despite the wide array of empirical tests done and contradictory results obtained.

Perhaps the best way to consider firm size is not as a factor directly affecting export behavior, but rather as a factor that affects and/or is correlated with other factors which affect the export behavior of firms. Cavusgil (1984)

and Aaby and Slater (1989) both conclude that this could be the case. Cavusgil writes:

> ...it may be more appropriate to view firm size as a concomitant variable (associated with export activity) rather than a causative factor. Since larger size usually implies greater availability of production, financial, and managerial resources, the true relationship it seems is not between size and export behavior, but it is between various advantages which accrue from larger size, and export behaviour. In this sense, firm size serves as a proxy for various advantages associated with size. (1984, 7)

Aaby and Slater echo this viewpoint, writing "...company size by itself is not an important factor unless it is linked to aspects such as financial strength or variables related to economies of scale" (1989: 21).

Moreover, other researchers have considered the possibility that firm size is correlated with other factors. For example, Tookey (1964) indicates that larger firms have greater access to financial resources and that larger firms can afford to hire or train staff for handling export orders. Bilkey and Tesar (1977) found that firm size was linked to managerial quality and ambition. Czinkota and Johnston (1983) hypothesized that managerial attitudes and perceptions were associated with exporting, but rejected this hypothesis in empirical tests. Yang *et al.* (1992) argue that changes in firm size are indicative of a variety of factors which are associated with exporting. Excepting Czinkota and Johnston however, none of these researchers have actually empirically

tested these proposed links between firm size and export activity.

In addition, many other firm characteristics associated with exporting can be hypothesized to be related to firm size. For example, firm size might be linked to locational factors. A model proposed by Juarez and Romero (1986) indicates that firms may choose their size and location together in such a way as to minimize the delivered cost of its product. The model suggests that larger firms will be biased towards locations with greater population density, e.g. cities, which in turn implies less costly access to information and finance and, assuming ports and other transshipment facilities tend to be located in cities, lower international transport costs.

Firm size could also be related to a variety of product and production-related factors. For example, product quality might be associated with firm size. In general, smaller firms may tend to skimp on quality control, but in some industries some production processes associated with smaller firms result in higher quality. For example, in lumber manufacturing a single headrig, used by smaller firms, allows the operator to produce a higher quality cut on each pass, but a gang headrig saws the entire log at one pass, producing lower grade lumber (Spencer and Luy, 1975 87).

Moreover, a firm's production costs are likely to be highly associated with firm size. Larger firms can take advantage of scale economies in production and administration. The degree of this advantage of course depends on the degree to which scale economies exist in the industry.

In addition, organization-related factors are probably highly associated with firm size. For instance, firm size and legal structure may be related. Partnerships and corporations will both tend to be larger than proprietorships, owing to the greater amount of financial backing in these types of enterprises. Moreover, enterprises where there is foreign-held equity will probably be larger than those that are totally locally owned because larger domestic firms are more likely to attract the attention of foreign investors than small ones, and because foreign participation results in an additional source of financing and information, both of which tend to cause growth in firms (see Kau and Tan, 1989).

Furthermore, several factors related to information may be related to firm size. The size of a firm's management force is directly related to the firm's size. The larger the number of managers a firm has, the greater is the amount of their collective knowledge and experience, and hence the greater the amount of information available to the firm. Consequently, larger firms are likely to have a more information and skill in any given subject than smaller firms simply because larger firms have more managers.

Clearly then, it is possible that many factors link firm size to export behavior. As a result, there is good reason for believing that firm size is related to export behavior because it is associated with determinants of export activity.

Notes

1. It is assumed in this thesis that the firm satiates the home market by selling quantity q_x on it before exporting.