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STRATEGY, COMPETITION AND DIFFERENTIAL COMPETITIVE ADVANTAGE: EXAMINATION IN THE U.S. NON-RUBBER FOOTWEAR MARKET

By

Daniel Patrick Rutledge

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ABSTRACT

STRATEGY, COMPETITION AND DIFFERENTIAL COMPETITIVE ADVANTAGE: EXAMINATION IN THE U.S. NON-RUBBER FOOTWEAR MARKET

By

Daniel Patrick Rutledge

This dissertation focuses on the relationship between competitive advantage and competitive strategy. Both these subjects have been topics of interest in marketing for the past decade providing an extensive amount of research in the literature. Empirical support, however, has been absent from this research stream.

The concept of competitive advantage was introduced to marketing by the work of Wroe Alderson. The definition of competitive advantage used in this research is based on the Alderson perspective. Other writers have contributed to the subject by suggesting sources of competitive advantage.

Models and theories of strategy and competition from a number of academic fields are reviewed. Through cross-fertilizing their contributions a perspective is formed which serves as the basis of an integrated theory of competitive strategy. This theory identifies six key elements in a competitive strategy and proposes that competitive strategy should be formulated on firm-specific competitive advantages.

Seven firm-specific profit equations in multiplicative, log-transform, econometric form are specified in the modeling system. Marketing mix, lag marketing mix, operational

policies, market effects and competitor variables are possible categories for inclusion in these unique specifications. The set of equations are simultaneously estimated using the "seemingly unrelated regression" procedure, an appropriate method when the disturbance terms are correlated across equations.

A method which objectively identifies firm competitive advantages is proposed. The test calculates a "D-statistic" by comparing SBU level versus market average coefficient values. It is proposed that an advantage is identified when this "D-statistic" exceeds +1.0 standard deviations from the market average value.

A study of the U.S. non-rubber footwear market served as the basis for testing the dissertation propositions. Results show competitive strategy is positively related to return on sales (ROS) and return on assets (ROA) at $p \leq 0.05$ level or better. Competitive advantage is also positively related to ROS but at the $p \leq 0.15$ level.

This research makes valuable theoretical and empirical contributions to the marketing field by investigating the concepts of competitive advantage and competitive strategy. It demonstrates that strategies, based on firm-specific competitive advantages, have a positive relationship with ROS and ROA profitability measures.

To My Sons....

Craig Patrick Rutledge and Todd Patrick Rutledge

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Lastly, a special note to my sons. You two fellows have been an important source of inspiration for me. There was never any doubt in my mind that I would finish, Craig and Todd, only the question of when. Thank you, sons, for your patience and understanding too. So finally, boys, after fourteen years of higher education, with the last eight years involving this Ph.D., of which the last four and one-half years have spanned the 4200 plus hours devoted to this dissertation, I can say with these remaining words....

"Dad has finally finished!"

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CHAPTER I

INTRODUCTION AND PURPOSE OF DISSERTATION

Introductory Comments

Formulating a strong competitive strategy, based on the identification of important market and competitive effects, has long occupied the attention of managers. More recently, competitive strategy has also gained increased attention in the marketing literature (Weitz, 1985; Kotler, 1980; Porter, 1980; Carroll, 1984).

Both in the marketing literature and other literatures examining competitive strategy the effects of competition on strategy formulation have, however, not been sufficiently explored (Wind and Robertson, 1983). This lack of attention has been due to: (1) data availability problems, (2) the inappropriate choice of statistical methodologies and, (3) the lack of testable hypotheses relating to competitive behavior from theories examining this phenomenon (Houston and Weiss, 1974; Joskow, 1975).

The goal of this dissertation is to develop a theory of competitive strategy formulation which explicitly includes the effects of competition. Competitive strategy should be based on firm-specific capabilities which provide the firm with competitive advantages (Weitz and Wensley, 1984; Coyne, 1987; Hofer and Schendel, 1978, p. 152). Although the concept of competitive advantage has been extensively discussed in the marketing literature, a formal, explicit

definition, however, has not been found. To achieve its objectives this dissertation will provide a formal definition of competitive advantage and proposes an objective method for its identification and measurement. How companies develop and retain competitive advantages should be given high priority for research in the marketing field (Day and Wensley, 1983).

[NOTE: The terms "differential advantage", "competitive advantage", and "sustainable competitive advantage" are used interchangeably in the literature. In this dissertation the term competitive advantage will be used].

The Dissertation Research Study

Purpose And Objectives

A common thesis in strategy research is the need to find a strong market position which provides the organization a "fit" between its capabilities and the requirements for success in its environment. Included in the environment are customers, competitors, and economic and other institutions. Finding this fit is the main purpose of competitive strategy formulation (Hofer and Schendel, 1978, p. 23; Harvey, 1982, p. 113; Miles and Snow, 1984). This dissertation attempts to demonstrate that firms which emphasize their competitive advantages as the basis of their competitive strategies will establish strong market positions and will attain superior

profit performance (i.e.), by creating a strong fit between firm and its environment.

To achieve its goal, this dissertation will accomplish a series of objectives. These include:

1) Providing a definition of the concept of competitive advantage;

2) Providing a list of sources from which competitive advantages may be recognized;

3) Developing a theory of competitive strategy formulation which includes the effects of competition;

4) Providing a procedure for objectively measuring firm-specific competitive advantages;

5) Developing a model of competitive strategy that includes sources of competitive advantage;

6) Demonstrating the concept of competitive advantage through an empirical study of a market displaying competitive oligoploistic market characteristics;

7) Evaluating the results from the firm-specific profit models to test the propositions of this dissertation.

Background Of Strategy Formulation Approaches

The major disciplines which have examined strategy and competition include economics, management, and marketing. Financial portfolio theory, military theory, sociobiology, population ecology, and game theory have also contributed models and theories of strategy and competition. Lastly, the "popular business press" has added the observations of consultants and practitioners. Some of these writings have shown a marked effect on management thinking regarding the strategy formulation process over the past two decades. Based on the research examined from these literatures, it

appears that the role of competition has remained mostly implicit in these different models and theories (with the exception of economics). In marketing, competition can not be said to be well developed either since the discipline has tended to emphasize consumer behavior theory and research as its central focus.

Need For Research

The lack of consideration of competitive effects in marketing theory is partially attributed to the fact that competitive advantage has remained largely undeveloped with little empirical research conducted. Identification of competitive advantage has been left to managers to spot an advantage and then incorporate it in their strategies. Both competitive advantage and competitive strategy formulation present attractive opportunities for research in marketing.

A formal definition has not, thus far, been provided in the literature which is explicit and can be operationalized. The only known attempt to measure the concept has been Cook's (1983) "strategic ambition" concept. However, both writers and theorists agree that: (1) customer acceptance, (2) an ability to successfully defend market position from competitors' attack, and (3) sustaining this position over time should be key criteria in any definition.

Alderson (1957, Chap. 4), while not explicitly providing a definition, credits J.M. Clark with introducing the idea of differential advantage to the marketing discipline. The need

to gain competitive advantage for establishing a strong market position is basic to marketing behavior. Following the vein of the Alderson context, the formal definition of competitive advantage proposed for this dissertation will include the three important elements listed above.

Research Problem Statement

Strategy requires managers to make a number of decisions based on understanding customer response to the strategy and the effectiveness of competitors' strategies. Identification of competitive advantage reflects the ability of the firm to serve its customers while sustainability is measured by its competitors' inability to change the firm's market position. Both conditions are present in an effective strategy.

Defining competitive advantage is the first objective. A list of firm distinctive competencies serves as the basis for identifying sources of competitive advantage. Next, to test the strength of its strategy, a firm-specific model of its competitive strategy is developed. Each coefficient will be compared to the market average coefficient value for this same variable, a procedure proposed for identifying competitive advantages. Lastly, the strength of a firm's competitive strategy, as established on its unique competitive advantages, will be directly related to the firm's profit earning potential.

If each firm's response model depicts a different set of profit generating policies, then the probability of two firm

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possessing exactly the same strategy should be relatively small. Hence, firm profitability can be shown to vary with the differences found between firm competitive strategies. In conclusion, competitive strategy can be shown to be firm-specific rather than selected from a sets of "generic" strategy choices, a criticism noted from Carroll (1984).

Organization Of The Dissertation

This dissertation is organized into six chapters and two appendices. These include:

Chapter I: Introduction And Purpose Of Dissertation

Chapter II: Literature Review

Chapter III: Theory Development And Research Propositions

Chapter IV: Research Methodology

Chapter V: Evaluation Of Results And Tests Of Propositions

Chapter VI: Conclusions And Areas For Further Research

Appendix A: Study Of The U.S. Non-Rubber Footwear Market

Appendix B: Data Discussion

The U.S. non-rubber footwear market was the focus of a study used to test the dissertation's propositions. The main reason that this market was selected was the availability of data for both market and competitor firms and the changes which took place in the market during the period of study. The time frame of this study was the period 1960 to 1987,

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providing a total of twenty-eight yearly observations per variable. Recognizably though, is the fact that the number of observations is small per variable which limits the tests of significance when regressing the equations in this modeling system.

Methodology

Multiplicative, logarithmic, econometric-based market response models are developed for testing the propositions of this research. These models will be specified along lines similar to Cobb-Douglas production functions found in the economics field (Chiang, 1974, pp. 407-10; Walters, 1963) in order to relate competitive advantage with competitive strategy formulation. The multiplicative model specification has been found superior to additive models (Naert and Bultez, 1973; Houston and Weiss, 1974; Jagpal, Sudit and Vinod, 1979). These types of models allow for competitive variables to be included exogenously capturing these effects directly. Accounting for effects of past policies, lagged marketing mix variables are included making the models dynamic rather than static. Additionally, two market factors are added to capture their impact on firm profitability.

Models which contain interactive and carryover effects require estimation procedures more sophisticated than ordinary least squares. Estimation methods utilized in this type of modeling included two-stage least squares, three-stage least squares, generalized least squares, and iterative

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generalized least squares. To reduce the effects of correlation among residuals in models where interactive effects are present, Zellner's (1962) seemingly unrelated regression procedure (SUR) is used when the disturbances are correlated across equations. This dissertation uses the SUR procedure to estimate the coefficients of the firm-specific profit equations in this modeling system.

Each equation was specified to reflect the unique nature of the firm and their different specific capabilities. To achieve this model form a multi-step specification method was employed. The use of this procedure has been observed with other small sample marketing studies (Lambin, 1970; Gatignon, Anderson and Helsen, 1989).

A study of the U.S. non-rubber footwear market included seven firms of varying size competing in different product categories. The data base constructed was based on a set of variables, each containing twenty-eight yearly observations available for each firm policy variable plus two market effect variables. Additional qualitative support was provided with case study information to supplement the empirical data, an idea suggested by Bonoma (1985). Data were gathered from publicly available market and financial sources. These were consistently available for the entire period of the study.

By concentrating on those significant variables found in the firm-specific profit equations, establishing competitive advantages by objective identification and measurement was

achieved. Competitive advantages were identified from the estimated coefficient elasticities of the policy variables contained in each equation by comparing these with their corresponding market average coefficient values. Those variables which satisfy the definition provided in Chapter II are deemed identified as competitive advantages.

Limitations

A number of limitations are noted regarding this study:

1) The theoretical base is largely from industrial organization economics while the concept of competitive advantage is developed from marketing.

2) The information used was based on accounting reports provided in a form not specifically designed to serve the needs of marketing studies. The possibility of measurement problems exists because of this reason (Mossman, Crissy, and Fisher, 1978, pp. 2-3).

3) Additional concern is with the variety of accounting reporting practices used by these firms. However, this is simply the nature of this type of data. Hopefully, during the time period of this study these effects will have only minimal impact.

4) Some of the included variables have been selected not only because they may be possible competitive advantages but because of data availability. Intangible variables may be sources of advantage but are not considered easily measured and, therefore, not included in the study.

5) Also missing is the ability to gather and use market information considered one of the more important marketing functions.

6) An important limiting factor is the small number of observations per variable. This factor affects the level of statistical confidence used requiring probability levels of significance lower than usually accepted. A 0.10 or 0.15 significance level has been found in certain instances in the marketing literature.

7) The manner in which the equations are structured assumes the coefficients are constant over time. With the

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limited number of observations, available examining for changes in parameter estimates is not a question that can be addressed satisfactorily.

Contributions To The Marketing Field

Competitive advantage has been a prominent concept in the marketing discipline but has lacked both theoretical development and empirical testing. This dissertation will provide a definition of the concept, enumerate sources of competitive advantage, and demonstrate a procedure for its objective identification and measurement. Such an objective identification should greatly aid managers when formulating competitive strategies by anticipating both type and degree of customer and competitor response.

Identifying competitive advantages should allow firms to evaluate which markets they can effectively serve. Through an emphasis on competitive advantage, the astute manager should be able to develop competitive strategies which will provide their firms with the ability to effectively compete in their markets.

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CHAPTER II

LITERATURE REVIEW

Chapter Outline

The effect of strategy on firm performance and the role of competition in this process have been investigated and researched from a number of viewpoints and academic fields. Jemison (1981) has pointed out the vast potential for cross-fertilization between management, marketing and industrial organization economics can provide a richer understanding of these two topics and their relationship.

The purpose of this chapter is to examine definition, theoretical and methodological issues of concern in this dissertation. To satisfy this purpose four major section are included in this chapter:

1) A brief discussion defining strategy and competition is provided.

2) An overview of various models and theories of strategy and competition from different academic fields and research streams and the "popular business press" is presented.

3) An analysis of the concept of differential competitive advantage is discussed. The focus centers on the origin of the concept, a formal definition is provided, sources of competitive advantage discussed in the literature are listed and two studies which have employed this concept are reviewed.

4) A review of research studies from the marketing field regarding the determinants of firm sales or market share are examined for the methodological issues they raise in performing this type of research.

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Defining Strategy And Competition

Strategy Defined

Hofer and Schendel (1978, p. 23) have provided a useful, concise definition of strategy. This definition highlights, in general terms, the basic questions which managers face as they attempt to plan direction and formulate a strategy for their firm. Strategy is defined as:

> "Fundamental pattern of present and planned resource deployments and environmental interactions that indicates how the organization will achieve its objectives."

This definition points to the first role managers are expected to fulfill, that of establishing objectives and goals to be achieved. Second, managers formulate two types of market exchanges. The first aspect deals with policies to acquire and allocate resources. The second establishes market exchange practices for interacting with customers while facing competitors whose goal it is to interfere with both these exchanges. The selected strategies will remain in force so long as either of these patterns is not seriously disrupted and the pre-established objectives are deemed accomplished.

Basic to the strategy-profit performance question is the extent to which market success depends on environmental conditions versus the effectiveness of managers dealing with conditions beyond their direct control. Traditional theory posits that strategy is the result of a rational, purposeful decision making process. But the process is often far from

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this depiction. Differing personal backgrounds, conflicting objectives and goals, and formation of political coalitions effect the process and shape its final configuration (Fahey and Narayanan, 1983; Mintzberg, 1978).

A common tenent found across various disciplines regarding strategy is the manager's attempt to match a "fit" between the firm and its environment. Microeconomics and the field of industrial organization economics have focused on industry structure as a main determinant of competitive conduct. The marketing discipline has concentrated on the selection of product-market segments and customer response. These three areas have been most concerned with the effectiveness of strategy. The management field has looked at functional areas of the firm where efficiency is the criterion that has received most of the attention. Clearly though, no field is concerned solely with effectiveness or efficiency as a single strategy objective.

Porter (1981) recognizes that feedback effects between firm conduct and strategy affect market structure. This factor is observed in models where a sales and advertising relationship exists specifying these endogenous variables in a simultaneous equation system. Empirical evidence supports this theoretical relationship and, therefore, the premise that competitive conduct can affect market structure.

A basic premise of this dissertation is that firms try to outmaneuver each other in an attempt to find differential competitive advantages in their market. If this premise is

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supportable an individual firm would be able to affect its market structure and change the nature of the competition found in that market. This premise indicates that strategy is an interactive process between market structure and firm conduct taking place as a dynamic, time-related phenomenon.

Competition Defined

J.M. Clark's thesis of firm competitive behavior differs from microeconomic models by depicting competition as a dynamic process rather than as a static condition. In this process firms act independently -- but ironically, also interdependently with their competitors -- when seeking the patronage of customers. Each participant, by seeking to improve its market position, becomes involved in what is commonly observed as "rivalous" behavior among competitors hoping to attract customers to themselves. (Clark, 1961, p.13).

Firms are continually observed entering and exiting the market. This type of dynamic change ultimately effects the structure of competitive markets. Not only is this due to the changing number of competitors but also to changes in the market due to what they bring to the competitive arena in terms of new resources, skills and capabilities. These new capabilities may likely vary significantly from what are current skills found in the market.

Recognized differences in the meaning of the term market "efficiency" and reference to time as an important factor

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become key considerations for understanding "rivalous" firm behavior. The meaning of efficiency recognizes definition differences and has a bearing on the concept of strategy. "Technical" -- or production efficiency -- serves as a basis for the "pure competition" model where products offered are nearly identical. "Social" efficiency, on the other hand, is achieved through product variety and the introduction of new products into the market. The "cost tradeoff" between "technical" and "social" efficiency are the welfare benefits balanced from lower unit cost of production versus availability of product variety and new product innovations.

Chamberlain (1950) points out that having a choice among differentiated "offerings" allowing consumers to select from a variety of sellers' strategies. This allows consumers the best chance to maximize their individual welfares through product diversity. Chamberlain adds that "a heterogeneous product....would seem to be as fundamental as anything could be" (p. 86). "The price system....appears to afford no test" [to the efficiency of the market system in reference to the welfare maximizing criteria of economics] (p. 90).

A second definition of competition rests on the number of sellers found in the market and the degree of "seller concentration" present. This definition is the "structure" based method of measuring competition taken from industrial organization economics. Despite the number of assumptions made in the models generated by this stream of research, this field has produced a large amount of empirical work over the

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past half century. This research has provided a richer understanding of market competition through development of the structure-conduct-performance paradigm.

Scherer (1980, pp. 9-11) emphasizes Adam Smith's conduct based definition of competition compared to one based on the industrial organization economics "structure" definition. Scherer likewise emphasizes firms actively seeking customer patronage against rivals. This dissertation will use the "rivalry" definition of competition which J.M. Clark and Scherer have endorsed.

SUMMARY--Strategy is concerned with what an organization considers as important elements which influence its ability to interact with its market and environment. How and where to deploy these factors and in what combination is the focus of the strategy formulation process.

Competition is one of these important elements. It has a major effect on how the organization prepares its strategy and deploys its resources. Competition is a dynamic process affecting market conditions and requires vigilant attention by managers to these changes. Eventually change leads to new resources, technologies, skills and, lastly, to managers reformulating their policies and competitive strategies.

An Overview Of Strategy And Competition Models And Theories From Academic And Business Fields And Disciplines

Various academic fields have attempted to investigate the many possible factors which affect firm profitability and survival. In research where profitability has not been directly examined another intermediate objectives criterion, such as market share, has been studied. The range of variables examined has been wide as has been the number of methodological approaches used.

The past two decades have produced writers and observers of strategy from the popular business press. These writers have contributed and influenced business managers by their reporting of anecdotal case instances which illustrate both successful and mistaken strategic decisions. Such examples provide interesting insights but are not useful for research purposes. However, something can be learned from this work even though they are not generalizable.

The analysis which follows examines a number of fields and disciplines which have contributed to the subjects of strategy and competition. The opportunity for integrating a multi-disciplinary, cross-fertilized approach is presented with the potential for illuminating a richer explanation of strategy formulation. The findings summarized below at the end of this analysis provides insight for the development of a theory of competitive strategy.

The list of fields and disciplines outlined in **Table 1 - Models And Theories Of Strategy And Competition**,

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provides seventeen different areas plus the "popular business press" which have contributed to understanding these two subjects. The area of Differential Competitive Advantage is examined in greater detail in the third section of this chapter.

Table 1

Models And Theories Of Strategy And Competition

Non-Business Fields	Economics	Management	Marketing
Military Theory	Micro-Economics	Organizational Behavior	Product Life Cycle
Game Theory	Industrial Organization	Congruency Theory	Market Share Models
Socio-Biology	Transaction Costs Economics	Strategic Management	Marketing Mix Models
Population Ecology	Strategic Deterrence	Portfolio Theory	Brand Choice Models
			Differential Competitive Advantage
Popular Business Press			

Each review provides a brief evaluation of the area's content as it relates to strategy and/or competition subjects. This breadth of coverage points to overlaps between the different disciplines. While this overlap makes it somewhat difficult to clearly delineate the contributions between the different fields, it does provide the richness sought from cross-fertilizing ideas among varying academic disciplines. By examining a number of these "principles" a

picture of the strategy-competition interface emerges and reveals several broad guidelines that help understand competitive strategy formulation.

Non-Business Fields

The first areas examined fall outside the general scope of business subjects. Military theory, as example, has made a significant contribution and serves as the starting point for examining and understanding current thinking in business strategy.

MILITARY THEORY--The origins of the strategy are rooted in the military science field. Among the prominent writers is Liddel H.B. Hart (Strategy, 1967), an English historian of military affairs. Hart asserts it is from the disregard of military principles that the hard lessons of strategy are learned. His key ideas and contributions to the subject are summarized in **Table 2 - Military Strategy Contributions To Business And Competitive Strategy Theory**. Overall, the military field has shaped the thinking and formulation of business strategy on several levels.

The conditions present in military thinking are not the same as those affecting business. One of the most important factors missing from military theory is the role of a third party -- the buyer -- who has a stake in the survival rather than elimination of suppliers competing for its purchases. An ability to keep several suppliers becomes a bargaining tool for future purchasing negotiations favoring this third

Table 2

Military Strategy Contributions To Business And Competitive Strategy Theory

1) Strategy is concerned with the achievement of objectives economically in applying resources.

2) Grand strategy guides competitive strategy (the military equivalent) which in turn directs tactical execution.

3) The levels are intertwined and not completely separate because their limitations influence each other.

4) Selection of the place of engagement has high priority for achieving success having the aim of attaining a defensible position from competitor incursion.

5) The decision as to the basis of competing is made before engagement based upon careful study and evaluation.

6) Emphasis is upon the application of strength against weakness to gain advantage.

7) Mobility in deploying resources will allow for maximum chance to exploit opportunities.

party. Elimination of a viable supplier is an unfavorable condition not likely to be accepted in many industrial situations.

A second approach relating military theory to business situations is given by Kotler and Singh (1981). They apply three basic principles of military strategy to competitive strategy. These descriptions include: (1) confrontation - head to head clash of rivals almost always ending in disappointment; (2) attack - non-confrontational engagement by maneuver other than direct attack of strength against

enemy weakness; and (3) defense - ability to withstand opponent's assault and to repulse its initiative.

It is apparent that military theory can be transferred in part to strategic business planning. However, the ideas are of value more for their ability at stimulating thinking than their direct application to competitive strategy solutions.

GAME THEORY--The theory of games was popularized by Von Nuemann and Morgenstern (1964) based on interactive movement and countermovement between pairs of adversaries. The focus centers on rivals acting directly rather than indirectly to settle the division of game "payoffs". The strength of game theory is its suggested framework for determining solutions to competitive situations.

Critics of game theory point to weaknesses based on the assumption that a unique stable solution exists in the game (Case, 1979, pp. 28-30). As a result, no "learning" takes place during the game. Rational behavior is presumed with all relevant information known to both players who likewise evaluate game outcomes and see the game situation exactly identical.

Game theory has stimulated strategic thinking but is not really a strategy exercise. Its value is more as a method that calculates outcomes of strategic moves than in formulating strategy. Little scope is afforded for the development of unique strategies since the "rules of the game" have already been determined. Nor are guidelines

established which lay out the key determinants affecting the environment.

SOCIOBIOLOGY--This field relies on the natural selection concept of competition for environmental resources in order to survive. This field emphasizes the "natural selection" approach which is more concerned with competition than with strategy. The field hypothesizes that each specie has some advantage over the others which allows it to compete successfully for necessary resources. Bruce Henderson (1983a; 1983c) is associated with this area.

This Darwinian concept of natural selection supports the principle of finding a "fit" between firm and its market. The species best able to survive are those most "fit", the assumption being that this is due to some unique capability enabling them to adapt to changing environmental conditions. In their "niche" the firm able to achieve a good "fit" with its environment will survive beating out the competition.

The natural selection hypothesis in strategic business situations is limited for the following reasons:

1) The integration of cognitive logic in business strategy which is not present in biological competition.

2) The environment is accepted as a given in biology but changes continually in business competition.

3) Natural selection is based on specific, unchanging firm capabilities as an assumption. Businesses can and do change their capabilities as evidenced by new business forms emerging over time.

4) The time frame for adaptation is very long in biology while in business it is much shorter.

5) The biological model is concerned with competition for resources rather than strategy; the business firm is conscientious of both strategy and competition.

Adams (1982, pp. 483-5) criticizes the natural selection hypothesis because of the assumption that firm capability is the sole explanation determining success. Due to political influence in the business environment change cannot be attributed only to some "natural cause" in market structure. Survival may be the result of "favorably influencing" the environment towards the stronger specie (in this case, the successful business firm). This type of question is one which the biological model does not address.

POPULATION ECOLOGY--This area is similar to sociobiology but differs in its approach by emphasizing strategy rather than competition. The unit of analysis is the population of organizations that consider survival their main objective (Hannan and Freeman, 1977).

The success with which organizations adapt to shifts in the environment is related to either the natural selection process or by adaptation of organizations to new or changing conditions. These two views present divergent explanations of how survival advantages are gained. Changes may originate from either (1) environmental effects which are random, or (2) the deliberate attempts of management to adapt to new conditions or constraints. The origination of the effect delineates the two viewpoints.

Aldrich and Pfeffer (1976) have described these two sources of change. First, external effects taking place in

the market or environment that can be treated as random. Second are changes due to internal adjustments initiated by the firm in order to adapt to changing conditions. These latter actions involve new "routines" or "patterns of activity", which when repeated consistently, emerge as new strategies and which seek to produce competitive advantages for the firm (Freeman and Boeker, 1984).

Both approaches rely on a selection mechanism which acts to separate the survivors from the vanquished. The natural selection process shows little concern for how the source of the effect arrives, only that it occurred. As such, "luck" or pure "fortune" play a role in explaining how these changes arrived.

The adaptation viewpoint sees management in a concerted effort to "fit" the organization to the market environment by the means of conscientious initiative. Nelson and Winter (1977) describe this as strategy formulation by management where the conditions are fraught with less than "perfect knowledge" under constraints of "bounded rationality" and where strategy is subject to the "uncertainties" of volatile market conditions.

Economics

The economics discipline has had the longest tradition of studying competition of any field. Only recently has an interest in strategy been raised. A basic proposition found

in economics is the "theory of the firm" concept as a model representative of the unit to be analyzed.

MICROECONOMICS--The subject of competition has been a focus of economists for over two centuries. Early writings dealt with monopoly and pure competitive models. Cournot contributed duopoly theory, a market situation where two sellers co-exist (Ferguson, 1966, pp. 269-71). The work is noted because it includes reaction to the actions of a competitor as part of its theoretical base. Later Marshall, influenced by Cournot, added the theory of the firm model to neoclassical economics. This concept provides a model which establishes firm prices, costs and output under the two main market models of pure competition and monopoly.

A problem with microeconomic models involves limiting assumptions about firm competitive behavior when explaining market activity. The assumptions are needed when developing analytical models but are severely restrictive for empirical research purposes.

Chamberlain's The Theory of Monopolistic Competition (1965, p. 31), discussed the formulation of strategy designed to differentiate one sellers offering from another. In this theory, seller's set their strategies based on knowledge of what their competitors" strategies are expected to be. In oligopoly, the tendency to collude or "tacitly agree" to set prices or to restrict output distinguishes this line of thought. Oligopolists move away from price forms of competition and deliberately focus their attention on non-

price strategy methods. Economists criticize this approach because it forces the seller to raise prices which results in misallocation of resources equated as firms "earning excess profits".

INDUSTRIAL ORGANIZATION--In the late 1930's, a field of economic inquiry emerged which has become known as "I-O" theory or industrial organization economics (the Mason (1939) - Bain (1951) line of thought). This field's main postulates center on the relationship between industry structure, firm conduct (behavior), and profit performance. The basic I-O model hypothesizes that industry structure, characterized by high seller concentration and barriers to entry, leads to a unidirectional causality and which keeps industry profit levels high for the member firms in this market.

Bain (1951) demonstrated that industries which have high seller concentration levels will have a systematic, positive relationship with high industry profits. (Concentration is measured as the share of industry shipments accounted for by the largest four, eight, and twenty firms in the industry). This measure can be viewed as "roughly" equivalent to the combined market shares of the top firms in the industry.

A second study of industry structure by Bain (1954) attributed high profit performance to the existence of high entry barriers. The presence of "barriers" serves to discourage potential entrants from coming into the industry and serves to maintain high profit levels for the protected firms. Low entry barriers ease the conditions of entry and

de-concentrates the market leading to increased price competition. The effects of high industry concentration and high entry barriers leads to excess industry profits being earned.

This paradigm is criticized for by-passing the critical explanation of the relationship between industry structure and individual firm behavior. It fails to explain how strategy influences profit results. The model, therefore, attributes profit performance largely to industry structure. Chief among these critics has been Phillips (1976) pointing out the link between profits and concentration has shown inconclusive results. He also raises the questions regarding the entry barrier hypothesis by stating that while barriers are necessary, they are not a sufficient condition for excess profits.

Several methodological concerns arise which should be noted regarding I-O research. One concern is data sources which use government Census of Manufacturers Reports and which mask differences within and between industries. The second problem is the level of analysis involved where four digit industry codes are used. Third, the level of analysis is focused at the industry rather than the firm. Porter (1981) points out that with industry as the level of analysis, no room is left of management to develop unique methods of competition.

Porter (1982) adds that regardless of the criticisms, the I-O field has provided interesting and useful insights

into the relationship between industry structure, firm behavior and firm profit performance.

TRANSACTION COST ECONOMICS--The theoretical background for this branch of study has been in existence since the late 1930s. Major contributors include Coase (1937), and Williamson (1975; 1979; 1985), the latter having taken the area to great depths with his well developed theoretical treatment. This area has developed its foundation from the fields of economics, organizational behavior and law. The emphasis on the individual transaction is unique as a unit of analysis.

Coase (1937) recognized two forms of organization and resource allocation mechanisms present. First, are markets where resources are allocated. The second falls within the firm itself, using the talents of decision makers to decide the allocation issue. The "firm", Coarse states, is organized to reduce transaction costs of coordination of market activities, thereby minimizing the total cost of going to market.

The objective for the firm is to minimize total costs throughout the whole market. This becomes difficult because of the uncertainties associated with executing contracts and market exchanges. Reasons given for these difficulties when executing exchanges include: (1) bounded rationality of the decision makers, (2) opportunism by participants, (3) uncertainty of market situations, and (4) small numbers of participants present in the market.

Vertical integration serves as a source of growth and may present a significant competitive effect in the development of strategy. The ability to vertically integrate part of its supply requirements gives the firm flexibility in resource acquisition and advantages over suppliers due to increased bargaining power (Harrigan, 1985, pp. 86-7). Integrated firms have a better bargaining position with suppliers and can usurp resources or market positions for their own advantage.

Contributions from this field include the emphasis on limited knowledge, the problems of uncertainty when making decisions and the role of asset "sunkeness" which limits strategic flexibility. The field is rooted in economics where the focus is on cost reduction. It fails, however, to address question of buyer segment differences, presumably considering buyers a homogeneous group. Neither is a method provided to identify which factors produce superior market positions or high profitability.

STRATEGIC DETERRENCE--This field of economic theory has gained attention over the past decade. It explains economic behavior in situations where both buyer and seller benefit from transactions which result from self-seeking but complex strategic behaviors (Williamson, 1979).

Williamson (1985, p. 373) defines the study of strategic behavior as "efforts by established firms to take-up advance positions in relation to actual or potential rivals and to respond punitively to new rivalry". This involves studying

the impact of competitive strategies involving both ex-ante and ex-post actions and the timing of this behavior when the intention is to deter market entry (p. 26). At this point the asymmetry of market knowledge and the uncertainty of response by incumbent members of that market may be enough to unsettle the potential competitor and stop any attempt at entering the market or segment.

The strategic deterrence approach examines behavioral aspects of the industrial organization model. Central to competitive strategy is the asymmetrical distribution of information, capabilities and resources across firms and the uncertainty of competitive response given this asymmetrical nature. Committing to a particular course of action when facing environmental uncertainty may significantly damage the firm's economic health due to the "sunkeness " nature of the investment.

Management

The focus in the management field has primarily been from the internal functioning viewpoint for establishing strategic direction. Portfolio theory is also added as this view is likewise related to resource allocation decisions from an internal decision making approach.

ORGANIZATIONAL BEHAVIOR--The major contributions to the study of strategy from the management field have approached the subject from the internal management decision making angle. The field differs from other disciplines in several

ways. One, is the lack of focus outside the firm. Second, emphasis is placed on managerial decision making and less on the strategy's content. Third, little attention is given to competition in the establishment of strategy. Lastly, the theoretical treatment comes from the behavioral sciences rather than the traditional deductive logic approach.

Strategy formulation is distinguished between "intended" versus "realized" strategy or the actual strategy which was implemented (Mintzberg, 1978). Recognition is given to the idea that the strategy actually executed is often different from that which was planned. Thus, the microeconomic view that rational decision makers possess full information and knowledge about the market is replaced with the view that resource allocation decisions do not follow the marginalist theory principle.

Researchers in the OB area seldom actually observe the strategy formulation process itself during the decision making activity. Often available information is collected after the fact from the memories of the participants. Their recollections often become a bit "rose colored" which adds another serious research problem.

A second concern is the theoretical approach which lacks input from the external environment. Absence of important information is a weakness which should not be overlooked. Any plausible theory of strategy formulation should consider the role played by external effects in the final decision.

CONGRUENCY THEORY--Recent contributions from the field of organizational behavior have overcome the lack of attention to the external environment. Chakravarthy (1982) defines congruency as the ability of the firm to find a "fit" between its set of capabilities and its environment. Market exchanges between the firm and environment provide the resources it needs for survival. Executing exchanges gives rise to the "resource dependency" approach to strategy. This type of approach recognizes the need for coalition formation and cooperation to acquire needed resources.

The resource dependency model is based on control of needed resources and, therefore, the power to influence or shape behavior. Two sources of power to control resources are recognized: (1) control over resources which lessen dependence on outside coalitions, or (2) creating dependence of others on the firm's control of resources for their own survival (Ulrich and Barney, 1984). With either strategy the ability to bargain more favorably or impose control over another firm impacts the terms of exchange and ultimately effect its ability to survive.

STRATEGIC MANAGEMENT--In the past decade this field has sought to extend congruency theory beyond its single goal of "survival" as in resource dependency theory. Researchers agree with the postulate of attaining a fit between the firm and environment. They find the lack of "perfect knowledge" complicates strategy formulation, an assumption opposite to those made with microeconomic theory.

Strategic management determines which of the firm's unique characteristics match the conditions in the market required to successfully establish a strong and defensible competitive position. Finding this "right" strategy is far from the rational, comprehensive process described in many fields (Jemison, 1981, p. 604). To a certain degree, strategy is affected by the content from previous strategic decisions. This explains the tendency to find continuity between old and new strategies over time (Jenison, 1981, p. 606). Generally, gradual "learning" modifies the direction the firm is headed and the content and manner in which it executes strategy.

Strategic management researchers have sought to develop strategy typologies to explain profit performance. Snow and Hrebiniak (1980) and Hitt and Ireland (1985) provide research which supports the hypotheses that generic strategies can be identified with specific characteristics which subsequently affect profit performance.

Hofer (1975) proposes a "contingency theory" of strategy formulation emphasizing business rather than corporate level strategy to meet changing market and environmental events. Strategy formulation depends on conditions expected in the market and is founded on unique firm characteristics which vary across competitors. Otherwise, strategists are forced to admit that there exists a "set of strategies which are optimal for all businesses no matter what their resources and no matter what environmental circumstances they face" (Hofer,

1975, p. 785). Strategy should be based on those unique competitive advantages specific to the unit. This factor is more important to strategy formulation than is the selection of the scope of business in which to participate (Hofer and Schendel, 1978, p. 25).

Teece (1984) recognizes "fit" as the object of strategic management. The problem involved in decision making is the degree of uncertainty which varies and the problem of resource immobility which reduces strategic flexibility. The aim is to strengthen the SBU against outside pressures, particularly competition, by committing to a specific strategy. What limits available choices are the problems of "asset specificity" investments and the measurement of strategy outcomes. To a large degree strategy and assets are inflexible in the short run due to previous policies and experiences. This includes both the cultural aspects of the firm and the habits of decisions makers involved in the formulation process.

PORTFOLIO MODELS--These models of strategy formulation are directed at corporate managers to guide investment allocation decisions. Their history originates in the late 1960's and have developed into more sophisticated models over time (Porter, 1980a, p. 361). This approach is important due to its widespread influence on business practitioners.

The most famous of these models originates in the Boston Consulting Group's "Growth-Share Matrix" approach. Other approaches have been developed and extended beyond the two

dimension BCG matrix. The other models are mostly variants which contain a larger number of variables considered to be potentially important. Other examples include the General Electric "Stoplight" model, the Shell "Directional Policy Matrix" and the A.D. Little "Life Cycle Matrix" (Wheeler and Hunger, 1986, pp. 156-8; Neidell, 1983, pp. 193-5; Boulton, 1984, pp. 60-1).

Henderson's BCG matrix approach attempts to demonstrate that strategy and market success need not be based on "head to head" competition. The two important factors in this model include the "experience curve" effect, a surrogate for relative market share, and real market growth. These two factors concentrate on future market prospects as the basis for strategy rather than historical data as the decision base. This approach emphasizes the military principle of concentration of force by placing unit strength against competitor weaknesses to achieve a difference in competitive capability (Henderson, 1983b, p. 1-3).

A mixed picture of satisfaction using these models is due in part to the assumptions made with portfolio models. Firm profitability can vary for reasons other than market share. Explanations include advantages gained from such factors as vertical integration, cost effect synergies, pecuniary cost factors, and using foreign sources of supplies, all factors which the BCG portfolio model fails to include. Additionally, these models have focused primarily on industrial products (Day, 1984b) with less attention given

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to consumer goods or labor intensive products and services. Finally, the investment objective is solely concerned with cash flow, leaving out the possibility of external financing sources.

Determining which dimensions should be included in the model is a matter of managerial judgement. No scientific method has been proposed which answers this question. The most important dimensions seems to be those which make for a real differences between competitors in the market. These differences are identified as firm specific characteristics important in the market and useful as the basis for setting SBU competitive strategy (Carroll, 1984).

The contributions of the portfolio approach serve as a starting point for establishing strategy at the corporate level (Porter, 1980a, pp. 461-3). Additionally, this modeling approach may contribute to competitor analysis by applying these same principles to the competitor's portfolio of businesses. The insights gained from this analysis may serve to indicate the firm's investment direction and, therefore, the degree of competition expected from the rival in the future.

Marketing

The main contributions to strategy from the marketing field involve five major concepts (Biggadike, 1981). The most basic of these is the "marketing concept" followed by market segmentation, positioning, and perceptual mapping.

These four are static concepts viewed at a single point in time. The fifth concept, product life cycle, represents a major stream of thought in the marketing discipline.

The "marketing concept" is important because it forms the basic philosophy of marketing. While most other fields have emphasized the "supply-side" of strategy, this concept addresses the "demand side" of market exchanges. Marketing based strategies anticipate buyer preferences as suggested by the "marketing concept" approach. Each of the marketing based models outlined below emphasize a customer philosophy of exchange processes. They contrast with the supply-side view which emphasizes acquisition and allocation of resource inputs within the organization as the basis of strategy.

PRODUCT LIFE CYCLE--This concept is a fifth important contribution from marketing. It conceives the marketplace as a dynamic process changing in form over time. Kotler (1980, p. 301) illustrates the characteristics of each phase and the strategic actions considered appropriate for each cycle. In Hofer's (1975) opinion, the stage of PLC is one of the most influential variables for determining business strategy.

Problems with the PLC concept occur on several points. The first problem is that of determining exactly what is being examined -- product class, product category or brand level. This is a major question left unanswered in the model. As an analytical tool, the PLC concept helps to understand the market evolution process. As a predictive

device, however, its useful for formulating strategy is too uncertain (Biggadike, 1981, p. 629) due to its ambiguity.

This same view is reiterated by Porter (1980a, p. 162) adding the comment that it is more of a descriptive than a predictive tool since it is not apparent which phase of the cycle the market is in. Nor is there an ability to predict when a change in the cycle will take place. The assumption that one strategy is appropriate for every type of product, for each cycle stage and for every type of firm appears a very bold assumption to make.

The contribution of the product life cycle concept is valuable mainly as an analytical device. However, it fails to provide prescriptive guidance for deciding which factors should be emphasized when formulating strategy. It remains an oversimplified explanation of market dynamics according to Wensley (1981).

MARKET SHARE--The importance of market share in deciding competitive strategy is a second major research direction in the marketing field. Considerable attention has been given to the PIMS project which has popularized the importance of market share and its relationship to profitability (ROI).

The market share-profitability hypothesis is one filled with controversy in the field. The findings of the PIMS research have been criticized along several points leading to questions regarding the conclusions reached from this investigation. Several researchers have examined and

discussed the market share hypothesis in their work. They include:

1) Fogg (1974) - Planning gains in market share to improve market position and firm profitability.

2) Bloom and Kotler (1975) - Several studies support the share-profitability thesis but indicate the cost of gaining added share may not be worth the effort.

3) Delombre and Bruzelius (1977) - Provided a case study example where increased share achieved firm objectives.

4) Buzzell and Wiersma (1981) - Methods to increase market share to improve ROI were based on increased effort by the firm relative to its competitors.

Some researchers disagree with the PIMS analysis and its conclusions. Examples can be found which show firms with small shares earning high ROIs. It would be a mistake for these firms to pursue higher share as they would waste time and misallocate resources. Deardon (1969) has criticized the use of ROI as the objective criteria. Its manipulation can be improved in the short term but at a cost to the firm of its long term strength and viability.

Anderson and Paine (1978) provide a stinging critique of the PIMS research. They iterate among its many weaknesses: (1) its usefulness primarily as a diagnostic tool rather than as a prescriptive guide; (2) subjectivity of several key variables (e.g., relative quality); and (3) the nature of the reporting base is biased toward large firms.

Lubatkin and Pitts (1983) point out that the PIMS model: (1) does not include industry specific peculiarities; (2) it tries to establish global strategy generalities; (3) uses a

single regression equation when simultaneous equation models are superior; and (4) suffers from severe multicollinearity.

The "increase market share" hypothesis is criticized for presuming that growth is the objective most feasible for the firm to pursue (Lauenstein, 1983). Where this strategy is not feasible, "harvesting" share may be a more favorable strategy even if it means leaving the market eventually.

An observation regarding the PLC versus market share (PIMS) views of strategy should be added. The PLC concept specifies a set of strategies which all types of businesses should pursue as the market and competitive conditions vary over time. On the other hand, following the market share line, market share should prescribe strategy but seemingly without reference to stage of the product life cycle.

A question important to this research is whether it is possible for the firm to pursue both PLC and market share strategies simultaneously except, of course, by chance. The two strategies provide divergent prescriptions at the same point in time. The conflict raises questions if either theory is adequate to explain strategy formulation or when is the appropriate time to select a particular strategy.

MARKETING MIX MODELS--These models involve management's ability to assess which elements favorably impact firm profits after implementing their marketing strategies. This set of models include "attraction" models, sales response models, and market share models (the latter referring to share of total marketing effort relative to competitors).

Developments in model building research in this area have progressed from single equation models (early 1960's) to more sophisticated multiplicative, ARMA, lagged marketing mix variables, competitor reaction matrix approach models with simultaneous equations systems solutions. If the models are to be valid for managerial decision making, it would be important that they properly represent market realities (Lilien and Kotler, 1983, p. 10; Parsons and Schultz, 1976, p. 27).

Model calibration represent one of the shortcomings of marketing mix models. When data is not available or time does not permit, "judgmental" estimation procedures are employed. This limits its use for scientific research but where the purpose is managerial decision making the models may serve adequately and provide useful insights.

Marketing mix models have developed an approach which assimilates competitive market features in their designs. Even when managers' judgments are used to estimate response elasticities, managers have some idea of what to expect or at least have an indication of the direction of the effect.

BRAND CHOICE--This set of models is designed to address strategy questions based on buyer behavior actions. These models can involve two basic types of choice: (1) stochastic individual choice models or (2) aggregate econometric based models. Both attempt to predict the purchasing decisions made for a brand from the currently available sets of brands in the market.

These models are primarily descriptive (Lilien and Kotler, 1983, p. 232). and used for managerial purposes rather than for analytical study. This is due to their construction and the biasness inherent with the available data, often judgmental because of collection convenience. The unit of analysis is at the brand level, usually the lowest level studied.

Brand choice models are based on assumptions which limit their usefulness. First, all possible "states of condition" are assumed known to the decision maker. Second, the brand switching probabilities use 'a priori' judgements rather than relying on empirical results. Third, the "switching" probabilities are assumed constant per individual and remain the same over time.

Fourth, is the disturbing assumption made that it is not possible to learn from earlier mistakes. It is unrealistic to think that a manager whose strategy is costing his firm market share would continue with the same strategy which is eroding its position and not take corrective action (Lilien and Kotter, 1983, p. 242).

Finally, the theoretical and empirical support for this approach is lacking although its application as a tool for management needs is useful. Still, a number of limitations remain even for the practical everyday applications designed for marketing problem solving.

DIFFERENTIAL COMPETITIVE ADVANTAGE--This last marketing approach explicitly incorporates competitive effects into its

concept of strategy formulation. A detailed discussion of this approach is included in the next section of this chapter.

Popular Business Press

Discussion of what comprises sound competitive strategy and outstanding profit performance has developed the area of strategic management planning. Competitor analysis is part of this focus since their strategies also affect firm profit results. Writers have addressed the practical aspects of strategy including the importance of market intelligence (Solomon, 1978; Shapiro, 1980), the need for evaluating firm strengths and weaknesses in relationship to competitors (Rothschild, 1979; Jain, 1979; Henry, 1980), and the role of competitive advantage in formulating firm strategy (South, 1981).

Kiechel (1981c) suggests that the focus over the past decade has shifted from competitive marketing issues aimed at improved market performance to the improvement of stock prices through financial strategies. Diverting attention this way results in less undertaking to find new competitive strategies to improve market position and more short term focus on "bottom line" reporting requirements.

Suggestions for the improvement of market performance have been outlined in two books of recent notoriety. One is Ohmae's The Mind Of The Strategist (1982), the other Peters and Waterman's In Search Of Excellence (1982). Both these

books have received considerable attention because of their simple, straightforward, easy to understand approaches for suggesting ways that managers can face the challenges of a restructured American economic and industrial system.

Peters and Waterman (1982) provide a short list of observations generated from their consulting work with business clients. "Successful" firms display characteristics such as "sticking to your knitting", "trusting in your employees", and having a clear cut corporate value system. Ohmae has prescribed a philosophy which emphasizes the total organization as part of the strategy process. Their books are mostly descriptive in nature explaining what constitutes success but giving little direction on how to recognize or attain an advantage. While both make for interesting reading, neither provides guidance of a prescriptive nature.

Two other books that deal with strategy and competition are Porter's Competitive Strategy (1980a) and later his 1985 book Competitive Advantage. Both are based on the author's research in the industrial organization economics where many of the basic research results are applied strategy concepts. The work is noteworthy because it integrates marketing ideas beyond straight economic theory such as market segmentation and the product life cycle.

Kiechel (1981a, b, c) has pointed out that many ideas of the late 1960s and early 1970s (e.g.), experience curve and others, have diminished in importance for firms formulating their strategies. One important reason given for their

demise are the disappointing results experienced by blind adherence to generic strategies without considering their marketing appropriateness.

Carroll (1984) carries this thought further criticizing firms that formulate their policies based on blind adoption of generic strategies. Use of generic strategies, such as cost based, segmentation based, and differentiation hide important differences between firms when these differences are what should be emphasized. More attention should be given to the identification of firm-specific capabilities and strategies in contrast with the practice of selecting a generic strategy which substitutes "cliches" for strategic decision making.

SUMMARY--Strategy and competition have many varied and interrelated aspects as witnessed from reviewing the many fields and disciplines which have examined these subjects. An eclectic approach to strategy formulation can provide new insights by cross-fertilizing ideas from these many fields. This approach should be given high priority for future research according to Day and Wensley (1983).

An attempt to develop this cross-fertilization approach is developed in Chapter III. This integration is based on the analysis prepared in the review provided in this chapter. A brief capsulization of some of these contributions is provided in **Table 3 - Major Conceptual Contributions To Strategy And Competition From Academic Disciplines And Fields**.

Table 3

Major Conceptual Contributions To Strategy And Competition From Academic Disciplines And Fields

Subject Area	Major Conceptual Contributions
Military Theory	principles of concentration and indirectness to upset opponent; action planned ahead; seek most advantageous ground favoring own terms
Game Theory	interaction of players; joint-effect results
Socio-Biology	sources of advantage found in environment; "fitness" for survival
Population Ecology	organization differences - endowed resources, views of opportunities, objectives/goals
Industrial Organization	rich theoretical development of structure and behavior; define competition as structure
Microeconomic Theory	theory of firm theoretical base; structure of markets; define competition as rivalry
Transaction Costs	includes economic and internal organization to explain formation of firm and markets
Strategic Deterrence	models firm behavior to explain organization of market which effects entry and exit

Table 3 (cont'd.)

Organizational Behavior	process of decision making; uncertainty role; bounded rationality; political processes; intended versus realized strategy
Congruency Theory	importance of "fit"; market adaptation
Strategic Management	contingency theory of match firm with market requirements along critical dimension
Portfolio Theory	original development of strategy decisions; attaining strong market position in domain
Product Life Cycle	dynamic effects require change in strategy to meet new competitive conditions
Market Share	identify effects which produce responses to performance goals
Mix Models	calibration of policy from expectations of end results for strategy planning purposes
Brand Choice	models to estimate outcomes from consumer switching behavior
Competitive Advantage	advantages attract customer; strong position against competitor; dynamic conditions; sources both demand-side and supply-side

The Concept Of Differential Competitive Advantage

Review Of Important Contributions From The Marketing Literature

The origin of the concept "differential competitive advantage" began with Chamberlain's classic book The Theory of Monopolistic Competition (1933, 1st. edition, with 8th. edition, 1965). In this book Chamberlain has attempted to resolve the conflict between monopoly theory and competition theory based on observing sellers with different "offerings" vigorously competing for customer patronage in the market.

Firms recognize interactions existing between themselves and their competitors. Where in close contact the natural reaction is to consider the strategies of their competitors when considering their own strategy. The entrepreneur has the goal of discovering which combination of policies will be most appealing to his customers and which "differentiates" him from other sellers in some significant manner.

Differentiation is defined by Chamberlain (1965, p. 56):

> "....any significant basis exists for distinguishing the goods (or services) of one seller from those of another. Such a basis may be real or fancied, so long as it is of any importance whatever to buyers, and leads to a preference for one variety of the product over another."

The concept is carried further by Chamberlain to include not just products but selling and distribution practices which appeal and attract customers. He allows intangibles, such as trade-marks or the way resellers do business, to be part of differentiation which goes beyond merely physical

differences. If the difference is important to buyers, differentiation is recognized as beneficial to consumers.

J.M. Clark (1954, p. 327) is credited by Alderson as the first to coin the term "differential advantage". According to Clark, differentiation favors competition. This view is contrary to the theories of industrial organization and microeconomics which criticize "artificial" differences for being wasteful and which only increase prices to consumers. Differentiation induces rivalry for buyer patronage by offering a wider selection of choices in the market and thereby achieving "social efficiency."

Clark sees competition as a dynamic rather than static condition as the economist's "theory of the firm" depicts monopoly to be. Each seller attempts to improve position relative to his rivals resulting in a continuous process of change rather than settling into a protected, uncompetitive equilibrium condition found in microeconomics models.

In Alderson's (1957) Marketing Behavior and Executive Action, emphasis is on the functional approach of marketing theory. The seller's goal is to reach the final consumer where "each participant [seller] is searching for strategies which will improve his relative position" [versus the other competitors] (p. 108).

Attracting buyers is accomplished with a strategy which seeks to establish a differential competitive advantage for the firm. Pursuing a superior strategy is a continuous and unrelinquishing process as the firm attempts to improve its

advantages and defend its position from the intrusions of its rivals. Its competitors, likewise, are trying to find "advantages" and formulate strategies of their own in order to offset or neutralize the strategy the firm has sought so keenly to achieve.

Defining Differential Competitive Advantage

A definition of differential advantage is implied from Alderson (1957, Chp. 4) (although a definition was not provided in his book). Examining the content from Chapter Four leads to these insights:

1-"they [competitive advantages] appeal to needs or attitudes of the buyer" (p. 102);

2-"sense of a permanent differential advantage....rival's response seeks to neutralize or offset the initiator's advantage by offering the buyers something more effective...." (pp. 108-9);

3-"initiators would have a limited monopoly....expect some enduring residue....small but lasting gain outweigh large temporary ones" (p. 108).

The essence of this discussion provides a definition of "competitive advantage" useful for this dissertation. As a formal definition, the one provided below serves the purpose of this research quite well. It is based on the definition of distinctive competence as a capability, skill, resource or some asset possessed by the firm which is used to conduct its business.

A "competitive advantage" is defined as:

"A distinctive competence which the firm possesses that can be employed in the market through its strategy and which:

1-customers show a desire to obtain (serves a need);

2-earns the seller a profitable return (meets an objective); and

3-its competitors can not easily neutralize, offset or surpass (is competitive with rivals and is sustainable).

This definition is comprised of three key parts which emphasize the ability of the firm to successfully bring to the market capabilities attractive to customers. The result is a strategy built around competitive advantages which will enhance the firm's ability to participate in the market.

Other authors have also provided insights which help to identify a competitive advantage. Delineation between these definitions varies somewhat and may hinder rather than help managers attempting to recognize advantages. Several of these ideas are presented which illustrate this problem:

(1) Wernerfeld and Montgomery (1986, p. 1224) suggest "efficiency differences between firms". This idea leaves open to question of how much of a difference is meaningful.

(2) Aaker (1984, p. 212) has coined the term SCA for "sustainable competitive advantage". He says an SCA has three characteristics. First, it involves a key success factor in the market - it must be important. Second, it needs to be substantial enough to make a real difference. Finally, it needs to be sustainable in the face of environmental change and competitor actions. The definition is similar to that of Alderson in that it emphasizes importance in the market and the problems of facing competitors.

(3) Day (1984a, p. 29) provides a definition also similar to Alderson. He points out, however, that because what is offered may be different this does not mean it has a meaningful competitive advantage. Such differences cannot be profitably exploited unless they can be converted into:

1. benefits;
2. perceived by a sizable customer group;
3. which these customers value and are willing to pay for, and;
4. cannot readily be obtained elsewhere.

Evidence is needed that indicates customers are willing to pay for the difference. This requires a perspective from the customer's view rather than an internal focus. Day adds that the establishment of a "customer franchise" is an asset that can be treated like any asset of a financial nature because it can be converted into long run profitability.

(4) Jain (1985, p. 184) summarized the general view of competitive advantage as a "barrier" against competitors. Jain limits these to cost differentials, price or service differentials. When successful they allow higher margins than competitors' earn and are sustainable, in a practical sense, are invulnerable to competition.

To summarize the idea and value of competitive advantage is to recognize its sustainability against competitors when at the same time satisfying some customer need. Lastly, a competitive advantage should direct the firm towards meeting its own objectives (often related to a profit goal). While there are many potential sources of advantage, simply being different is not the same as being better.

Sources Of Competitive Advantage

Markets which display competitive behavior often contain firms seeking to establish positions uniquely distinguished from each another. The objective is to find some specific capability which can be successfully employed as a basis for establishing a competitive strategy. These are preferably capabilities which other firms are not able to easily match or duplicate.

A number of dimensions are possible as potential sources of competitive advantage. The dimensions include more than just marketing policies. Operating policies also provide sources of advantage. The literature mentions dimensions from all the functional areas of a firm. **Table 4 - Sources Of Competitive Advantage**, lists a large number of these sources (identified by the author who suggested the source).

The list is a comprehensive, but not exhaustive, assembly of the many factors which may be potential sources of advantage. It extends well beyond the marketing area to illustrate this point. Those considered supply-side sources may in fact be more important than the marketing mix policies found in the market, contingent of course, on the nature of the market and competition being faced.

An extensive list of sources has been provided by Hitt and Ireland (1985) which include 55 separate items. Another set of sources supplied by Aaker (1984, p. 66) enumerates a long list of dimensions. Both these lists contrast sharply with the three generic strategies provided by Porter (1980a,

Table 4

Sources Of Competitive Advantage

Source Of Advantage	DA	WA	EC	JC	GD	WF	GR	JO	MP	SPE	SS	UA	WW
advantaged position		X	X		X	X					X		
advertising; sales promotion	X		X							X			
after sale service		X			X					X	X		X
brand name; loyalty	X	X								X			
plant capacity	X				X	X							
condition of sale		X											
control resources										X			
cost-shared output					X								
cost economies/scope	X		X		X					X	X		X
credit/financing		X	X		X						X		X
differentiation									X				
distribution system	X				X					X			X
early entry											X		
equipment used	X					X							
financial structure	X				X		X				X		
information support							X						
inventory/logistics							X						
labor conditions	X												
legislative influence										X			
management quality	X												
operating flexibility					X	X		X		X			
negotiating ability contracting	X				X					X			
niche positioning		X			X				X				
packaging		X											
patents/technology product innovation	X	X		X	X		X	X		X	X		
price leadership			X	X		X					X		X
process innovation		X											
product design		X		X	X					X			
product leadership; variety	X			X	X						X		
quality/performance	X	X											X
sales services	X	X		X							X		X
sales force; trade relations	X			X	X					X			
trade barriers											X		
transportation						X				X			
warranty												X	

DA-David Aaker (1984)
EC-Edward Chamberlain (1965)
GD-George Day (1984)
JO-John O'Shaughnessy (1984)
SPE-Shirley, et. al. (1981)
SS-Stephen South (1981)
WA-Wroe Alderson (1957)
JC-J.M. Clark (1961)
WF-William Fruhan (1972)
MP-Michael Porter (1980)
WW-Weitz & Wensley (1984)
UA-Udell & Anderson (1968)

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p. 35) of low cost, nicher or differentiated position. The point is that competitive advantages may be established on one or more of these capabilities and should not be thought as limited to only a few choices.

Studies Which Have Directly Examined Competitive Advantage: Fruhan (1972a) and Cook (1983)

Two studies which directly examine competitive advantage in rivalous market situations are provided by Fruhan and Cook. Each study is discussed below for its contribution to the understanding of this concept.

The first study, by Fruhan (1972a), examines the U.S. domestic airline industry at a time when this industry was a regulated sector of the American economy. Several factors normally considered discretionary strategic options are found in the airline industry to be subject to regulation which circumscribes available options open to management in deciding their strategy.

The major objective of Fruhan's study was to discover how competition is practiced in this market subject to the CAB's intervention. The agency's involvement in setting policy in several key areas directly restricted management's decision making discretion. The result of this examination of CAB policies indicates a loss of market share from large airlines to small airlines due to CAB decisions.

Fruhan indicates that competition in this market centers around the type of equipment used, flight frequency, and favoritism granted by the CAB. Key issues involving CAB

policies include route awards and setting rate fares. These are identified as sources of advantage with the latter two factors bestowed by regulatory fiat.

Interestingly, the decision regarding revenue generation and fare structure, where the firms were compelled to follow CAB policy, produced the most disagreement. Arguments were usually over the size of rate increases and fare structure which affected revenue generation differently. Oddly enough, price setting is the area where oligopoly theory, suggesting collusive behavior, should be most evident.

The important point made here is that several avenues are available for achieving competitive advantages. This study was well prepared and analyzed even though it involved a regulated sector of the economy. As such, the study is notable for capturing the full context of identifying advantages for use when formulating strategy, even though the full range of decision variables were not available for strategy formulation.

A second study focusing on this concept involves Cook's (1983) development of "strategic marketing ambition" used in his study of the U.S. automotive market. This study equates "ambition" with firm marketing investment, relative to its market share, as indicating the strength of the advantage. The difference between share of marketing investment and share of market corresponds to its identified differential advantage. Equating "ambition" with "advantage" as similar

concepts is bothersome without a definition of advantage being provided.

This study appears to be a variant of market attraction models. However, it fails to establish why this measure is a proper definition of differential advantage. Ambition relies on current period firm marketing investment relative to competitors' effort as the basis for determining advantage. It unfortunately ignores past marketing mix decisions and their carryover effects.

Additionally, this view limits advantages to only the demand-side of strategy and does not consider supply-side factors as potential sources. This approach assumes that only marketing policies can produce competitive advantages. It fails to recognize variations in response coefficients for separate mix variables that may produce different effects on different customer groups. Finally, it leaves no room for market effects to influence market share, (e.g.), market growth or entry barriers.

SUMMARY--Competitive advantage focuses on finding those factors which are attractive to customers and effective at competing against rivals enabling the organization to meet and accomplish its objectives. An advantage can be either a demand-side or supply-side factor but is one specific to the nature of the firm. The definition provided in this dissertation is one that can be operationalized for research purposes unlike many suggested definitions which tend to be merely descriptive.

Methodology Review Of Previous Model Building Research

The review of marketing strategy models examined here extends back to the mid-1960s. This early research focused on a simple vein of inquiry initially predicting either market share or sales response from single equation models. More recently, research has become more sophisticated in its development by adding environmental, lagged mix variables and competitive effects in multiplicative, simultaneous equation modeling systems.

Examination Of Marketing Model Building Texts

Two books which examine marketing model construction are Marketing Models And Econometric Research (Parsons and Schultz, 1976) and Building Implementable Marketing Models (Naert and Leefland, 1978). These are discussed first since their comments are applicable to the model building process in general. The Lilien and Kotler (1983) textbook Marketing Decision Making also investigates this same line of inquiry providing additional comments on this type of research. The book is not discussed here although several references to this work are made in other parts of the dissertation.

Parsons and Schultz (1976): This book provides an extensive review of research studies where the dependent variable was either firm sales or market share. The use of firm sales as the dependent variable represents an attempt to model the effects of marketing strategy in a manner consistent with actual business experience.

Early marketing model studies presented several problems since resolved in later research. The first question to be addressed are environmental effects impacting the firm. The premise examined here is whether these effects will impact each firm in the market equally or if their affect will vary across participants. When the economy is fluctuating during the course of the business cycle it is easy to observe that some firms are more affected than others. These variations should not be assumed away in the model's construction but should be directly specified and tested for their presence and impact.

Second is the problem of finding incorrect coefficient signs than those theoretically expected. This problem is reduced when using sales as the dependent variable since it does not constrain the sum of squares estimates as happens when market share is used. A third problem in earlier work was the use of single rather than simultaneous equations. This modeling form also explains some of the problems found with incorrect coefficient signs. Specification errors due to incorrect model form introduce coefficient bias because of this problem.

Estimation methods have gradually expanded to include econometric techniques employing a variety of simultaneous equation solutions. If brand is specified as the dependent variable and the equations include endogenous variables, use of two-stage least squares (2SLS), three-stage least squares (3SLS) or seemingly unrelated regression (SUR) estimation

should be employed. Each method reduces the contemporaneous correlation among residuals and facilitates estimation of consistent, asymptotically unbiased estimators. The models, when specified in multiplicative form, estimate parameters as elasticities facilitating comparisons without regard to unit of measure of the variable.

Managers would like to have knowledge of any competitor effects impacting the firm especially prior to formulating and executing their marketing strategy. Competition can be handled by using one of three methods. First, by ignoring it, which seemingly goes against marketing theory and logic. Second, as an implicit variable such as a summary, share, or a relative measure of the firm versus firm.

The third method is inclusion as an explicit variable by directly specifying it as part of the equation. Where this method is used competitor variables become part of the model specification rather than assuming they are implicitly captured. The simultaneous, multiplicative model can reveal any important market and competitive factors by this method of construction.

Naert and Leefland (1978): This text adds to the above review by Parsons and Schultz. Models which utilize the direct method include competitor effects are static unless lagged effects are included to capture the impact of prior marketing decisions. This model more accurately reflects the nature of oligopolistic markets because lagged variables capture this feature as part of their specification.

Competitor response models are of two types of effect. Simple effect models assume the same marketing variable is the response variable (e.g.), price to price. Mixed effect models are characterized by different marketing mix elements as the competitive weapon (e.g.), price to advertising. The Naert and Leefland models are broad based being able to take into account demand and market share effects, dynamic market changes, competitor actions, and previous marketing policy decisions along with current marketing mix decisions. This set of models can be estimated in additive or multiplicative specifications. The advantages for each estimation method are discussed in Parsons and Schultz.

An assumption often implied in sales response models is that the values for the coefficients in the equations are identical for every seller in the market. This assumption directly conflicts with the rationale for forming a separate competitive strategy by each firm. One advantage with the multiplicative form is that it does not make this assumption in its specification.

The multiplicative models specification can easily adapt to variations among firm strategies, a key premise implicit with marketing theory and practice. However, the models are not free of the usual problems of multicollinearity, serial correlation and heteroskedasticity. The authors warn that it is not justifiable to use simple market attraction models due to computational simplicity if the sacrifice is a trade-off of model specification and improved estimation.

Review Of Previous Marketing Response Model Research

Kotler (1965) looked at the effects of marketing mix variables on sales for a new product entering the market, in this case, a small novelty item. First, market demand was estimated followed by individual firm sales in which sales were assumed to vary directly, but not proportionally, with total marketing effort by each seller.

The study specified multiplicative form equations using a simulation method to examine variable effects (covering a sixty month time period). These models were tested in nine models of competitive strategy. Sales were assumed to vary with level of marketing effort by each seller relative to the level of effort by its rivals. A major weakness of this study was the finding that a non-adaptive strategy produced the best equation to guarantee a minimum profit. The result is contrary to competitive strategy rationale of adapting to market changes and competitor actions.

Frank and Massy (1965) designed a market segmentation study which involved competitive effects, price and "deal" variables for the sale of a frequently purchased consumer item. The objective was to determine which factors affect market share for a particular brand in each of three market segments.

Competition was represented as relative measures for the price and deal variables of both current and lagged time periods. The interest here was in measuring the response elasticities between brand share for each variable based on

the belief that segment responses should be significantly different and knowing that the magnitude of these differences can be used to effectively segment the market. The results confirmed differences for both size of magnitude and level of significance between segments.

Weiss (1968) studied the effect on market share of two marketing variables, price and advertising, specifying both linear and log linear models. The product was a frequently purchased, widely distributed consumer product. One flavor predominated the product line with the four largest brands accounting for 65% of total sales.

Highest R-bar^2 criterion was used to evaluate and select the best equation which used the "ratio" method (for example, firm A relative to the market average) to account for competition, specified in log linear format, including a dummy variable for product quality. Price was found to be significant but advertising was not. The equation reported an R-bar^2 value of 0.935.

Bass (1969) studied the effect of advertising on sales using a multiplicative, simultaneous equation model. Since the exact nature and direction of influence between sales and advertising can not be obtained with a single equation model use of a simultaneous equations system is justified. The equations were estimated using two-stage least squares.

Bass and Parsons (1969) note that earlier work involving the sales-advertising relationship centered on predicting and forecasting requirements with little concern for testing

hypothesis. Importantly, finding the correct specification of the model is necessary if analysis is to indicate which factors affect sales. To determine whether the proper model has been identified examining the outcomes of predictive tests of model parameters should be used in preference to employing a forecasting criterion.

This study examined a frequently purchased consumer item in an oligopolistic market situation. The model specified current advertising, price, and quality variables plus use of lagged advertising variable as a dynamic effect. Sales were hypothesized to be a function of firm marketing mix, lagged advertising and the effects of competitor strategies. The second equation in this system used advertising as the dependent variable with independent variables including lagged advertising and current sales level.

Lambin (1969) studied the profitability of advertising for a frequently purchased consumer food product using a marketing mix model that included three marketplace related variables and four management decision variables to explain quantity sold per one-thousand capita. The study centered on one seller's policies using marketing mix variables to estimate the profitability of advertising.

With this specification Lambin showed that by applying the Dorfman-Steiner rule the positive effect of advertising on profits can be optimized. The model shows its usefulness for predicting sales and, therefore, guiding managers setting marketing mix policies and deciding strategy.

Lambin (1970), in a similar study, examined the market for a small electrical appliance item. The purpose of the study was to determine the optimal allocation of marketing mix expenditures for achieving its market share objective. This model used price, product differentiation, and quality with the dependent variable market share. Marketing effort was optimized through utilization of a resource allocation rule based on the Dorfman-Steiner rule. The "relative" elasticity of marketing variables, compared to the market average for all sellers, was used for including competitive effects. Use of equation "fit" as a criterion appears to be the determining factor for deciding its suitability.

Schultz (1971), in an early study using simultaneous equations containing lag effects, examined a city-pair air travel market. In this study, estimates were made for total passenger demand using a single equation multiple regression model. Equations were estimated in both log-linear and lag form using a one period lag specification. One objective of the study was to find the optimal set of marketing variables to maximize firm profits.

The study employed three estimation procedures. Models were estimated using ordinary least squares, two-stage least squares, and three-stage least squares. Three-stage least squares provided consistent structural parameter estimates in preference to ordinary least squares which are known to be inconsistent and biased (p. 156). The three-stage least squares procedure is likewise preferred to two-stage least

squares as well (p. 157). With this system, an attempt is made to simulate causal ordering in an attempt to capture the marketing decision making process.

Beckwith (1972) employed an iterative Zellner efficient method (IZEF) to obtain a set of consistent coefficient estimates in a five equation simultaneous model system for brand share of a consumer good item. This model recognized that the covariance matrix of disturbance terms was not diagonal and, therefore, not independent across the system of equations.

The solution to these estimation problems was the use of IZEF (also referred to as seemingly unrelated regression). High R^2 values were found for each equation (at 0.92 and above). Advertising coefficients were found significant as were the lagged market share coefficients.

Schultz (1973) examined marketing factors which included marketing mix, lagged mix and competitive effects in sales response models containing simultaneous relationships. The use of econometric solution procedures is preferred because simultaneous variables can all be handled within this model framework.

Three methods of accounting for competition are outlined and discussed. The endogenous method directly includes competitor variables is preferred since it more closely approximates oligopolistic market conduct. When models are specified to include competitor variables in this manner the disturbance terms are assumed not to be independent thus

necessitating the use of simultaneous solution methods such as SUR (p. 20).

Competition based models provide a more complete picture of market behavior but are recognized to be more difficult to implement. The reason for this is related to acquiring sufficient data which is the major problem. Evaluating this type of model uses rigorous predictive tests although Schultz admits that "goodness of fit" is often used as the decision criterion (p. 24).

Wildt (1974) studied the effect of competition on market share using the seemingly unrelated regression method. The product studied was an infrequently purchased consumer item sold through food stores where the top three brands accounted for the majority of market sales in this oligopolistic market situation.

Independent variables included firm share of new product activity and relative price in addition to three advertising and promotion variables (local and network TV spending and total media spending for advertising). A dummy variable for seasonal effect was also added. Market share was specified as the dependent variable in the first equation making it the only lagged variable specified in these equations. For the advertising and promotion equations the lag variables used were different across equations.

The equations were estimated using SUR, a method first suggested by Zellner in 1962. This procedure was repeated until no further efficiency gains were achieved making this

essentially a successive iteration process. An advantage of this process is the improved efficiency gained compared to ordinary least squares (OLSQ). The three firm market share equations showed fairly high R^2 values ranging between 0.867 and 0.840.

Wildt accounts for competition three ways: (1) directly by inclusion in the market share equations, (2) through the market share covariance matrix, and (3) through significant competitor mix variables in the advertising and promotion equations. In solving the advertising equations OLSQ was used while generalized least squares (GLS) was used for the three promotion equations. The R^2 statistics ran between 0.856 to 0.322 for these latter six equations.

This study is interesting because competition is treated directly using endogenous variables. Interestingly, this system recognizes conjectural interaction and the problem of anticipating competitors' actions and reactions. Since the level of competitive activity is not known in advance the assumption is made that the most recent experience is the best information available (p. 53). Thus, it is assumed the expected level of competitor marketing effort will continue the same or nearly the same as that recently experienced or "learned" from the market.

Houston and Weiss (1974) evaluated the effects of lagged advertising on market share in a study of a low cost, widely distributed, frequently purchased, food item in the Chicago trading area. Panel data was gathered on a number of

quantity purchased, advertising expenditures, and prices for three major brands over a four year period. The sample contained twenty-four data points for each of three brands in a market characterized as an oligopolistic.

The model was tested in both additive and multiplicative forms with the latter containing more significant variables than the former. The model included current price and three lagged variables, one each for advertising, price and market share. Competitive effects were included as ratio variables for both the price and lagged advertising expenditures.

Using OLSQ would fail to account for the contemporaneous correlations across equations necessitating application of joint generalized least squares (JT/GLS) when estimating the model. Where variables were found insignificant they were constrained to zero with the equations re-estimated for each brand. The results of this step found each equation to vary in specification with the weakest brand containing only the price variable. In contrast, the leading brand in this market had all its variables significant.

Nakanishi and Cooper (1974) developed a Multiplicative Competitive Interaction model specification. The objective was to capture the interactive effects of competition on the firm's market share. The advantages of this specification include guaranteeing that the market shares will be greater than zero and sum to one. This condition cannot be met with multivariate linear regression models, a criticism noted by Naert and Bultez (1973).

In Monte Carlo simulations with sample sizes of 50, 100, and 200 trials and 100 runs each, GLS results were found to produce better estimators than using OLSQ (p. 308). The use of ordinary least squares (OLSQ) is inappropriate since the coefficients will not be minimum variance although they will be unbiased and consistent (p. 306). While the properties of GLS estimators are not well known these coefficients are more efficient than OLSQ.

Moriarty (1975) examined a low cost, widely available, frequently purchased consumer product. Understanding the differences between marketing mix variables across market segments was the objective of this study. Knowledge of how market shares are affected by different marketing policies is important information particularly when the results are known to vary across segments due to differing marketing policies. This approach is opposite the usual practice of aggregating results to measure policy effectiveness.

The purpose of the study was to discover which marketing policies varied by segment due to unique market differences. The dependent variable was specified to be firm brand share. Procedural questions arise in this type of study because of the problem of determining 'a priori' when it is appropriate to use aggregated versus disaggregated market models.

Data for this study was obtained on twenty-five sales districts covering twenty-five monthly periods. The model included competitive volumes and prices of six major firms for each sales district. Competition was handled in terms of

relative volume and relative price. Local television advertising, however, was included for only the brand which was the focus of this study. The use of the lagged market share was justified on the basis of market share volatility by district and then incorporated as a "carryover" effect to represent the effectiveness of previous marketing policies.

The study divided the market into multiple segments and estimated each equation separately to test for differences between coefficients. Differences were found important for magnitude of effect and level of significance across market segments. For each equation competition was handled by the ratio method for price (advertising was not included here). Moriarty concluded that simultaneous equation systems are useful for examining competitive effects among firms.

Lambin, Naert and Bultez (1975) looked at the problem of finding the optimal marketing mix using a Dorfman-Steiner rule for determining profit maximization. A general model was developed which included competition directly and marketing mix variables while adding primary demand as a market effect variable. Both "simple" competitive effects and "multiple" competitor effects were included in the models. Examples from the literature are cited to illustrate these particular models.

This study examined three brands (90% of market volume) testing for competitive effects and dynamic market growth. The model was specified in multiplicative, simultaneous equation form and solved by two stage least squares (2SLS).

Independent variables included price, distribution, media advertising and product quality (supplied judgmentally). The market was defined as a differentiated oligopoly with data available for seven yearly periods which covered four geographic markets.

This sales response model showed that the simultaneous effects of expanding market demand and firm marketing mix elements could be successfully included in the same equation and separately identified. In the dynamic version of the model lagged market share served to represent the carryover effect of the firm's marketing strategy. With the sales response model specification the coefficient elasticities directly account for competitor reactions while using the market share form of specification these competitor effects cannot be directly measured. It is worth noting, the authors contend, that it is misleading to judge firm behavior based on elasticities from the market share model specification form because this form does not directly take into account the effects of competitors' actions.

Prasad and Ring (1976) experimented with spot television advertising to measure the effect on brand share of a low cost food item. The experiment matched consumer panels from the Milwaukee Advertising Laboratory which covered a 64 week period. The study included as independent variables three types of advertising (television, magazine and newspaper), relative firm price and lagged market share (capturing the effect of the other marketing variables not included in the

model). The advertising and price variables were included for both current and lagged periods, the latter serving to represent carryover effects from previous policies.

Competitive effects were handled two ways: first, as a relative variable as with price and second, directly including magazine and local newspaper advertising variables. With this method the effects of competition on brand share was pinpointed. The model was specified in linear form and solved with OLSQ. Only the equation representing the main brand of interest was estimated. "Step-up" and "step-down" regression methods were tried to determine which variables should be included in the model. The first method retained independent variables significant at the 0.15 level.

The main variable of interest in the model was level of spot television. Each panel received different advertising levels placed in four flights of six weeks each. Tests were made for differences in share due to this effect. Both panels received the same amount of network advertising. In comparing the two equations the high level exposure panel (receiving the extra advertising) contained variables dominated by current period effects. The lower level exposure panel showed greater carryover effects indicated by the size of the positive coefficient for lagged market share.

McGuire, Weiss, and Houston (1977) examined consistent multiplicative market share models looking at the properties of this type of model and their limitations. One of the problems with these models is the assumption that conditions

of cross-demand elasticity must be near zero, meaning brand switching is assumed to be a one for one trade-off so that competitive strategy would not produce an improvement in market position. Additionally, the rate of substitution for brands is assumed to be encompassed only among those brands already in the product class.

A consumer food item, using panel data reporting, was the subject of examination. This study compared the use of multiplicative models versus linear specified models and concluded that the multiplicative specification was the superior form. In estimating brand share the coefficients were compared with those of its competitors' (exogenously included as a summary variable) and found that differences between coefficients did influence firm share. This method demonstrates that important differences for firm marketing variables versus rivals' marketing variables are directly identifiable for examination purposes.

Jagpal, Sudit, and Vinod (1979) looked at the use of multiplicative, non-homogeneous models (MNH) for the purpose of capturing interaction effects among variables. Models which use Koyck distributed lags in either log-linear or linear form are restrictive in their treatment of lagged effects. This particular problem is avoided when using the MNH type model. While distributed lag models may do well in predicting firm sales, there are problems due to equation mispecification which affect the parameter estimations in the

model and, therefore, their usefulness for policy planning purposes.

Many distributed lag models are solved with OLSQ which further complicates the estimation problem because managers often establish advertising budgets as a function of sales introducing simultaneity problems. MNH models allow for the presence of intertemporal and marketing interaction effects while not assuming the coefficients for advertising or level of advertising expenditures are constant.

Hanssens' (1980) study of a three airline, city-pair market developed a competition model using the competitive reaction matrix approach. The model used flight frequency and advertising as independent variables (no price variable was included) with market share as the dependent variables. The use of a primary demand variable was added serving the role of market effect.

The modeling system was specified in logarithmic form and solved with a two stage least squares (2SLS) procedure. Time series analysis was applied using an "autoregressive integrated moving average" (ARIMA) to "pre-whiten" model variables (referring to the Box and Jenkins approach) and employed a Granger test for establishing direction of causality. The random time series variables were then estimated with 2SLS to measure the size and significance of the parameters.

The effects of competitive interactions were directly added as marketing mix variables are specified as part of the

individual firm equations in the system. Estimation of simple competitor response effects were found significant in the market share equations. With the flight frequency and advertising equations simple competitor mix effects were used which varied by the airline examined. This modeling system differs from the Lambin, Naert, and Bultez (1975) approach by treating competition, not as a summary variable, but including each firm as a separate competitive entity.

The model tested a city-pair market using data for the period 1965 and 1974 when the industry was still regulated by the CAB. Testing was done in both static and dynamic model versions using lagged market share as the carryover effect for the firm's marketing effort. Hanssens states that past studies have found marketing variables to differ in effectiveness. The strongest effects have been price variables followed by distribution and product strategies. The weakest variable has been advertising where elasticities have typically been of a magnitude of 0.50 or less (p. 473).

Leone (1980) used an iterative autoregressive-moving average (ARIMA) method in studying a consumer product. He explains the nature and advantages of this method is its ability to provide time series data relatively free from serial correlation. He describes a three stage procedure as "pre-whitening" variables in the first stage, followed by cross-correlation of variables to determine the direction and polynomial order used to investigate causal ordering. In the last stage the results of the first two stages are combined

in a model to explain the relationship between the original variables.

This type of model is able to use data from time series variables which generally are more readily available than cross-section data. Hence, this type of study opens up the possibilities for researchers to understand the effects of competition on the marketing process and its impact on firm profit performance.

Studying a frequently purchased consumer product sold predominantly in supermarkets, the investigation utilized an ARIMA time series method. Five major brands comprised over 90% of total sales in this oligopolistic market comprised of four major product line categories. A total of 95 bimonthly observations were used holding out twelve observations to test the forecast ability of the model.

Brand advertising dominated the marketing effort in this market (as such, price and distribution were not included in the equations). An ARIMA model was used to process the time series data in a manner similar to the one described in Hanssens (1980). Separate sales estimates were tried for each major brand using lagged sales, advertising and lagged advertising as independent variables. Competitor effects were directly included with an advertising variable. The results provide a model where serious competitive effects were evident. No lagged advertising effects were found significant which is surprising since non-price competition is typical for many of these product line categories.

Dutta and King (1980) provided a competitive modeling system that accommodates anticipated competitor strategies, industry sales (primary demand), and a variety of competitor marketing mix decisions evaluated in a range of competitive marketing scenarios. The importance of competitive effects lead the authors to try to accommodate this factor in their models. Subjective executive judgements were used as inputs rather than empirical data. This system had the advantage of being able to compare anticipated results of competitor strategies under a number of varying market scenarios.

Competitive effort was included by the use of "relative" marketing effort in the market share submodel. Relative effort was defined as the percent change in firm A's variable minus the percent change in firm B's identical mix variable (p. 264). Where a positive difference was found, relative marketing effort was considered improved. As a consequence market share and sales should be expected to likewise show increases.

The system was estimated using a linear least squares curve fitting program to predict firm market share. When combined with the profit submodel it is possible to compare different competitive strategies. Selecting the one best strategy should be readily apparent given the defined set of objectives. While the modelling system appears to have some validity, its usefulness depends on whether it is accepted by the organization as a worthwhile contribution to the management decision making process.

Dolan (1981) reviewed a variety of competition models investigating both economic and marketing theory viewpoints. Two of these are discussed below in reference to Allan and Porter. Classical economic reaction models include both Cournot and Stackelberg but require restrictive behavioral assumptions to reach equilibrium solutions. This limitation renders both models primarily as analytical tools. The same comments can be attributed to game theory based competition models where the players must gain the cooperation of rivals if the payoffs are to be optimized.

Cournot and Stackelberg models have both been criticized for their failure to include "learning". Competition models should reflect marketplace realities and not be limited to assumptions imposed by theorists if the models are to be prescriptive strategy tools. Dolan quotes Singer (1958) for criticizing oligopoly models which fail to provide for this aspect of management behavior.

Marketing based models that utilize judgmental inputs when formulating strategies are burdensome to manage and are non-optimizing solutions. The reaction matrix approach will incorporate this feature of competition for both simple and mixed marketing effects. Allowing for expanding demand and market share elasticities to effect firm sales is a feature of these models.

Optimal strategies can be determined from these models if constant response elasticities are assumed to continue. With the reaction matrix approach a method for analyzing

competitive effects is presented since this specification closely matches actual market conditions. This advantage compares favorably to the exogenous method which uses a summary variable as a single effect.

Dolan (1981) reports that Allan's 1978 dissertation research was a study of different behavioral approaches to firm strategy formulation focusing on firm personality characteristics. Central focus of the study involved eleven large chemical firms from 1966 to 1975. This model included operating policies such as capacity utilization, financial position and firm objectives. Dolan concludes that while the evidence is limited there is some support which indicates internal firm conditions have an impact on strategy. The evidence here did not produce a strong correlation with observed marketing changes (p. 230).

Porter is also recognized for his contributions to strategy based on ideas brought from the industrial organization economics field. Dolan notes that since marketing factors operate in an interactive fashion the analysis of marketing factors in isolation is not valid. However, research in the I-O field has been at the industry rather than firm level of analysis. Porter is credited with providing many intuitively appealing ideas which have stimulated writing and research interest in strategy.

Wilkinson, Mason, and Paksoy (1982) studied short-term effects of marketing mix variables. Focus was on the main and interactive effects of three marketing mix variables

covering four supermarket product categories. A factorial design was used for analysis of variance and covariance to measure the effect on the dependent variable sales per week. The authors noted that a large number of studies have been performed using single cue variables. The results of these studies, however, are questionable because of poor research design and experimental control.

In this study they controlled for seasonality by using items known to have displayed little seasonal pattern. They also controlled for traffic levels by selecting one store with fairly steady levels of customer count (as suggested by the sponsor of the study). Three levels of price, three shelf display treatments, and two levels of advertising were employed for each of the four items used. The treatments were repeated twice over an 80 week period.

Jagpal, Sudit, and Vinod (1982), involving in a second study of multiplicative, non-homogeneous models conclude this form is structurally superior because such models do not restrict coefficients to constants but allow nonlinear parameters to be included. This model is consistent with marketing theory because it permits nonlinear distributed lag form specifications which allows the results to vary in a manner closely resembling the path of marketing mix spending. Finally, MNH model specifications can accommodate comtemporaneous correlations among residuals.

To test this specification form a model of the Lydia Pinkham sales-advertising relationship was estimated using

monthly time series data. Solving with OLSQ, the presence of multicollinearity indicated that OLSQ produced a high mean square error while many of the t-statistics were found to be small. Estimating with ridge regression reduced MSE but the coefficients were then biased (characteristic of the method) which limited its usefulness for hypotheses testing. The model provided support for the hypothesis that policy effects will vary over time.

Two major problems occur with this specification form when marketing mix variables are combined with different structural lags. One of the difficulties concerns a degrees of freedom problem when estimating the equations. A second problem with the MNH form is that simultaneous equation estimation is not possible.

Aaker, Carman, and Jacobson (1982) discussed problems associated with model specifications which involve dynamic and simultaneous relationships. Finding the true shape of the lagged relationship should not assume 'a priori' to take any particular form as Koyck large models specify. Using ARMA models, the time series order can be estimated from the data series. To test the comparison between time series and Koyck lag forms, monthly data from the FTC cereal case was modeled.

To determine the proper specification of the equation, they suggested using ARMA procedures. The next step to follow is to test the model for "causality" between leading and lagged variables. Only a few correlations were detected

significant at the 0.10 level. This led to the conclusion that causal relationships were questionable and, hence, the firms were overspending on advertising. They also concluded that using Koyck lag models could produce results which are misleading because these models may incorporate incorrect model specifications. Problems with ARMA models are noted, however, because detecting the correct time series pattern can be difficult if the number of observations are few. Finding the "true" form of the lagged specification can be rewarding because this can lead to theory based models which can represent marketing activity and be useful for strategy formulation.

Naert and Weverbergh (1985) reviewed market share model specification issues beginning with the belief that market attraction models were superior to multiplicative or linear model types. After further evaluation they concluded that no definitive answer can be reached. Concern with a number of model related problems were discussed.

When the dependent variable is market share it can be sum-constrained to a value of one if the model parameters are homogeneous. However, a disadvantage of this model is that the response coefficients would be the same for all competitors. Such an observation would go "against the grain" of marketing theory and the rationale for strategy formulation which expect firm marketing mix variables to vary across rival firms.

A problem using multiplicative models occurs when some of the variables contain zero values which produce a zero in the calculations. To deal with this problem they suggest using some small number near zero be substituted which will not materially effect the final calculations but will manage to produce sufficient results. In deciding the final model choice, face validity and superiority of forecast can be relied on for making the selection.

Eliashberg and Chatterjee (1985) provide an extensive review of analytical competition models. Their purpose was to investigate how competition has been handled in marketing model building.

Problems with competition include not only recognizing who and in what market competitors exist, but also, how to anticipate competitors' actions when planning strategy. Marketers have focused on dynamic competitive behavior in oliopolistic markets, concentrating in the opposite direction of economists who emphasize deterministic solutions to competitive questions.

A series of studies were reviewed which were placed in several sub-categories for examination purposes. Decision oriented models examine the firm rather than the marketplace as whole. Conceptually, three classes of variables which influence firm profit performance were included: (1) firm marketing variables, (2) competitor marketing variables, and (3) external environmental factors.

These three sets of factors recognize the simultaneous interaction or learning taking place when responding to the initiative actions competitors. The role of uncertainty is inherent in strategy formulation since anticipation of competitors' future actions is often based on observations from previous strategies and past experiences or knowledge. Additionally, market effects can be static or dynamic. The latter type seems more realistic as it allows environmental and competitor changes to have their influence incorporated. Additionally, carryover effects from past marketing policies materialize and influence manager's perceptions of market conditions.

Observations made by the authors include:

1) "Strategic behavior captures the adaptive nature of competing firms" (p. 240).

2) "Static models may yield interesting insights...they do not explicitly incorporate the inherent dynamics of both sales response and competitive interactions" (p. 241).

3) "Dynamic models...explicitly recognize...that decisions are made not just once, but continuously over some time horizon" (p. 241).

4) "Head-on reaction strategy may be somewhat restrictive because...more effective to respond via a different variable" (p. 242).

5) "Dynamic models permit...both sales response and competitive interaction...important...where carryover effects must be considered" (p. 252).

6) "A large number of marketing mix variable provide richer implications...only a limited number... may be used...as competitive weapons...may imply that the "competitive weapons" should vary over the product life cycle" (p. 252).

7) "In an oligopolistic market...firms may have a differential advantage...can constitute a barrier to entry" (p. 252).

8) "The importance of competitive adaptability has been emphasized" (p. 253).

9) "The competitive interaction mode is simultaneous and noncooperative...based on the rival's expected action as perceived by each competitor" (p. 254).

10) "A firm also may have a competitive advantage if its advertising (or any mix variable) is more effective either in terms of its immediate impact on sales or in terms of greater carryover effects" (p. 252).

11) "Predictive validity does not imply that the models predictions is based on a valid description of the actual decision-making process and competitive behavior" (p. 257).

In examining the competitor reaction matrix approach to strategy model building two limitations become important. First, conjecturing competitor's response at some point in time may not coincide with the response elasticities of the econometric model. Second, learning may affect the response elastically over time, and therefore, the should not be assumed permanently fixed.

SUMMARY--The review written by Eliasberg and Chatterjee highlights many interesting ideas regarding regarding the development of competitive market models. These idea and other points of interest are presented in **Table 5 - Review Of Marketing Model Contributions To Competitive Strategy Formulation.** The final comment listed concerns the ability to measure variables which have the greatest impact on firm profit performance. Many of these ideas are

used later to develop and guide the formulation of the firm-specific profit models used in this dissertation.

Table 5

Review Of Marketing Model Contributions To Competitive Strategy Formulation

1) The use of multiplicative simultaneous equation models has become widespread following the initial efforts of researchers who concentrated first with single equation market share models.

2) These first studies were generally concerned with the effect on share with one or two mix variables, especially advertising, and only later became more involved with marketing mix models.

3) By using the multiplicative form the main advantage is the ability to reflect marketing mix decisions measured as response elasticities of the variable coefficients in log form.

4) With models specified as multiplicative simultaneous functions, the interaction and carryover effects can be estimated using 2SLS and 3SLS methods. Other procedures tried and found applicable include GLS, SUR, and JT/ZEF methods.

5) The use of market share as the dependent variable has been wide spread but increasingly the use of quantity or sales has been employed. With sales used as the dependent variable, it is possible to include feedback effects of the advertising-sales relationship which has the advantage of reducing bias and improving the estimated parameters.

6) Using lagged models can capture the carryover effects of previous marketing policies where advertising or market share have been the lagged variables.

7) Another trend found in the literature is the inclusion of market factors which exogenously impact market demand. These effects may be due to a number of causes, some due to primary demand effects, others reflecting significant events that impact the market and sellers.

8) Inclusion of competitive market categories should be included rather than limiting the focus to the immediate product-market category.

Table 5 (cont'd.)

9) Competition should theoretically be included in any model of market activity. It can be exogenously added as a ratio, share or relative variable which treats competition as a summed quantity able to account for all competitors. This method is not as preferable for handling competition.

10) The exogenous method of including competition directly measures this effect on the firm. This method is in line with oligopoly theory and is favored because of managerial usefulness.

11) The exogenous competition method has gained greater attention with managers as forecasting has diminished in importance. The ability to predict the response to firm mix variables and anticipate competitor responses to firm policy changes has increased in importance.

12) Organizational validity and usefulness is now a more important focus of model building concern.

13) The idea that competitors respond through the same mix variable no longer needs to be assumed when the endogenous method is used. This method is able to incorporate both simple and mixed competitive responses. However, this may produce specification problems since knowing which mix variable to include is not known 'a priori'.

14) Either large samples of firm and competitor observations are needed -- which practically, is not very feasible -- or some method to determine which variables to include for each firm's equation is needed. One method favored is the use of ARIMA modeling procedures which "prewhitens" the time series of autoregressive effects and allows for pairwise variable correlations to examine interaction effects.

15) Additionally, this method can be carried further to detect direction and causality using Granger, Haugh, Sims, or Pierce tests.

16) A comparison between the firm and its competitors show their relative strengths and weaknesses can be obtained by looking at the elasticities produced by equations based on log transform model specification. The elasticities should be examined for proper theoretical sign and to discover the relative importance of the mix variables considered.

CHAPTER III

THEORY DEVELOPMENT AND RESEARCH PROPOSITIONS

Chapter Outline

The previous chapter provided an extensive examination of models and theories of strategy and competition. Chapter III attempts to bring these ideas together in an eclectic integration of a theory of competitive strategy formulation. This chapter contains four sections which include:

1) A Hierarchy of Strategies Model is proposed outlining five different levels of strategy each with its own particular focus.

2) A model of competitive strategy, one of the levels in the hierarchy described above, is provided to emphasize six elements basic to shaping the market position and competitive strategy of the firm (SBU) in the market.

3) A theory of competitive strategy is proposed.

4) Following from the above theoretical explanation, nine propositions are defined. Testing these propositions demonstrates the relationship between firm competitive strategy, competitive advantages, and profitability.

The end goal of this dissertation is to prescribe a method for formulating competitive strategy based on firm-specific competitive advantages. Where successful, the firm should attain higher profitability relative to its competitors.

Levels of Strategy

Hierarchy of Strategies Model

Theorists researching strategy have proposed the idea that strategy is a phenomenon which can be examined at more that one level of analysis. The Hierarchy Of Strategies Model outlines different types of strategies which vary in their content, objectives and focus. A key axiom related to strategy formulation can be put forth at this point: factors which are important to shaping strategy at one level may be only marginally important at another level. Thus, content and focus for different strategies vary among levels in the hierarchy.

The concept of a hierarchy structure has been given some attention in the marketing field. One example found is in advertising with the "hierarchy of effects" model (Lavidge and Steiner, 1981). A second model is proposed in corporate planning with the analytic hierarchy process idea (Wind and Saaty, 1980).

Figure 1 - Hierarchy Of Strategies Model, demonstrates an important point regarding the multitude of factors which affect strategy formation. When the center of focus is at the competitive strategy level content is on customers and competitors. These dimensions are different than those at higher strategy levels such as corporate strategy. Less emphasis is placed on longer range factors such as new forms of technology. Instead, the competitive

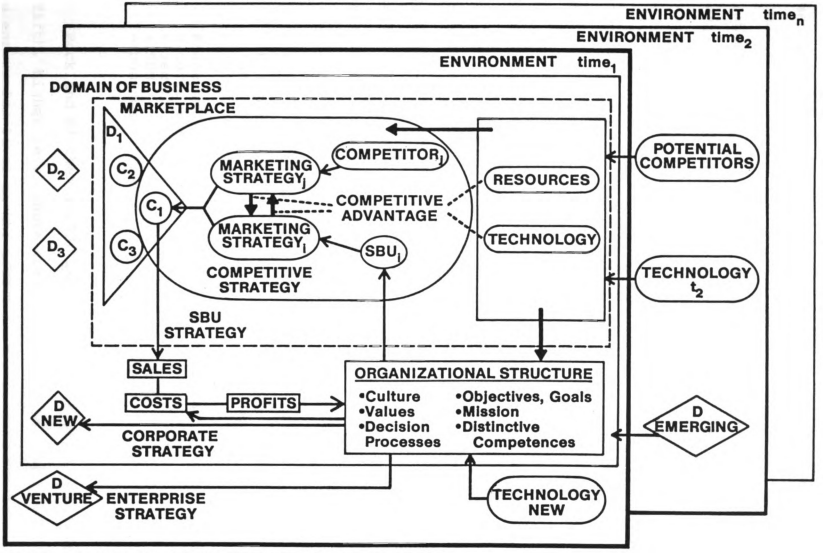

FIGURE 1. HIERARCHY OF STRATEGIES MODEL

strategy level is concentrated on factors having a more immediate impact on the firm, (e.g.), selecting target segments and/or engaging market competitors. Hence, as strategy varies its content and focus will likewise have a different configuration.

Recognition of different levels of strategy has received considerable attention in the literature. Researchers have addressed the idea of multiple levels rather than viewing strategy as a microeconomic "theory of the firm" model based on the limiting assumption of a single strategy for a single product serving a single market.

Several theorists have acknowledged the "hierarchy" of strategies idea. However, there is lack of common agreement as to what should constitute the various levels. A few of these authors and the strategy categories they include in their hierarchies are listed below:

Hofer and Schendel (1978)
- corporate
- business (SBU)
- functional
  (e.g., marketing)

O'Shaughnessy (1984)
- corporate
- business (SBU)
- investment
- competitive

Roach and Allen (1983)
- corporate
- sector
- SBU
- business segmemt

Robertson and Wind (1983)
- corporate
- SBU
- product
- product brand

Rock and Eisthen (1983) introduce "Enterprise" strategy, a fifth, higher level above corporate strategy. They define the enterprise level as the effort by firms to seek totally

new domains of business and the development of new skills and technologies. Similarly, Murray (1981) proposes defining "Entrepreneurial" strategy as the means by which the firm can reestablish its fundamental set of relationships with the environment. The rational for this strategy direction is the search for new opportunities to exploit. Both see this level of strategy as a means for finding and capabilities leading to new sources of competitive advantage for competing in the market.

The downward flow of strategic direction acts to narrow the important factors considered decisive when formulating lower level strategies. Decisions made at higher levels restrict the options available to managers at lower levels. The descriptions for each strategy level are summarized in outline form in **Table 6 - Outline Of Factors Delineating Strategy Levels In The Hierarchy Of Strategies Model**.

These decision factors are assumed fairly fixed and rigid for the time period immediately ahead when the strategy is to be implemented. Formulating strategy requires finding and giving primary emphasis to the set of factors believed most important for effectively competing in the marketplace.

The relationship of the various strategies influence the management of the firm and its units. At the highest level of strategy all new domains of business, technologies, and resources are potential strategic choices available. As a result the available options at higher strategy levels are wider than at lower levels. The limits placed on strategic

Table 6

Outline Of Factors Delineating Strategy Levels In The Hierarchy Of Strategies Model

1. Enterprise Strategy
   - entry into new ventures and domains not previously participated in or totally new environment
   - acquisition or change of capabilities -- new skills, resources or technologies

2. Corporate Strategy
   - establishing firm objectives, goals
   - delineate the current domains of business in which to participate, withdrawal or exit
   - determining basic capabilities -- basic technologies, skills to utilize in conduct of the business operations
   - set the investment and profit roles
   - allocation of investment resources

3. Business (SBU) Strategy
   * assumes has a defined SBU investment role
   - establish functional level policies and goals
   - decisions where to participate, enter, exit
   - allocate resources to functional areas
   - coordination between functional areas
   - skills/capabilities developed into distinctive competencies

4. Competitive Strategy (Strategic Marketing)
   * assumes have defined SBU market participation
   - target market selection
   - recognition of the competition
   - market share objective
   - establish "positioning" statement
   - development of competitive advantage(s)

5. Functional (Marketing) Strategy
   * assumes target market and competitors are known
   - marketing, operational, finance and management strategy formulation and integration
   - tactical implementation and execution
   - control and evaluation of strategies

options have implications from a implementation viewpoint. In addition, they involve large and significant commitments or withdrawals of resources and are expected to have a more significant, longer lasting impact on the firm.

This "significant commitment" aspect is related to the role of time as a strategic factor. The "sunkeness" nature of financial, technological or marketplace investments limit future flexibility. Poor strategic choices "up front" will lead to an endless series of related problems needing to be corrected. Equally important, the results of weak corporate strategy decisions are realized only at some later point in time rather than being immediately recognized as mistakes. Corrections are not able to be quickly or easily remedied when dealing with corporate strategy decisions.

At lower levels the results of successful or incorrect strategies are reflected sooner. Competitive strategy falls into this category since the response (or lack thereof) by customers and competitors are quickly -- and sometimes quite painfully -- realized. Likewise, functional strategies are shaped by decisions made at the competitive strategy level. Market "competitiveness", the test of the firm's strategy effectiveness, is evaluated at these lower levels.

Competitive Strategy Formulation And Competitive Advantage

The elements which are important to competitive strategy formulation should be made clear. These elements are listed in **Table 7 - Elements Of Competitive Strategy**.

Table 7

Elements Of Competitive Strategy

1)	Environment: continually providing new forms of skills, resources, and technologies, etc. needing to be utilized economically.
2)	Customers: responding favorably or unfavorably to what the firm has to offer in the market place.
3)	Competitors: forms of competition seeking to acquire these same resources, etc. and to attract customers to themselves.
4)	Organization: what is to be achieved, both at the SBU and corporate levels.
5)	"Offering": reflecting the form taken for the firm's resources, skills, etc. designed to satisfy and retain customers.
6)	Time: which is changing customer groups, environment, technologies, competition, objectives, resources and "offering". These changes are not necessarily to the firm's favor which introduces risk-taking and provides the profit incentive necessary to induce initiative.

Strategy formulation is a "matching" process between the external environment and firm-specific capabilities. The objective of competitive strategy is to find a "fit" in the market where the firm can satisfy its established objectives through successfully serving its customers while defending its position against competitors. Sources of competition may come from current forms as well as potential entrants threatening to come into the market in the future.

Figure 2 - Competitive Strategy Model illustrates how these elements are arranged. The model depicts both types of "marketing exchange" processes where resource

acquisition reflects the supply-side dimension and customer transactions relate to demand-side activities. The adept skillfulness at formulating strategy enables the firm to be successful at conducting both types of transactions. This requires skills developed for both marketing and operating abilities. The search for competitive advantages should not be viewed as limited to only the demand-side of the business.

It is from "distinctive competencies" that "competitive advantages" emerge. Distinctive competencies may be either demand-generating and supply-side factors but are specific to the unique nature of the individual firm. The ability to relate its distinctive competencies to market and competitive conditions provides the firm the opportunity to establish unique competitive advantages when formulating competitive strategy which are themselves uniquely designed.

Shirely, et. al. (1981, p. 72) state the key idea behind competitive advantage: a strength has value only if it is important to customers while not possessed by rivals [able to match or surpass]. What makes a distinctive competence a competitive advantage is the presence of both these two conditions simultaneously. Competitive advantage involves customer responsiveness to the firm's strategy relative competitor' own strategies. Put another way, the strength of customer response to the firm's distinctive competencies compared to competitors' capabilities indicates sources of competitive advantages.

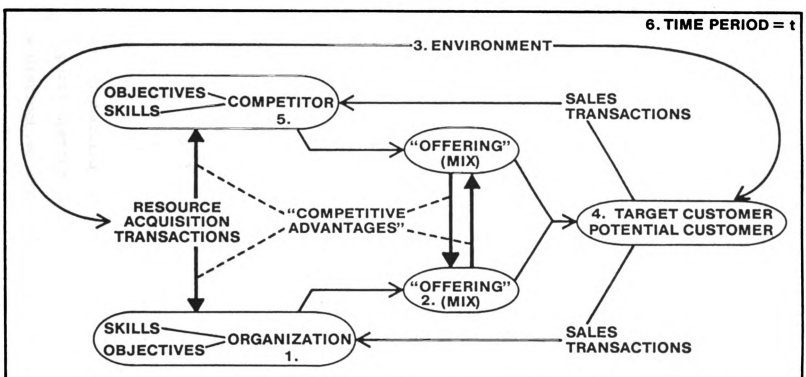

FIGURE 2. MODEL OF COMPETITIVE STRATEGY

Hofer and Schendel (1978, pp. 23-25) emphasize there is a difference between the two concepts. They suggest that these two factors are more important for formulating firm strategy than defining the "scope of business" participated in. The key to finding a fit in the market is to know where specific competitive advantages can be attained. It is equally important to know which distinctive competencies are the most suitable for the individual firm to pursue.

The element of time has a critical role for establishing or decreasing firm competitive advantages. It should not be assumed that competitive advantages will endure unendingly -- no monopoly will remain unchallenged forever. Expecting changes in the environment should be a norm of strategy formulation. This introduces both new problems for the firm while opening up new opportunities as well.

Sources of environmental change may come from several effects. Market factors, internal developments, or "luck" which favors or punishes firms by chance. Change naturally produces some type of effect, favorable or unfavorable, as its end result. Developing new firm-specific competitive advantages leads to formulating new competitive strategies necessary for adapting to this new environment in order to remain competitive.

Competition emphasizes "rivalry" -- the search for new advantages for participating in the market. The aggressive firm seeks new distinctive competencies as old capabilities decline in effectiveness. Relying on obsolete competitive

strategies based on previous distinctive competencies will likely find the firm by-passed by more astute competitors as time passes.

New sources of distinctive competence and competitive advantage are likely found outside the organization as it is presently structured. These sources include new domains of business or new technologies [enterprise level]; new skills and resource or new management with a different vision for directing the firm [corporate level]; emerging markets and customer groups [SBU level]; changes in competitors' skills and capabilities or customer preferences [competitive level]; and improvement in the refining and executing of basic capabilities [functional level].

SUMMARY -- Different strategy levels vary in their content and focus. Direction in policy flows from corporate, down to SBU, and finally to competitive and functional strategy levels. This downward flow narrows the strategic options available to managers at lower levels. At the competitive strategy level the focus is on customers and competitors as key market dimensions.

A Theory Of Competitive Strategy

An Eclectic Approach To Competitive Strategy Formulation

Understanding competitive strategy formulation can be aided by using an eclectic approach to theory development based on the contributions from the models and theories of

strategy and competition presented in Chapter II. A theory is proposed here which attempts to integrate key ideas and observations from these research streams seeking to explain the basic content involved when formulating competitive strategy.

Strategy formulation reflects the intention of managers to follow a particular "pattern of action". This decision has been made prior to the time the strategy is implemented [organizational behavior]. The decision requires making an up-front, irreversible commitment of limited resources to support the strategy [transaction cost] and is based on the anticipated responses from both customers and competitors [competitive advantage; game theory; marketing mix models]. It is anticipated results, not the actual results, which becomes the basis for deciding if the strategy should be implemented [organizational behavior].

There are specific reasons why competitive strategies differ in configuration. The options available to managers are circumscribed by corporate strategy decisions which vary according to differences between competitors in evaluating and processing market information [organizational behavior; population ecology]. Significant differences are observed even when the firms are in the same market. A comparison of important elements explain why strategies will differ. The reasons span the scope of competitive strategy elements:

1) organizational factors: varying objectives and goals, obtaining information, problem of "bounded rationality"

and putting this information into action, the ability to deal with risk/uncertainty;

2) marketplace factors: perceptions of future environmental conditions, changing customer tastes and preferences and competitive conditions and ability to assess future opportunities and problems;

3) operational factors: endowed resources/skills needed to form the firm's marketing "offering", constraints when acquiring resources or changes in technologies;

4) dynamic factors: perceived ability to effectively meet these changes as time progress.

The primary objective of competitive strategy is to find a solid "fit" between the firm and environment [congruency theory]. Diligent attention is required to changing market and environmental conditions which vary in their intensity and form over time [product life cycle]. Such changes force firms to adjust to new conditions when formulating strategy [contingency theory]. Strategic flexibility can prevent the firm from being placed in the helpless position of resource dependency and, instead, allows it to influence and shape the conditions of its environment and maximizes its chances for survival [industrial organization; sociobiology theory; congruency theory; population ecology].

The principle of concentrating strength against weakness is a basic tenet of strategy formulation [military theory]. The SBU is given direction as to where to participate from "grand strategy" formulated at the corporate level [military science; strategic management]. This level specifies what roles each SBU should fulfill relating to corporate profit objectives and resource utilization [portfolio theory].

Sources of competitive advantage may come from either demand-side, supply-side or lagged effects. Marketing based theories emphasize the first type of exchanges [marketing mix models; market share]. Other sources of advantage are obtainable through acquiring scarce resources and economical utilization of these inputs [population ecology; strategic deterrence; military science; industrial organization]. If access to needed resources is seriously disrupted chances for successful market participation would appear remote due to competitors usurping favored positions and acquiring critical resources for themselves [strategic deterrence; sociobiology theory].

Market and environmental effects may either benefit or hinder the firm in accomplishing its objectives. But these same factors may equally aid or hinder competitors due to chance occurrence [population ecology theory]. As such, these effects would not meet the definition of competitive advantage established in Chapter II since they are not very likely to be directly controlled by the firm. Finding those factors which provide firm-specific competitive advantages as a result of purposeful strategic actions should become the basis for formulating competitive strategy [contingency theory].

The role of competition is recognized as a dynamic force [microeconomics] influencing environmental conditions and where change is the accepted norm. Where the environment is continually being modified the firm is likewise required to

adjust its position and search for new forms of advantage [competitive advantage]. Competition pressures this process of adjustment for improved effectiveness and efficiency. In contrast, the monopoly models found in economics depict a static, equilibrium condition with competitors permanently sheltered from competition outside their specific industry [industrial organization; microeconomics].

Competitive strategy formulation is not totally focused on adapting to new market conditions. Strategy is affected by previous decisions which continue to linger and influence the shape of the firm's current market position due to their "carryover" or lagged effects. For example, investment in advertising by creating "goodwill" with present customers is designed to lead to brand preference and, subsequently, to repeat purchase [market share; competitive advantage; marketing mix models]. The strength of these effects are important when formulating strategy if the effect in the past was to condition current consumers and potential customers in a path favorable to the firm or discourage rivals from competing against it in the market [marketing mix; strategic deterrence; industrial organization; military theory].

The best competitive advantages are those sustainable over time. This indicates competitors are unable to offset, neutralize or surpass the firm's advantages. It should not be expected that advantages remain unchallenged forever by competitors or new product forms. But where its customers continue to patronize the firm and are satisfied with what is

offered, it should be these unique factors which should be emphasized when setting competitive strategy [competitive advantage; contingency theory].

A Competitive Strategy Model

Major categories considered when formulating competitive strategy are outlined in the five categories below which span the list of elements in the competitive strategy model. Each category contains a multitude of factors which interact and affect the objective function (operating profit level in this study). The variables in each of these categories are detailed in Chapter IV and are further defined in Appendix B.

		[1]	[2]	[3]	[4]	[5]
Firm Profit Level	=	market (factor) effects	marketing (mix) effects	lagged (mix) effects	operating (policy) effects	competitor (marketing) effects

The effect of firm-specific policies [2, 3, 4] are expected to be positive [marketing mix]. Market effects [1], hopefully, are positive but may be negative for some firms [population ecology]. Competitors' marketing mix effects [5] should be negative while price is expected to be positive due to cross-price elasticity effects [microeconomics].

Determining the firm-specific models reflects the unique nature of the individual entity. Each model should vary in composition from the others since firms evaluate information differently and are endowed with varying resources and employ different technologies and skills. Each firm would thus be expected to analyze future market conditions from different perspectives and formulate separate competitive strategies as

a result [population ecology; organizational behavior; microeconomics]. (In Chapter IV, an explanation of how these models are specified is provided; in Chapter V an evaluation of the results is given).

Modifications and adjustments reflect "learning" that has occurred over time. "Emergent" strategy, in contrast, is the firm's "realized" strategy or how the firm actually addressed the situation it faced. The firm's long range marketing approach is realized through a series of iterative steps that reflect the development of strategy over time. (This assumes the absence of institutionalized constraints other than economic resources). Thus, realized strategy reflects an evolutionary process -- a persistent, gradual adaptation rather than strategy as a decision decided at a single point in time [organizational behavior; population ecology]. One reason for this modification is the decline of distinctive competencies as competitive advantages when environmental and market conditions change.

In this theory there is no presumption that high market share is paramount to establishing a strong market position. While it may be true that high share has advantages there remain may examples of smaller, "nicher" firms effectively competing in select segments against much stronger rivals [market share].

Establishment of firm-specific competitive advantages is hypothesized as the foundation for formulating competitive strategy. Thus, environmental and market effects, marketing

mix effects, lagged mix effects and operating policies vary in their impact on strategy efficiency and effectiveness even across competitors participating in the same market. As a result each firm should formulate its competitive strategy specific to its interpretation of future market conditions and its own firm-specific capabilities.

SUMMARY -- Competitive strategy accepts the capabilities (distinctive competencies) of the firm as given. Deciding how to deploy its capabilities for engaging in transactions with customers and acquiring needed resources, while facing competitors trying to disrupt these plans, is a major focus of competitive strategy.

The strength of a competitive strategy is based on firm-specific competitive advantages. Successful strategies are those attractive to customers which remain sustainable over time against competitors. Distinctive competencies may be either demand-side or supply-side elements which the firm possesses.

The environment, customer preferences, competition and firm capabilities are persistently changing. The need to reformulate competitive strategy emerges as prior advantages lose effectiveness when market conditions change. The response of the aggressive firm is to search for new opportunities and distinctive competencies which may provide new sources of competitive advantage in this environment.

Firms vary in both capabilities and the characteristics of their managements. Differences in their perceptions of

future conditions and willingness to take risks influence the development of new advantages and formulation of new competitive strategies. Because competitive strategies vary across firms the results of these strategies also differ. Consequently, the stronger is its competitive strategy -- equal to strong competitive advantages -- the higher should be the firm's profitability relative to its competitors.

Propositions

The nine propositions discussed in this section are provided for the purpose of testing the basic tenets of this research. Statistical evaluations and accompanying conclusions are discussed in the Evaluation Of Propositions section in Chapter V.

Proposition 1 looks at the differences between firm competitive strategies. In Proposition 2, the definition of competitive advantage is tested to examine if any variables in the modeling system meets this criteria. Propositions 3 through 5 examine the relationship between firm competitive advantage and firm competitive strategy. Proposition 6 investigates if there is an association between competitive advantage, competitive strategy and total equation effect. Proposition 7 tests three measures of the total equation effect with firm ROS profit performance. Proposition 8 also looks at these same three measures and their relationship with firm ROA profitability. Proposition 9 looks at market share and firm profitability measures, competitive strategy

and competitive advantage. Even though market share is not the main focus of this research its importance in marketing encourages testing this relationship.

The tests of propositions utilize statistical techniques well recognized in marketing. These include conditional probability, paired comparisons tests, binomial probability distribution and regression analysis. References consulted for applying these techniques are found in Neter, Wasserman and Kutner (1985) and Bhattacharyya and Johnson (1977).

Proposition 1: Competitive Strategies Among Firms

Differences between firm competitive strategies are examined in this first proposition. In this study, each firm has its own uniquely specified equation which reflects its particular competitive strategy.

It is assumed that firms are not equally endowed with the same set of resources and skills nor do they forsee market opportunities and problems from the same perspective. Each firm's competitive strategy reflects policy variables which differ between competitors.

P_1o: Competitive strategies are the same across the firms in the market.

P_1a: Competitive strategies are not the same across firms in the market.

Proposition 2: Defining Competitive Advantage

Proposition 2 is a test of the definition of competitive advantage. Firm competitive advantages are identified by

comparing coefficient estimates at the firm level with the coefficient estimate at the market level and then testing for a significant difference.

P_2o: No policy variable in the set of policy variables contained in these models satisfies the definition established for a competitive advantage.

P_2a: There exists at least one policy variable among all policy variables which satisfies the definition of competitive advantage.

Proposition 3: Competitive Advantages Among Policy Variables

The sources of competitive advantage vary among all the policy variables included in this study. There are seven policy variables composed of marketing mix, lagged marketing mix and operating factors.

P_3o: Competitive advantage policy variables are limited to an insignificant number of policy categories.

P_3a: Competitive advantage policy variables account for a significant number of all policy variables in this study.

Proposition 4: Sources Of Competitive Advantages Vary Among Firms

The dispersion of competitive advantages varies across firms in this study.

P_4o: Competitive advantages are not dispersed across firms.

P_4a: Competitive advantages are dispersed across firms.

Proposition 5: Strength of Competitive Advantages Vary Among Firms

The strength of competitive advantages vary across different firms in the market where strength is measured by the size of the coefficient.

P_5o: Competitive advantages are of "equal strength" across firms.

P_5a: Competitive advantages vary in "strength" across firms.

Proposition 6: Relationship Between Competitive Advantage And Competitive Strategy

Based on the theory of competitive strategy discussed in Chapter III the most effective competitive strategies are based on strong competitive advantages.

P_6o: No significant relationship exists between strength of competitive advantage and strength of firm competitive strategy.

P_6a: The relationship between strength of competitive advantage and strength of competitive strategy is positive.

P_6b: The relationship between strength of competitive advantage and strength of competitive strategy is negative.

Proposition 7: Relationship Between Firm ROS Profitability And Measures Of Competitive Strategy

Competitive strategy can be categorized into three major measures of effect: competitive advantage (CA), competitive strategy (CS), and total equation effects (TE). Each of these measures is evaluated for their impact on return on sales (ROS).

P_7o: The level of ROS profitability is not positively related with firm competitive advantage (CA) or competitive strategy (CS) or total equation (TE).

P_7a: Level of ROS profitability is positively related with CA.

P_7b: Level of ROS profitability is positively related with CS.

P_7c: Level of ROS profitability is positively related with TE.

Proposition 8: Relationship Between Firm ROA Profitability And Measures Of Competitive Strategy

Competitive strategy can be categorized into three measures of effect: competitive advantage (CA), competitive strategy (CS), and total equation effects (TE). Each of these measures is evaluated for their impact on return on total assets (ROA).

P_8o: The level of ROA profitability is not positively related with firm competitive advantage (CA) or competitive strategy (CS) or total equation (TE).

P_8a: Level of ROA profitability is positively related with CA.

P_8b: Level of ROA profitability is positively related with CS.

P_8c: Level of ROA profitability is positively related with TE.

Proposition 9: Relationship Between Market Share And Firm Profitability, Firm Competitive Strategy, And Firm Competitive Advantage

The marketing literature has proposed that market share is an important factor affecting profitability. If share is

important, then it should have a positive effect on ROS and ROA. Likewise, market share should be positively related with strength of firm competitive strategy and competitive advantage.

P_9o: There is no relationship between market share and: ROS, or ROA, or strength of competitive strategy, or strength of competitive advantage.

P_9a: Firm market share and strength of firm competitive strategy are positively related.

P_9b: Firm market share and strength of firm competitive advantage are positively related.

P_9c: Firm market share and ROS are positively related.

P_9d: Firm market share and ROA are positively related.

CHAPTER IV

RESEARCH METHODOLOGY

Chapter Outline

Discussion of marketing models which examine the impact of environmental effects and marketing mix policies on sales and/or market share was discussed extensively in Chapter II. Research trends in the field clearly point in the direction of econometric modeling employing estimation procedures more sophisticated than OLSQ. Research has been conducted using cross-section competitor effects directly specified in the equations. Estimating these models requires methods that take into account several methodological problems which emerge when regressing simultaneous equation systems.

This chapter examines methodological problems commonly encountered when time series variables are used in cross-section models in multiple equation systems. These problems include:

1) Discussion of data sources used, data development and transformation of variables.

2) The problem of selecting a market which displays the desired competitive conditions needed to evaluate the propositions of this research.

3) An analysis of the time series data and related modeling problems encountered and how these affect parameter estimation.

4) An examination of model specification and estimation problems for the cross-section study of firm-specific profit equations.

5) In the last section, the seemingly unrelated regression (SUR) procedure is presented, commenting on small sample

properties of these estimators and including examples of where SUR has been applied in the marketing literature.

Discussion of the results of time series analysis, the evaluation of the results for the system of firm-specific profit equations and tests of propositions are deferred until the next chapter.

Data Sources

Data used to construct the variables in this study were obtained from publicly available information sources. These details are provided in **Appendix B - Data Discussion**. Each set of variables was recorded as positive, real numbers to allow for their transformation into natural logarithm base. The coefficients estimated will then be elasticities in the specified multiplicative models. Thus it was possible to make comparisons between variables and across different equations.

Appendix B provides the following explanation:

1) A detailed list of the specific reference sources used. These sources are the basic published sources: firm annual stockholder reports, SEC 10-K reports and well known basic financial reference services. Consistency of these sources helps to ensure some degree of reliability of the data which covers a twenty-eight year time span.

2) The list of variables and their method of determination and measurement are provided. The list consists of four major categories including four marketing mix, two market effects, one lagged mix and two firm operating factors. A

total of nine variables were available for possible inclusion in the firm-specific equations. In addition, by allowing for inclusion of competitors' marketing mix and lagged mix variables, a fifth category of factors affecting firm profits is provided.

3) For missing or unavailable data, estimates were made utilizing one of several acceptable methods. Frequently simple interpolation was employed. Additionally, regression estimates were made using proxy variables for some missing data points, (e.g.), estimating shoe advertising spending as a function of total firm advertising. Lastly, some price data was approximated using market level proxy variables.

Study Of A Competitive Marketplace: The U.S. Non-Rubber Footwear Market

In order to study the effects of competitive strategies between companies a "marketplace" containing several active competitors was needed. Requirements for selecting this market included:

1) obtaining complete sets of data for several firms;
2) ability to gather market related information;
3) firms of varying sizes and resources, and therefore, presumably varying target markets and competitive market strategies;
4) significant changes in market structure experienced leading to firms adapting to changed conditions;
5) evidence of competitive interaction effects.

A market which meets the conditions described above was found in the U.S. non-rubber footwear market. A total of seven firms were included in the research which covered the period from 1960 through 1987. Each variable in the system contained twenty-eight yearly observations, recognizably a small number of observations for a time series. This factor should be acknowledged since the degree of confidence which can be placed in the statistical tests is not as strong as what is the usual practice in research.

Several significant changes in market structure occurred during this timeframe. Details of these changes are found in **Appendix A - Study Of The U.S. Non-Rubber Footwear Market**. Briefly, the major changes included: (1) a domestic import policy leading to significant supply increases from foreign producers; (2) forward vertical integration by firms into retail shoe distribution; (3) increased emphasis on advertising; (4) a demise of the number of domestic shoe producers participating in the marketplace; and (5) revamped product line policies leading to specialization by firms in particular product segments. The results of these changes become evident following examination of the firm-specific competitive strategies.

The list of firms included in this study is provided in **Table 8 - Firms In The U.S. Non-Rubber Footwear Market**. The list shows the names of these firms (with symbol and reference number used for identification) and their "market shares" calculated in this study:

Table 8

Firms In The U.S. Non-Rubber Footwear Market

Firms	Market Share	Share Index
(ME-#3) Melville	28.3%	1.98
(BR-#1) Brown Group	24.3	1.70
(IN-#2) Interco	18.5	1.29
(US-#5) U.S. Shoe	15.7	1.10
Majors Total	86.8	6.07
(WO-#7) Wolverine	6.1%	.43
(SR-#4) Stride Rite	4.6	.32
(WE-#6) Weyenberg	2.5	.18
Minors Total	13.2	.93
TOTALS	100.0%	7.00

For purposes of this study the term "market share" refers to the percent of sales each firm accounted for among the seven footwear firms included in this study (not the total of all competitors in the market). The term "relative share index" means compared to the "average" market share of these seven firms which equals 14.3% (equivalent value of 1/7). Firm "share index" is found by dividing firm "market share" by 14.3% (example: Melville at 28.3% share / 14.3% = 1.98).

The list of companies can be divided into two distinct groups. The first group contains the four largest who are multi-divisional companies manufacturing, wholesaling, and retailing footwear. They are also diversified into other consumer lines but vary in their degree of commitment to a variety of clothing, furniture and retailing markets. The three smaller firms are almost exclusively in manufacturing with only limited exposure in footwear retailing. The share

index calculation was used to separate the major from minor players in this marker.

The Effect Of Time Series Variables In Regression Equations

It is important to note that the variables included in this study are time series in nature. Historically, the question of the effect on coefficient estimation, when the observations can be represented as an ARMA (autoregressive, moving average) process, has been ignored by researchers in the belief that the loss of efficiency will be insignificant (Pesaran and Slater, 1980, p. 63).

The time series issue is fundamentally important in the statistics field. Granger (1980, p. 43) notes that many of the variables in business and economics are time series in nature introducing the potential for autocorrelation. If a variable can be expressed as an ARMA (p,q) representation, the observations will be autocorrelated and will violate one of the basic assumptions of regression methodology. These parameters are unbiased and consistent by inefficient. The standard errors of the regression are biased and the usual tests of significance will be inappropriate (Pindyk and Rubinfeld, 1981, pp. 152-4).

If serial correlation is present in time series data it will also be present in the regression equations. A method is needed to remove this problem from the observations so as not to "contaminate" the regression equations. The problem can be resolved through data transformation procedures and

then applying statistical tests to determine if the problem remains present.

Data Transformation

Since the observations were available as positive, real numbers, transformation into natural logarithms was employed for ease of estimating and comparing parameters. With the use of elasticities to measure the affect on the dependent variable, comparisons are facilitated between variables as well as estimating the magnitude of their effect.

Each variable was transformed through the "deviations" method. The manner for calculating the deviation is well known in the time series field. The steps outlined below follow a procedure similar to the one proposed by Brockwell and Davis (1987, pp. 15-6).

The general representation of the time series variable Y(t) is:

$$\mathbf{Y(t) = m(t) + Z(t)} \qquad \text{[Eq. 1]}$$

where m(t) is the deterministic component of the series and Z(t) the "random noise component" portion. Transformation procedures remove the deterministic portion m(t) leaving the residuals Z(t) as a realization of the random "white noise" process. The steps include:

1) transformation of the raw data series Y(t) into its natural log base. This is possible because all the observations are positive, real numbers

$$\mathbf{y(t) = \ln Y(t)} \qquad \text{[Eq. 2]}$$

2) calculation of the "first differences" of the log values for each period of observation, (e.g.), $y(t_0) - y(t_{-1})$, where the x(t)'s represent first differenced values:

$$\mathbf{x(t) = \Delta\, y(t) = y(t_0) - y(t_{-1})} \qquad \text{[Eq. 3]}$$

3) regress the first differenced log values x(t) against time by fitting the trend component m(t) as a parabolic time curve $m(t) = a_0 + a_1(t) + a_2(t^2)$ resulting in the equation:

$$\mathbf{x(t) = m(t) + e(t)} \qquad \text{[Eq. 4]}$$

equivalent to:

$$\mathbf{x(t) = a_0 + a_1(t) + a_2(t^2) + e(t)} \qquad \text{[Eq. 5]}$$

where t=1 to 28 observation periods and a_0, a_1 and a_2 are parameters to be estimated for the intercept and time trend components and e(t) the residual error term,

4) remove by subtraction the deterministic portion from the series resulting in the residuals e(t) found as the deviations from the mean of the time series:

$$\mathbf{e(t) = x(t) - m(t)} \qquad \text{[Eq. 6]}$$

or equivalently:

$$\mathbf{e(t) = x(t) - [a_0 + a_1(t) + a_2(t^2)]}. \qquad \text{[Eq. 7]}$$

It is these transformed residuals or "deviations" **e(t)** which are the observations formed as the variables used later when estimating the regression equations.

An alternative to the parabolic time curve estimation step would be to take the second and third "differences" of these log observations. The disadvantage of this method is, however, the loss of two observations from what is already a small sample size time series.

Application of ARMA models have been found on occasion in the marketing literature. Hanssens (1980) employed ARMA modeling techniques in his study of airline competition that

had samples of thirty-five and thirty-eight observations in the time series. Likewise, this dissertation is a study of a competitive market and is designed along lines similar to Hanssens. The Hanssens study contained more observations per variable but utilized only three airlines to test its hypotheses. In contrast, the variables in this study had a total of twenty-eight observations each and used seven firms as its sample size to test its propositions.

Estimating Time Series ARMA Processes

Two basic approaches have been suggested for estimating time series models involving large sample studies. Where the number of observations is considered small (200 has been suggested), the "systems" procedure is feasible according to Pandit and Wu (1983, p. 151). Unfortunately, knowledge of the properties of small sample time series models are not well known. This question is reexamined at the end of this chapter in reporting a study by Kmenta and Gilbert (1968) which specifically addresses this topic.

The main problem with using these procedures for ARMA model estimation is the recognizable lack of any underlying theoretical support. Instead, the model is based solely on past behavior of the variable and the variable alone (Pindyk and Rubinfeld, 1981, pp. 469-71).

The first methodology, the "correlogram" approach, is described by Granger (1980, pp. 64-5) and attributed to Box and Jenkins. This procedure utilizes the autocorrelation and

partial autocorrelation functions for estimating the initial starting order levels for ARMA models. The second method, labeled the "systems" approach, is given in Pandit and Wu (1983). The method begins with a low order model and increases the order one step each iteration. The process continues until the independence assumption for the residuals is satisfied. This method is examined in the section following discussion of the "correlogram" approach.

Basically, the model building approach suggested by Box and Jenkins is a three stage method (Granger, 1980, p. 65):

(i) identification of appropriate models;

(ii) estimation of parameters from data;

(iii) diagnostic checking of residuals to determine if the model is adequate or if another model should be estimated.

Pandit and Wu agree with this basic idea but provide another method for order level identification.

The "Correlogram" Approach

The first method used for determining the appropriate order level for ARMA model estimation is the "correlogram" approach. This method begins with examining the plots of the autocorrelation and partial autocorrelation functions. If the plots of the functions fall outside the "confidence bounds" from the expected "zero" mean, these points are considered to indicate the initial order level for the model in question.

The "bounds" limits are calculated by multiplying two times the standard deviation of the sample size n, computed as $\pm 2/(\sqrt{n})$ (Granger, 1980, p. 71). When examining the partial autocorrelation function these "bounds" aid in estimating the initial order level of size "p" for the AR portion. The same criteria is used for the MA portion order size "q" using the autocorrelation function.

Having determined the initial order levels the program PEST, provided by Brockwell and Davis (1987), is utilized to estimate the initial parameter estimates. Once the initial values are calculated, the optimized values can be computed using PEST. To settle on the final order level a test for randomness of the calculated residuals is applied.

When test of randomness for the residuals indicate an approximate random "white noise" process and no significant reduction in the sum of the squared residuals is found, the model is considered adequately determined. Therefore, the key test involves satisfying the independence assumption of the residuals (Pandit and Wu, 1980, p. 160).

If the residuals indicate a definite pattern or the test statistic for independence is significant, reestimating the model using a higher order level is required. This step is appropriate since the additional parameters included in the model should result in a large reduction in sum of squared residuals. If the higher order level is found inadequate, the process continues until an order level is reached which

indicates the model has met the assumption of independent residual terms.

The Pandit and Wu "System" Approach

A second approach for determining ARMA order levels has been proposed by Pandit and Wu (1983). This method may be described as the "systems" approach for ARMA (n,n-1) (or ARIMA) order model and modeling strategy in contrast to the correlogram approach described above. The usefulness of the "systems" approach for representing time series models "can be answered in the affirmative for stochastic stationary systems, including the limiting cases such as random walk" (Pandit and Wu, 1983, p. 44).

The "systems" method begins with a low order model and proceeds to successively higher order models starting with the independence assumption model, the AR(0) model (p.42). For each iteration a one step advance of order level "n" is tried, that is from the ARMA (n,n-1) to the ARMA (n+1,n) to the ARMA (n+2,n+1), etc. To check for the adequacy of the model an F-test is performed for significant reduction in sum of squared residuals following each iteration. This particular criterion serves to ascertain "the adequacy of the independence assumption, that is, the adequacy of the AR(0) model" (Pandit and Wu, 1983, p. 37-9.)

Pandit and Wu (1983, p. 37-8) address the question of determining the final order size "n" for any model. A test of the "null" hypothesis of no significant difference in the

sum of the squared residuals [between the AR(0) and AR (1) models] was developed on the assumption of independence. If no significant reduction found, evidence for rejecting the null hypothesis is lacking and the conclusion reached that the observations are independent and uncorrelated. (This is opposed to H_1: the alternative hypothesis of dependence). The test requires employing a standard F-test as defined below. In addition, Pandit and Wu maintained that if the residuals [defined as $a(t_0)$] are independent of the lagged residuals ($a(t_0)$ with $a(t_{-1})$, $a(t_{-2})$, etc.), they will also be found independent of past observations as well (that is, $a(t_0)$ with $x(t_{-1})$, $x(t_{-2})$, etc., Pandit and Wu, 1983, p. 25).

The "F-test" criterion is well known in statistics and is calculated as (reference is made to Rao, 1965):

$$F = \frac{A_1 - A_0}{s} \Big/ \frac{A_0}{N-r}$$

and distributed approximately as F (s,N-r) (Pandit and Wu, 1983, p. 161). If the statistic does not demonstrate a significance reduction in sum of squared residuals between the lower order and next higher model, the lower order model is determined to be the appropriate ARMA representation since the independence assumption is shown to be satisfied. Preference with time series, as with regression, favors minimal parameterization of the model (Granger, 1980, p. 65).

Testing the adequacy of the AR(0) model (that is where the observations are the deviations from the detrended time series) $x(t)=a(t)$, comparison is made by fitting the higher

order AR(1) model. If the F-test of the null hypothesis of independence shows no significant reduction between the two models, evidence for rejecting H_0 is deemed lacking. The AR(0) model is then considered an adequate representation of a random time series and expresses a "white noise" process. Therefore, if the transformed observations are not serially correlated the parameters in the regression model should not be affected by serial correlation existing within the time series itself.

Comparison Between The Correlogram And Systems Approaches

The "systems" approach provides a number of advantages when compared to the correlogram method. These advantages demonstrate several solid reasons for using the systems approach (Pandit and Wu, 1983):

1) The systems approach, contrary to correlogram method, does not assume the data has been generated by an ARMA process. The latter method attempts to estimate the fixed values "n" and "m" [p and q using correlogram terminology] by trial and error (p. 42).

2) Issue is taken with the correlogram approach because finding the starting order levels is somewhat arbitrary and all possible values of "n" and "m" are treated on par (p. 42). Granger (1980, p. 64) notes that using correlograms provides an initial "guess" of the model order.

3) The systems approach remains the easiest method for finding the order level (p. 44).

4) The systems approach can approximate any stationary stochastic system (p. 44).

5) The systems approach gets closer to approximating the starting order by successively increasing level "n" by applying a statistical test as the stopping criterion (pp. 160-1). In contrast, the less sophisticated

correlogram method relies upon the "examination of plots of autocorrelations, spectra, residuals, etc." (p. 44) and serves to "roughly check the independence of the a(t)'s" (p. 163).

6) The result of over fitting ARMA models may result in some practical cases of getting a slightly large sum of squares (p. 161).

7) The correlogram approach provides parameter estimation when the order level "n" and "m" are known. Determining the correct order level before fitting the model is very difficult, but solvable, when "m" is zero (p. 42).

Granger (1980, p. 68-74) adds three points worth noting as regards model estimation. "The best available approach seems to be to fit a slightly higher order model and then to see if the extra parameters are significantly difference from zero" (p. 68). Second, that "data found in real economic series . . . . do not always allow such easy identification" of their representations (p. 74). And lastly, "It is quite frequently observed that the purely automatic techniques extract too much" from the interpretations of the plots of the autocorrelation and partial autocorrelation functions (p. 74).

Model Specification Using Multi-Step Procedure

Models were separately developed for each firm in this study. The reason for this step follows from the assumption that competitors have unique strategies and, thus, require separate firm-specific configurations for their individual profit equations.

A wide variety of variables were initially considered for possible inclusion in any one of the unique equations.

Four major categories, totaling nine possible variables, were developed for this equation fitting purpose (variables are discussed in Appendix B). A fifth category group of possible variables provides for including competitors' marketing mix and lagged marketing mix variables. **Table 9 - Categories of Competitive Strategy Variables**, lists these variables with their expected theoretical signs:

Table 9

Catergories Of Competitive Strategy Variables

Marketing Mix	Market Effects	Lagged Mix	Operational Factors
X_1 Advertising (+)	X_5 Total Demand (+)	X_7 Average* Lagged Advertising (+)	X_8 Operational Costs (+)
X_2 Retail Stores (+)	X_6 Real Leather Costs (+)		X_9 Debt Level (+)
X_3 Product Variety (+)			
X_4 Average Shoe Price (+)			

* Indicates "average lag" calculated as the average for the past two years combined.

The multiplicative model specification takes advantage of the ease of measuring the coefficients as elasticities. These firm profit equations form an oligopolistic market modeling system which accomplishes two objectives. First,

each equation estimates firm profit results based on a set of select variables. The determination of these equations were unique to that firm. Second, the model serves as the basis for identifying specific competitive advantages by comparing these with the average coefficient values for the same variable at the market level.

Since the primary level of analysis is the SBU/firm and not the market, the equation outlined below is a "general" representation of the starting specification of the firm profit model. Initially, the model considers all variables as potentially important candidates for explaining operating profit level. The multiplicative form is:

$$Y = (C_0)^{a_0} (X_1)^{a_1} (X_2)^{a_2}, \ldots, (X_9)^{a_9} e_i \quad \text{[Eq. 8]}$$

where C_0 is the intercept of the equation, X_j's are the variables in question, the a_j's are the elasticities of the variables to be estimated and Y is the dependent variable specified as non-rubber footwear operating profit level. The equation is then transformed to a natural log model where the values for the observations are the detrended "deviations" calculated as described above in the Data Transformation section:

$$\ln Y = a_0 \ln C_0 + a_1 \ln X_1 + \ldots + a_9 \ln X_9 + \ln e_i. \quad \text{[Eq. 9]}$$

To determine which variables of this group to initially include for estimating the firm-specific profit equation, a method for variable selection was required. This particular step is more accurately described as a preliminary variable elimination stage. It serves the purpose of eliminating a

large number of candidate variables from the original list. Using the BMDP-81, Biomedical Computer Programs (1970) 2R (step-up regression) and 9R (all possible regressions), a method for resolving the variable elimination question is logically provided. (In Neter, Wasserman and Kutner, 1985, pp. 430-6) an example is provided of the BMDP-2R "step-up regression" program).

To arrive at the initial specification for each of the firm-specific equations a multi-step modeling procedure was undertaken. It should be emphasized that these models need to be separately specified for each firm. Three examples using a multi-step procedure are cited.

Specifying models using a multi-step procedure has been found in the marketing literature. Lambin (1970) used a stepwise program for establishing his models in two stages. The initial basic model was estimated and evaluated for significant variables. Then, with insignificant variables eliminated from the basic model, a second step estimation was performed. (The results included variables with small t-statistics at 1.20 in two equations).

Houston and Weiss (1974) estimated a system of three equations using JT/GLS (referred to as SUR). Finding some coefficients not significantly different form zero, these parameters were constrained to equal zero with the three equations reestimated, again using SUR.

Gatignon, Anderson and Helsen (1989) first estimated a system of individual brand equations using OLSQ. To decide

to include a particular variable in the SUR model, a cut-off t-statistic of 1.20 was used. The models were reestimated simultaneously with SUR to take into account correlations among disturbances across equations.

In this dissertation, the first step consisted of the identification and elimination of the large number of firm, market and competitor variables originally considered for inclusion. The decision was based on the potential effect on the dependent variable operating profit level. Using BMDP-9R "all possible regressions" program, a matrix of simple correlations among all variables was obtained and used for this purpose.

The criteria established for continued inclusion was based on having a simple correlation minimum value of 0.20 or greater with the dependent variable (this value was the minimum level found useful when estimating the equations). For competitor variables only marketing mix or lagged mix variables were considered, taking into account their correct theoretical signs (positive for price, negative for all other mix and lagged mix variables). With market effect variables, only the size of their correlation was considered important as sign could be either positive or negative. Variables not meeting the correlation and sign criteria were set aside.

In the second step the BMDP-2R "stepwise regression" routine was used to regress the set of limited candidate variables with firm profits using OLSQ estimation. For the most part five to six firm variables along with about ten

competitor and market effect variables were retained from the first step for model calibration purposes at this point.

The third part to this problem involved estimating the system of equations simultaneously using the SUR procedure. At this point a slightly different set of variables emerged. The reason for this difference is explained by the heuristic decision criteria for adding or deleting variables provided in the "step-up" regression program. Step two identified variables for initial use in estimating the full model set of equations. Many of the variables identified in step two were retained in the final equations determined in the third step.

Estimation Using Seemingly Unrelated Regression

To examine the main theoretical premises of this study, a set of firm-specific competitive strategy equations were specified using the model estimation method described above. This three stage procedure allows for the inclusion of firm marketing mix, lagged mix, operational policies and market effects. By adding competitor marketing mix and lagged mix variables directly in the equations, oligopolistic market features are introduced. However, this feature also leads to the problem of correlation among disturbances when the model system is estimated simultaneously.

A method for simultaneous estimation of a system of equations where the disturbances are correlated has been proposed by Zellner (1962). Seemingly unrelated regression is appropriate in this case because of the correlation found

among the error terms. The method of ordinary least squares will provide unbiased and consistent estimators but use of the SUR procedure additionally improves the efficiency of the parameters (Pindyk and Rubinfeld, 1981, pp. 331-332).

The SUR approach addresses the problems of cross-equation correlation by treating the entire system as a single large equation (Pindyk and Rubinfeld, 1981, p.333). Using the Generalized Least Squares (GLS) approach, SUR resolves this correlation problem which arises because the contemporaneous covariance matrix of disturbances is non-spherical. SUR solves this difficulty by producing a weighted covariance matrix where the weights are proportional to the inverse of the estimated covariance matrix of residuals. SUR uses this new matrix to multiply through the equation resulting in a new identity matrix used to form a new estimate of the error covariances matrix (Pindyk and Rubinfeld, 1981 pp. 347-8; Time Series Processor, 1983, p. 253; Kennedy, 1979, p. 75).

TSP considers SUR a special case of non-linear least squares estimation (TSP, Reference Manual, 1983, p. 253). This process is described as first obtaining estimates of the error covariance matrix by initially estimating each of the equations with OLSQ. The TSP (1983, p. 74) procedure provides estimated disturbances which are maximum likelihood estimates to form a weighted matrix following the procedure described above. The second step uses these new values when reestimating the equations. The new set of coefficients are

more efficient due to elimination of the contemporaneous correlation among the error terms. The SUR methodology is essentially a two-stage estimation procedure according to Pindyk and Rubinfeld (1981, p. 334).

Small Sample Properties Of SUR Estimators

The properties of small sample estimators have received limited attention in the academic literature. Houston and Weiss (1974, P. 153) indicate that their choice of SUR for estimating a system of three equations simultaneously was because these estimators are asymptotically efficient and their small sample properties generally stable.

A study which examined the small sample properties of SUR estimators was undertaken by Kmenta and Gilbert (1968). In this study the authors performed Monte Carlo simulations of varying sample sizes 10, 20 and 100 observations. They report that Zellner's two-stage Aitken estimators (the basis of the SUR method) performed well compared to OLSQ and "that most of the asymptotic properties of this estimator tend to hold in small samples as well" (p. 1180). In addition, the "most important asymptotic property of the ZEF estimator is asymptotic efficiency" (p. 1198).

In their analysis Kmenta and Gilbert report the results of a study of investment equations attributed to Zellner. The modeling system specified two variables for two separate but correlated investment models covering a small sample of twenty yearly observations. They found little difference

between SUR and maximum likelihood estimators, the results being small for both coefficients and standard errors. Both these methods were observed superior to OLSQ (Kmenta and Gilbert, 1968, pp. 1199-1200).

Applications OF SUR In The Marketing Literature

Examples using SUR as an estimation procedure are found in the marketing literature. This has usually been when brand sales or market share have been employed as the dependent variable.

Beckwith (1972) compared the use of OLSQ, ZEF (the SUR procedure) and iterative ZEF (IZEF) methods. This study involved simultaneous competition between brands where the major policy variable was advertising. Results showed both ZEF and IZEF to have smaller variances that OLSQ.

A second example involved a study by Wildt (1974) in which the top three brands commanded a seventy-five percent market share. The simultaneous equation system was able to capture the effects of the competitive process using market share as the dependent variable. A change in market share for one brand will affect the shares of the other brands producing correlation among disturbances. The independent variables were all marketing policy based. Unfortunately, the direct inclusion of competitor marketing mix variables were not specified in the equations missing a characteristic feature expected to be found in oligopolistic markets.

A third example is found in a study by Houston and Weiss (1974). In this study SUR was considered the appropriate estimation method because: (1) use of market share as the dependent variable assures interdependence among equations and, (2) the competitive nature of the market assures the presence of interdependent relationships. A small sample of twenty-four bimonthly observations for each of three brands in this market comprised the data available. Both additive and multiplicative forms of the model were tested with the latter found to provide results slightly stronger than the former.

All three studies had a small number of observations in their time series variables. Beckwith had available thirty-five time period observations for five different brands. In Wildt, forty-two observations for three firms were available while Houston and Weiss had twenty-four observations each for three brands studied. None of these studies mentioned examining for the question of serial correlation introduced by time series variables.

SUMMARY - - The trend in methodological research involving this type of model building has been in the direction of econometric techniques using the multiplicative, logarithmic specification model form. To solve multi-brand equation systems, use of simultaneous regression procedures have been commonly employed.

The effects of time series variables used to estimate the regression parameters requires their transformation to

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"white noise" random variables. The "systems" approach for determining if the time series is a "white noise" process is suitable and can be easily applied where the variables have a limited number of observations.

Determing individual models, particularly where small samples are involved, multi-step specification procedures have been utilized. Examples are cited from the literature where this method has been successfully employed.

The SUR estimation procedure has been used in marketing studies where the disturbance terms are correlated across equations. This problem can be expected in oligopolistic markets. The small sample properties of SUR estimators have been found asymptotically efficient and generally stable, making this procedure suitable for the models developed in this dissertations.

CHAPTER V

EVALUATION OF RESULTS AND TESTS OF PROPOSITIONS

Chapter Outline

The purpose of this chapter is to present and evaluate the results of the estimation procedures discussed in the prior chapter and to test the propositions proposed in Chapter III. The content of this chapter includes:

1) An evaluation of the time series variables to check for the presence of serial correlation.

2) An explanation of the method used to develop the firm-specific profit models.

3) Evaluation of equations for test of significance and check for "goodness of fit" using a F-test and R^2 and R-bar^2 statistics respectively.

4) Examination of equations for violation of the basic assumptions of regression methodology.

5) Examination of the equation results concentrating on the type of variables included in the specifications and the significance of the coefficients.

6) An evaluation the tests of research propositions, with particular interest to competitive advantage and its effect on firm profitability measures.

Selection Of The Dependent Variable Operating Profits

A comment regarding the selection of operating profit level as the dependent variable is in order. Selection of this variable was made for four reasons:

1) The use of profit as the objective criteria is a basic and accepted proposition in economics and business.

2) Operating profits are reported (or can be calculated) at the line of business level in company annual reports to stockholders and SEC 10-K reports. Generally, this is the only profit level reported specifically for the footwear segment of a multidivisional firm which allows for comparisons to be made between competitors.

3) Operating profits are calculated before interest paid and income taxes. This minimizes differences in firm accounting treatments which may affect interpretation of results if lower profits levels were used.

4) Each firm managed to report positive operating profits for the entire twenty-eight year period covering this study. Thus use of logarithms made it convenient for estimation and interpretation of model coefficients.

Previous research studies have used ratio variables such as market share, return on sales or return on assets as the dependent variable. The reason for not using these choices is that they are expressed as ratio variables. When using a ratio variable, such as "relative" market share, the results may be affected because the values are constrained to vary between one to zero and would be expected to sum to one to be logically consistent. Due to this constraint, it is possible that heteroskedasticity may result, causing a loss of efficiency as larger firms would be expected to have larger error terms. Using profit level as the dependent variable minimizes the chance of incurring this problem.

Examination Of Time Series Variables

Results Using The Systems Approach

Testing for the presence of autocorrelation for each time series variable in the system is a necessary first step before estimating the full system of equations. In order to examine for serial correlation the Pandit and Wu (1983) "systems" approach was used to determine the appropriate order of the ARMA model representation. Essentially, the question being asked is: does the AR(0) model represent an approximate "white noise" process? If the "zero" order model can be shown to be appropriate, then the observations are uncorrelated and the variables can be considered as random time series or "white noise".

Following the systems approach for estimating the AR(0) and AR(1) models (equivalent to ARMA (0,0) and ARMA (1,0) models), comparisons of the two models were made to test for significant reduction in the sum of squared residuals. As an additional test for the presence of serial correlation in the AR(0) model, the Durbin-Watson statistic is provided for each equation.

The tests for significant reduction in sum of squared residuals between the AR (0) and the AR (1) models for each of the transformed variables employed in this study are provided in **Table 10 - Comparison Between AR(0) And AR(1) Models: Test For Significant Difference In Sum Of Squared Residuals**. The examination of this table

illustrates that for each variable in this study, no significant reduction in sum of squared residuals was found at the 0.05 significance level using an F-test criterion. Therefore, the null hypothesis of random "white noise" time series is not rejected for any of the variables.

The TSP package contains an autoregressive estimation option for estimating AR(1) models using the Cochrane-Orcutt procedure. The method adds the parameter "rho" to the AR(0) model making it AR(1). Where "rho" is not significant, the implication is that the observations in the series are not serially correlated.

Table 11 - Comparison Between AR (0) And AR (1) Models: Test For Serial Correlation Using Durbin-Watson Statistic In AR (0) Model and Significance Of "Rho" In AR (1) Model gives the Durbin-Watson statistic for testing the presence of serial correlation. The table indicates that each variable either equals or surpasses the upper bound critical value at the 0.01 significance level. It also provides estimates for the parameter "rho" in the AR(1) model, finding none of the "rho" parameters significant at the 0.05 level. (Only minor concern is found with two variables at 0.10 level and two at the 0.15 level).

Table 10

Comparison Between AR(0) And AR(1) Models: Test For Significant Difference In Sum Of Squared Residuals

Variable	F-Statistic For SSE Difference Ar(0) vs AR(1)	Test Of "Null" Hypothesis At 0.05 Level Of Significance
Market Demand	.097	not reject
Leather Cost	.332	not reject
Advertising-Brown	1.079	not reject
Product-Brown	.363	not reject
Price-Interco	.376	not reject
Product-Interco	1.110	not reject
Debt Level-Interco	1.583	not reject
Operational Cost-Melville	2.663	not reject
Stores-Melville	2.507	not reject
Price-Melville	1.627	not reject
Lag Advertising-Melville	3.554	not reject
Product-Stride Rite	.443	not reject
Operational Cost-US Shoe	1.130	not reject
Lag Advertising-US Shoe	2.978	not reject
Product-Weyenberg	.907	not reject
Advertising-Wolverine	.671	not reject
Price-Wolverine	.035	not reject

F-statistic for 1 and 25 degrees of freedom is 4.26 at 0.05 level of significance.

Table 11

Comparison Between AR(0) And AR(1) Models: Test For Serial Correlation Using Durbin-Watson Statistic In AR(0) Model And Significance Of "Rho" In AR(1) Model

Variable	Durbin-Watson Statistic AR(0) Model	Coefficient For "rho" AR(1) Model	t-statistic For "rho"
Market Demand	2.03	-.065	-.317
Leather Cost	2.21	-.114	-.581
Advertising-Brown	1.53	.210	1.060
Product-Brown	1.69	.124	.615
PPrice-Interco	1.53	.148	.668
Product-Interco	2.40	-.120	-1.058
Debt Level-Interco	1.43	.257	1.304
Operational Cost-Melville	1.35	.312	1.662[15]
Stores-Melville	1.38	.299	1.603[15]
Price-Melville	2.38	-.259	-1.298
Lag Advertising-Melville	1.28	.349	1.912[10]
Product-Stride Rite	2.26	-.135	-.704
Operational Cost-US Shoe	1.46	.233	1.129
Lag Advertising-US Shoe	2.26	.337	1.797[10]
Product-Weyenberg	2.37	-.181	-.957
Advertising-Wolverine	2.18	-.175	-.844
Price-Wolverine	1.88	.037	.185

Durbin-Watson statistic critical value for 25 degrees of freedom is 1.30 at 0.01 significance level. "t-statistic" for 24 degrees of freedom in AR(1) model is 1.711 at 0.10 level and approximately 1.514 at 0.15 level.

SUMMARY -- Testing for the presence of serial correlation among time series was investigated using the "systems" method. The interpretations and conclusions given below are based on the results of this analysis.

1) AR(1) models do not produce significant reductions in sum of squared residuals compared to the AR(0) models.

2) The Durbin-Watson statistic for autocorrelation in the AR(0) models show no significant serial correlations.

3) Estimates for the parameter "rho" included in the AR(1) models show only minimal likelihood of autocorrelation.

4) The AR(0) models are adequate representations of random time series variables.

It is safe to conclude that the observations comprising these variables approximate "white noise" processes. This set of variables can be considered random time series with only minor serial correlation problems contained among their observations.

Examination Of Individual Firm Profit Models

Model Building Procedure

A discussion of the "general" firm profit model and the procedure which eliminated inconsequential variables was provided in the previous chapter. The outline which follows describes the steps taken to determine the smaller set of variables from which the firm's competitive strategy is defined. As a basic tenet proposed for this dissertation, it should <u>not be assumed 'a priori'</u> that each competitor

possesses the same competitive strategy. It is necessary, therefore, to specify each profit equation uniquely for that firm. Therefore, no two equations are expected to reflect identical competitive strategies.

The models were first estimated by applying OLSQ to the variables which passed the 9R ("all possible regressions") and 2R ("step-up regression") programs. Thus, a logical method was developed for indicating which variables would probably be significant when estimating the full system of seven firm-specific equations.

Next, the system of seven firm-specific profit equations were simultaneously estimated using the SUR procedure. As a result some variables were dropped from the original set estimated with OLSQ. The decision to eliminate a variable was made if its "t-score" failed to reach the marginal 0.15 level of significance.

When a variable was dropped it was replaced by another candidate as determined during the "all possible regression" step. In some instances the reformulated model introduced a significant new variable. More often, the original set of variables initially suggested were retained when SUR was applied.

Selection And Acceptance Of Final Model Configurations

Selecting the final set of models comprising the full model system of equations was based on a number of criteria. The results for market and firm level coefficients are shown

in **Table 12 - SUR Equation Evaluation: Coefficient Values At Market And Firm Levels**. The market level coefficients reflect a composite for the seven competitors included in this study for a total of 196 observations.

The coefficient values labeled competitive advantage level reflects one positive standard deviation from the market average value. A value of .0001 was substituted when the calculated value at one positive standard deviation from the market average was found to be a negative number as was the case with the two variables. These values were used later to identify a competitive advantage variable.

The firm level coefficient estimates were based on fewer observations (28 data points each). Variables were retained if their coefficient "t-scores" surpassed the 0.15 level of significance. While this level is recognized as lower than what is usually accepted in research, a number of small sample studies have been observed in the marketing literature which have accepted this significance level. (Further discussion evaluating the findings in Table 12 follows the completion of the analysis of the basic assumptions of regression).

Table 13 - SUR Equation Statistics presents the results from evaluating the equations "goodness of fit" and test of significance. In this table each firm equation had at least a moderate R^2 and R-bar^2 values (although only one equation exceeded an R^2 value above 0.50). For all equations the "F-statistic" surpassed the critical value of 3.01 at the

Table 12

SUR Equation Evaluation: Coefficient Values At Market And Firm Levels

	Adver-tising	Retail Stores	Product Line	Prices	Lagged Advertising	Operating Cost	Debt Level	Market Demand	Leather Cost	Competitor Effect Variable
MARKET	-.1192	-.0162	.4125	-.6471	-.4451	1.2085	-.0666	-.2793	-.3006	
(t)	(-.64)	(-.23)	(1.87)	(-1.61)	(-1.37)	(3.09)	(-.80)	(-.51)	(-1.20)	
COMPETITIVE ADVANTAGE LEVEL	.0662	.0549	.6333	.0001	.0001	1.5999	.0164			
BROWN	.8254*							1.1240		-.7005 L-ADV 5
(t)	(3.80)[1]							(2.59)[1]		(-2.76)[1]
INTERCO				-1.4283			.2921*			-.4310 ADV 7
(t)				(-3.29)[1]			(2.87)[1]			(-3.25)[1]
MELVILLE		-1.6096				1.9928*				.7815 PRIC 7
(t)		(-2.78)[1]				(4.03)[1]			(2.66)[1]	
STRIDE RITE			.6809*						-1.4518	-2.2795 PROD 1
(t)			(3.22)[1]						(-3.04)[1]	(-1.55)[3]
US SHOE					-.4154	1.1676				-.8187 L-ADV 3
(t)					(-1.62)[3]	(4.24)[1]				(-1.55)[3]
WEYENBERG			1.3312*						-1.1032	-1.7076 PROD 2
(t)			(1.70)[3]						(-2.47)[1]	(-2.16)[1]
WOLVERINE				-3.1238						7.0897 PRIC 3
(t)				(-1.60)[3]						(2.83)[1]
										-6.6941 PROD 1
										(-1.68)[3]

Significance Level: [1] = 0.05, [2] = 0.10, [3] = 0.15; n = 28; degrees of freedom = 24.
* indicates competitive advantage variable.

0.05 level of significance with three equations surpassing the 0.01 level. [Heteroskedasticity, serial correlation and multicollinearity are discussed in the next section].

As a further check of significance of the regression equations in this research, a test of significance of the equation correlation coefficient **R** is made. This statistic is noted from Hopkins and Glass (1978, p. 284) as being appropiate for small samples. The t-statistic is defined as:

$$t = \frac{r}{\sqrt{\frac{(1-r^2)}{n-2}}} \qquad \text{[Eq. 10]}$$

Table 13

SUR Equation Statistics

Eqn	Firm	R	R^2	R-bar^2	R t-statistic	F-statistic
1	Brown	.66	.44	.37	4.50^{01}	6.39^{01}
2	Interco	.74	.56	.51	5.69^{01}	10.32^{01}
3	Melville	.69	.48	.41	4.88^{01}	7.27^{01}
4	Stride Rite	.54	.30	.21	3.29^{01}	3.36^{05}
5	U.S. Shoe	.56	.32	.23	3.46^{01}	3.76^{025}
6	Weyenberg	.57	.33	.25	3.55^{01}	4.01^{025}
7	Wolverine	.54	.30	.21	3.29^{01}	3.39^{05}

Critical value for t-statistic with degrees of freedom 26 is: 0.01 = 2.78 and 0.05 = 2.06

Critical values for F-statistic with degrees of freedom 3 are 24 are: 0.050 level = 3.01; 0.025 = 3.72; 0.010 = 4.72.

Comments regarding acceptance of the set of variables and equations should be mentioned. To accept the set of seven equation containing all their variables requires <u>each variable and each equation</u> be reasonably significant and not

violate any of the basic regression assumptions. This means that all criteria be satisfied simultaneously. Otherwise, any variable or equation found insignificant or not meeting the tests for violation of basic assumptions would require re-estimation for all seven equations. Any new variable that was added to the full model set would be retained if (1) it was statistically significant, and (2) the new variable did not lead to any equation violating the basic regression assumptions after being added to the system.

Two studies which accepted low significance levels were found in Lambin (1970) and Gatignon (1984). In Lambin, five variables were accepted having t-statistics starting at 1.20 and ranging to the 1.80 level in equations containing sample sizes between twenty-one and to twenty-eight observations. With Gatignon, variables with t-statistics at the 1.20 level were retained in his study of airline competition. This study had a sample size of twenty-four data points. Both studies are considered small sample sizes.

Examination for Violation Of Basic Regression Assumptions

Each equation was checked for consistency with the basic assumptions of regression. This included tests for problems arising from heteroskedasticity and serial correlation by applying Park-Glejser tests and Durbin-Watson statistics respectively. Another test checking for multicollinearity between variables applied the "variance inflation factor" (VIF) test statistic.

The question of multicollinearity between equations, however, did not produce a formal test when a search of the model building literature was conducted. Houston and Weiss (1974, p.153) note that JT/GLS (same as SUR) "recognizes and exploits any contemporaneous correlation existing across regression equations which was the reason this procedure was chosen". Following this reasoning, multicollinearity across equations does not appear as a problem when the equations are estimated using SUR.

HETEROSKEDASTICITY -- Serving as a first check, a plot of the residuals for each variable was obtained. After examining these plots, no particular pattern for any of the variables was detected implying an absence of this problem.

A formal test involved calculation of a Park-Glejser statistic for each variable. This procedure regresses each independent variable against the residual values of the equation containing this variable (Pindyk and Rubinfeld, 1981, p. 150). The test for significance uses a t-statistic for the slope of the coefficient of the independent variable against the equation's residuals.

Results for each variable are provided in **Table 14 - SUR Equation Evaluation: Test For Heteroskedasticity**. The statistical evidence shows only three suspect cases that may be of minor concern. Two variables were at the 0.10 level of significance while one other was at the 0.15 level. It would appear, therefore, that heteroskedasticity would be only a negligible problem among these variables.

Table 14

SUR Equation Evaluation: Test For Heteroscedasticity

Eqn	Firm	Park-Glejser Test "t-statistic" Var 1	Var 2	Var 3	Level Of Significance Var 1	Var 2	Var 3
1	Brown	.07	1.22	.51	ns	ns	ns
2	Interco	-1.35	.47	.05	ns	ns	ns
3	Melville	-1.30	.62	1.20	ns	ns	ns
4	Stride Rite	1.94	.09	1.83	0.10	ns	0.10
5	U.S. Shoe	.18	1.38	-.48	ns	ns	ns
6	Weyenberg	-.18	.43	.77	ns	ns	ns
7	Wolverine	-1.55	.68	1.17	0.15	ns	ns

SERIAL CORRELATION -- Each equation was examined for serial correlation by examining the plot of its residuals. In reporting the Durbin-Watson statistic for each equation it was found that five of the seven equations exceeded the upper limit test statistic value of 1.41 (positive serial correlation; negative serial correlation is 2.59) for p=3 parameters and n=28 observations (Neter, Wasserman, and Kutner, 1985, p. 1087). **Table 15 - SUR Equation Evaluation: Test For Serial Correlation** provides the results for these statistics and interpretation of their significance.

In two equations the test statistics fell between 1.41 and .97 (2.59 and 3.03 for "negative" serial correlation) indicating the inconclusive range for this test. To resolve this question a Cochrane-Orcutt procedure was employed which adds the parameter "rho" to the original equation (Pindyk and

Table 15

SUR Equation Evaluation: Test For Serial Correlation

Eqn	Firm	Durbin-Watson Statistic	Interpretation Of Results At Level Of Significance = 0.01
1	Brown	2.48	exceeds negative upper limit
2	Interco	2.46	exceeds negative upper limit
3	Melville	1.91	exceeds negative upper limit
4	Stride Rite	2.67	falls in indetermidate range
5	U.S. Shoe	2.80	falls in indeterminate range
6	Weyenberg	2.19	exceeds negative upper limit
7	Wolverine	2.34	exceeds negative upper limit

Critical values for p=3 and n=28 observations at 0.01 level of significance are:
positive lower = .97, positive upper = 1.41
negative lower = 3.03, negative upper = 2.59

Source: Neter, Wasserman and Kutner (1985), p. 1087.

Rubinfeld, 1981, p. 157). The values for "rho" (and their respective t-statistics) were calculated for the two equations in question. These were found to be -0.0007 (-0.0034) for Equation 4 (Stride Rite) and 0.0996 (0.5200) for Equation 5 (U.S. Shoe). These results indicate that it is unlikely serial correlation is a problem in this set of equations.

MULTICOLLINEARITY -- In this system of equations problems of multicollinearity between variables is a major concern. This correlation among the variables creates problems which affect the estimated error variances (Pindyk and Rubinfeld, 1981, p. 89). Difficulties arise when confidence intervals are established for performing tests of

significance on the coefficients in the equations as the variances are larger than the "true" variances.

One method used to informally check for this problem is to examine the matrix of partial correlation coefficients. Kennedy (1979, p. 131) has suggested that correlations with absolute values of 0.8 or 0.9 implies multicollinearity is likely to exist. The highest correlations found were two at 0.33 and 0.36; all remaining correlations were below the 0.30 level. By using this method of checking, it would appear that multicollinearity is not a problem between variables.

A more formal method of examination involves using the "variance inflation factor" (VIF) statistic found in Neter, Wasserman and Kutner (1985, p. 391-93). They suggest a VIF value in excess of 10 to indicate that multicollinearity may be unduly influencing the least squares estimates. This statistic also indicates the severity of the problem in terms of how far the "true" value is the estimated value. The VIF statistic is defined by Neter, Wasserman and Kutner, (1985, p. 362) as:

$$E\left[\sum_{k=1}^{p-1}(b'_k-\beta'_k)^2\right] = (\sigma')^2 \sum_{k=1}^{p-1} (VIF)_k \qquad \text{[Eq. 11]}$$

The VIF statistics are provided in **Table 16 - <u>SUR Equation Evaluation: VIF Test for Multicollinearity</u>**. In this table only the highest VIF statistic was reported for each equation. None of the statistics exceeds a 2.0 value, placing each well below the critical value of 10. Using the

VIF criteria it does not appear that multicollinearity is a problem in these equations.

Table 16

SUR Equation Evaluation: VIF Test For Multicollinearity

Eqn	Firm	Highest VIF Statistic	Interpretation Of Statistical Results
1	Brown	1.65	no problems evident
2	Interco	1.46	no problems evident
3	Melville	1.62	no problems evident
4	Stride Rite	1.28	no problems evident
5	U.S. Shoe	1.27	no problems evident
6	Weyenberg	1.26	no problems evident
7	Wolverine	1.21	no problems evident

A critical VIF value of 10 has been suggested by Neter, Wasserman and Kutner (1985, p. 392) for indicating the existance of undue influence of variables attributed to multicollinearity problems within the equations.

Examination Of Model Results

Three variables were included in each of the seven firm profit models specified in this study. Adding a fourth variable lead to estimation difficulties attributed to the possible presence of multicollinearity.

An analysis of the results indicate that sixteen of the twenty-one estimated coefficients were found significant at the 0.01 or 0.05 level. The five other coefficients were marginally significant at the 0.15 level. While this level is lower than normal convention, small sample studies have

been found in the literature which accepted coefficients at this level of significance.

Several observations regarding these models are provided in **Table 17 - Observations Regarding Firm Profit Equations**, which are deserving of highlighting. These include comments examining some of the basic tenets of this research, such as the breadth of firm policy variables, market effects, and competitor variables, both "single" and "mixed" competitive effects.

These coefficients values provide the input content for evaluating the propositions of interest in this research. The relationships between firm strategy elements and profit performance, emphasizing the role of competitive effects, is an integral part of this explanation. In this study, two measures of firm profit performance are used. One measure is weighted return on sales (ROS) with the second weighted return on total assets (ROA)

To analyze these propositions several terms specific to this study are utilized. These are defined as:

CA = Competitive Advantage. Coefficients for policy variables exceeding market average ≥ +1.0 standard deviations.

CS = Competitive Strategy. Sum of coefficients for those variables over which managers have direct control when formulating their strategies (includes marketing mix, lagged mix and operating policies).

TE = Total Equation. Includes all firm policy coefficients plus market and competitor effects.

MS = Market Share. Average yearly sales for the firm divided by the average yearly sales for all firms (weighted by year).

Table 17

Observations Regarding Firm Profit Equations

1) Of the ten firm policy variables, six were from the four marketing mix variables while three were from the two operating policy categories. This split indicates equal proportioning between demand-side and supply-side categories.

2) Lagged advertising was included for only one variable. This coefficient had a negative sign opposite to what was theoretically expected.

3) Direct competitor effects accounted for eight of the twenty-one total variables. These included some of the largest coefficients in the study.

4) The size of the coefficients for operating costs are in excess of +1.0000 as should be found. Otherwise, less than +1.0000 would indicate operating inefficiencies for the firm.

5) The two market variables differed in their impact and direction for the firms involved.

6) Excluding the competitor effects, the other thirteen variables were about evenly spread across the nine categories.

7) Five of the ten policy variables were identified as firm competitive advantages (marked with *). These varied by competitor and among policy categories.

Table 17 (cont'd.)

8) Competitive effects are dominated by the large firms such as Melville and Brown. The smallest two firms had no competitor effects included (Weyenberg and Stride Rite).

9) "Simple" direct competitor effects were found in EQN 1, 4, 6, and 7. In three of these equations, the impact created was severe judging from the size of their coefficients. These were:*

Brown ADV1 > US Shoe L-AD5
Stride Rite PROD4 < Brown PROD1
Weyenberg PROD6 < Interco PROD2
Wolverine PRIC7 < Melville PRIC3

10) "Mixed" direct competitor effects were observed EQN 2, 3, and 7. These included:*

Interco DEBT2 < Wolverine ADV8
Melville OPC3 > Wolverine PRIC7
Wolverine PRIC7 < Brown PROD1

11) Major competitors appear to be much "stronger" than their smaller rivals. Examination of a list comparing firms by their competitive effects include:*

Melville > Wolverine - Price
Interco > Weyenberg - Product
Brown > Stride Rite - Product
Melville > US Shoe - Advertising
Brown > US Shoe - Advertising

* Reference to the nomenclature in Table 10 will explain these abbreviations.

These three different measures of firm strategy were regressed against ROS and ROA to determine how well each measure explained strategy effectiveness (Propositions 7 and 8). The calculated values for these three measures by firm are given in **Table 18 - Calculated Values From Regression Coefficients For Competitive Advantage, Competitive Strategy And Total Equation**.

Table 18

Calculated Values From Regression Coefficients For Competitive Advantage, Competitive Strategy And Total Equation

Firm	Competitive Advantage[1]	Competitive Strategy[2]	Total Equation[2]
Brown	.8254	.8254	1.2489
Interco	.2921	-1.1362	-1.5672
Melville	1.9928	.3832	1.1647
Stride Rite	.6809	.6809	-3.0504
U.S. Shoe	.0001	.7522	-.0665
Weyenberg	1.3312	1.3312	-1.4796
Wolverine	.0001	-3.2138	-2.7282

1 Where no competitive advantage was found, a small value of .0001 was substituted to replace the zero values.

2 Where negative values were found, a constant was added to all observations making the values positive numbers.

Both these steps allow for transforming the variables to logarithms for the purpose of estimating the small sample regression models used for testing the propositions.

SUMMARY -- The seven firm profit equations in this study demonstrate "goodness of fit" and test of significance

statistics which can be considered quite acceptable. Sixteen of the twenty-one coefficients in the system were significant at the 0.05 level with the remaining five accepted at the 0.15 level of significance.

Examining the equations and variables for violation of the basic assumptions of regression found no major problems. Minor concern was registered in a few cases. Overall, the equations and variables appear to adequately satisfy the basic assumptions of regression.

The results presented above are interpreted as generally supporting the main tenents of this dissertation. The range of explanatory variables covers a wider spectrum than just marketing mix variables. This observation lends support to the conclusion that competitive advantages may be obtained from a number of different sources.

Evaluation Of Propositions

Statistical Procedures

Due to the limited number of firms which comprise the sample size in this dissertation, the type of statistical procedures employed for evaluating these propositions tend to favor use of non-parametric methods in certain instances. These procedures are well known in statistics and will not be explained in detail here (see Bhattacharyya and Johnson, 1977, Chapters 11 and 15, for a fuller explanation).

In examining Propositions 6 through 9, the special term variables CS and TE were adjusted. This was accomplished by adding a small constant to each of their values. The reason for this adjustment was to make each value a positive number for transforming the data into logarithmic values. The main advantage of this step is in lineralizing these small sample models which expresses the coefficients as elasticities.

Evaluation Of Propositions

For each proposition a brief synopsis is provided which conveys the main idea being examined. Each proposition is followed by a discussion of its statistical test results. Lastly, conclusions reached from testing the proposition are stated.

Proposition 1: Competitive Strategies Among Firms

Are firm competitive strategies similar or different?

Differences between firm competitive strategies are examined in this first proposition. In this study, each firm has its own uniquely specified equation which reflects its particular competitive strategy.

It is assumed that firms are not equally endowed with the same set of resources and skills nor do they foresee market opportunities and problems from the same perspective. Each firm competitive strategy reflects policy variables which differ between competitors.

P_1o: Competitive strategies are the same across the firms in the market.

P_1a: Competitive strategies are not the same across firms in the market.

TEST: If a pair of firms have at least one variables in common between both profit equations they are considered to have the same strategies. The conditional probability of having a similar variable is p=.333; of not have one variable in common is (1-p)=.667. In paired comparisons of n=7 firms, 21 pairs of competitive strategies were analyzed. A total of x=18 "successes" were observed, that is, of not having a variable in common between the pair of equations.

The cumulative binomial probability distribution is:

$$P\ [X] = \binom{21}{18} (.667)^{18} \quad (.333)^{3} \quad = .987 \qquad [Eq.\ 12]$$

Conclusion: Reject P_1o at the 0.013 level of significance. The probability of observing at least one variable in common between firms in a significant number of pairs of equations is low. Therefore, this set of firms are concluded to have different competitive strategies.

Proposition 2: Defining Competitive Advantage

Which, if any, of the variables satisfy the definition of competitive advantage?

Proposition 2 is a test of the definition of competitive advantage. Firm competitive advantages are identified by comparing coefficient estimates at the firm level with the coefficient estimates at the market level and then testing for a significant difference.

P_2o: No policy variable in the set of policy variables contained in these models satisfies the definition established for competitive advantage.

P_2a: There exists at least one policy variable among all the policy variables which satisfies the definition of competitive advantage.

TEST: A "D-statistic" is calculated to identify a competitive advantage. The comparison is conducted between the value of the firm's coefficient with the value of the market average coefficient for that same variable. If the firm coefficient exceeds +1.0 standard deviation from the market average, its D-statistic is concluded to indicate the presence of a firm competitive advantage. The "D-statistic" is calculated as:

$$D = \frac{(b_1 - b_0)}{s_0} \geq +1.0 \text{ Z-score} \qquad \text{[Eq. 13]}$$

where b_1 is the firm coefficient value, b_0 is the market average coefficient value, s_0 the standard error, "D" is the

critical statistic and Z-score is the standard normal distribution value at +1.0 standard deviations equal to .8413. This value indicated approximately 16% of all observations are to the right of this point. It is assumed that using a Z-score criterion equal to one positive standard deviation establishes a sufficiently restrictive test for determining if a competitive advantage is present.

From Table 12, five coefficients possessed D-statistics that exceeded the Z-score criterion. These were:

Brown (advertising)	= .8254	D = 5.1
Interco (debt level)	= .2921	D = 4.3
Melville (operating cost)	= 1.9928	D = 2.0
Stride Rite (product)	= .6809	D = 1.2
Weyenberg (product)	= 1.3312	D = 4.2

The probability a variable will be a competitive advantage is p=.16 (falls right of the mean by at least +1.0 Z-scores). Observing that five of the ten firm policy variables satisfy this criteria, the cumulative binomial probability distribution is:

$$P\ [X] = \left(\frac{10}{5} \right) (.16)^5\ (.84)^5 = .989 \qquad \text{[Eq. 14]}$$

Conclusion: Reject P_2o, that no variable satisfies this criteria. Note: A problem may occur if this criteria is considered too lenient to serve as a decision criterion. The results show, however, that it is highly unlikely, at the $p \leq 0.011$ level of significance, that these variables easily satisfy this criteria.

Proposition 3: Competitive Advantages Among Policy Variables

Do the sources of competitive advantage vary across the set of policy variables?

The sources of competitive advantage will vary among all the policy variables included in this research. There are seven firm policy variables including marketing mix, lagged marketing mix and operating factors.

P_3o: Competitive advantage policy variables are limited to an insignificant number of policy categories.

P_3a: Competitive advantage policy variables account for a significant number of all policy variables in this study.

TEST: Of the n=7 policy variables included, x=4 were found to contain competitive advantages. The probability of finding a particular variable as a competitive advantage is p=.16. The cumulative binomial probability distribution is:

$$P\ [X] = \left(\frac{7}{4} \right) (.16)^4\ (.84)^3 = .998 \qquad \text{[Eq. 15]}$$

Conclusion: Reject P_3o at the 0.002 level of significance. The number of categories containing competitive advantages among all policy categories indicates wide variation. The probability of this dispersion occurring by chance is very low.

Propositions 4: Sources of Competitive Advantage Vary Among Firms

Do the sources of competitive advantage vary across firms in the market?

The dispersion of competitive advantages vary across the different firms in this study.

P_4o: Competitive advantages are not dispersed across firms.

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P_4a: Competitive advantages are dispersed across firms.

TEST: Among the n=7 firms included in this study, x=5 were found to have variables satisfying the definition of a competitive advantage. The probability of a competitive advantage is p=.16. The cumulative binomial probability distribution is:

$$P\ [X] = \left(\frac{7}{5} \right) (.16)^5\ (.84)^2 = .999 \qquad \text{[Eq. 16]}$$

Conclusions: Reject P_4o at the 0.001 level of significance. The number of firms found to have a competitive advantage among all firms in this market indicates a low probability of observing this dispersion by chance.

Proposition 5: Strength of Competitive Advantage Vary Among Firms

Will the strength of competitive advantages vary across the different firms found in this market (where strength is measured by the size of the coefficient)?

Competitive advantages are expected to vary in strength for each firm possessing an identified advantage.

P_5o: Competitive advantages are of "equal strength" across firms.

P_5a: Competitive advantages will vary in "strength" across firms.

TEST: The five firms with competitive advantages have coefficients which range from a high of 1.9928 to a low of .2921. Ten paired comparison tests were conducted for significant difference between coefficients using a 95% confidence interval. For n=10 tests, x=5 occurrences were observed where the coefficients were within the 95% confidence interval. The cumulative binomial probability distribution is:

$$P\ [X] = \left(\frac{10}{5} \right) (.95)^5\ (.05)^5 = .000064 \qquad \text{[Eq. 17]}$$

Conclusion: Reject P_5o at the 0.001 level of significance. The number of observed occurrences indicates that the size of the coefficients for the competitive

advantage variables do vary in strength across firms in this market.

Proposition 6: Relationship Between Competitive Advantage and Competitive Strategy

Is the effectiveness (strength) of a firm's competitive strategy based on possessing strong competitive advantage?

Based on the theory of competitive strategy discussed in Chapter III, the most effective competitive strategies are those based on strong competitive advantages.

P_6o: No significant relationship exists between strength of competitive advantage and strength of competitive strategy.

P_6a: The relationship between strength of competitive advantage and strength of competitive strategy is positive.

P_6b: The relationship between strength of competitive advantage and strength of competitive strategy is negative.

TEST: The relationship between firm competitive strategy and firm competitive advantage can be measured by regressing the sum of the coefficients for the competitive strategy or the total equation against the value of the coefficients which represent competitive advantages. these results are shown below:

$$CS = 1.3119 + .5659\ (CA) \qquad R = .64 \qquad [Eq.\ 18]$$
$$(t=) \qquad (1.84)^{15} \qquad R^2 = .40$$

$$TE = -1.0386 - .0939\ (CA) \qquad R = -.11 \qquad [Eq.\ 19]$$
$$(t=) \qquad (ns) \qquad R^2 = .01$$

Conclusion: The results of the regression of CA with CS are marginally significant. The CA coefficient is small having a t-statistic = 1.84, significant at the 0.15 level for 5 degrees of freedom. The equation correlation coefficient of R = .64 has a t-statistic of 1.84, significant at the 0.15 level.

Competitive advantage is not significant with total equation results which include market and competitor effects.

The relationship between CA and CS is shown to be positive (although marginally significant). **Therefore, a negative relationship P_6b is rejected because of mutual exclusion.**

Proposition 7: Relationship Between Firm ROS Profitability And Measures Of Competitive Strategy

How is ROS affected by competitive strategy?

The equation estimating profit level can be categorized into three different effects: competitive advantage (CA), competitive strategy (CS) and total equation effects (TE). Each measure is evaluated for its impact on return on sales (ROS).

P_7o: The level of ROS profitability is not positively related with firm competitive advantage (CA) or competitive strategy (CS) or total equation (TE).

P_7a: Level of ROS profitability is positively related with CA.

P_7b: Level of ROS profitability is positively related with CS.

P_7c: Level of ROS profitability is positively related with TE.

TEST: The results of these regressions are shown below:

Prop.	Ind	R	R^2	F=	b_o	t=	b_1	t=	
P_7a	CA	.62	.39	3.21	2.1962	43.53	.0241	1.84^{15}	[Eq. 20]
P_7b	CS	.79	.63	8.43^{05}	2.1382	56.65	.0344	7.86^{01}	[Eq. 21]
P_7c	TE	.30	.09	.48	2.1193	36.40	-.0134	-1.57	[Eq. 22]

Conclusion: Firm ROS profitability is significant with firm competitive strategy (CS). Competitive advantage is only moderately significant with ROS. The equation t-statistics for the correlation coefficient are 2.88 and 1.77, significant at the 0.05 and 0.15 levels, respectively. These two equations have moderately respectable R^2 values. The F-statistic for the CS equation is significant at the 0.05 level.

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When adding market and competitor effects (TE), ROS is not very well explained.

Proposition 8: Relationship Between Firm ROA Profitability and Measures of Competitive Strategy

How is ROA affected by competitive strategy?

The equation estimating profit level can be categorized into three different effects: competitive advantage (CA), competitive strategy (CS) and total equation effects (TE). Each measure is evaluated for its impact on return on sales (ROA).

P_8o: The level of ROA profitability is not positively related with firm competitive advantage (CA) or competitive strategy (CS) or total equation (TE).

P_8a: Level of ROA profitability is positively related with CA.

P_8b: Level of ROA profitability is positively related with CS.

P_8c: Level of ROA profitability is positively related with TE.

TEST: The results of these regressions are shown below:

Prop.	Ind	R	R^2	F=	b_o	t=	b_1	t=	
P_8a	CA	.68	.47	4.40^{10}	2.9696	25.91	.0491	2.62^{05}	[Eq. 23]
P_8b	CS	.61	.38	3.03	2.8468	31.42	.0495	4.97^{01}	[Eq. 24]
P_8c	TE	.22	.05	.25	2.8488	24.32	.0181	.94	[Eq. 25]

Conclusion: Firm ROA profitability is significant with firm competitive advantage (CA). Competitive strategy (CS) is also significant with firm ROA. The equation t-statistics for these correlation coefficients are 2.09 and 1.72, in the marginally significant range at 0.10 and 0.15 levels. Both equations provide moderately respectable R^2 values. Their F-statistics are, in general, not very significant.

When adding market and competitor effects (TE), ROA is not well explained.

Proposition 9: Relationship Between Market Share And Firm Profitability, Firm Competitive Strategy, And Firm Competitive Advantage

Is market share an important factor explaining firm ROS and ROA profitability? Is market share related to firm competitive advantage and/or competitive strategy?

The marketing literature has proposed that market share is an important factor affecting profitability. If share is important, then it should have a positive effect on ROS and ROA. Likewise, market share should be positively related to strength of competitive strategy and competitive advantage.

P_9o: There is no relationship between market share and: ROS, or ROA, or strength of competitive strategy, or strength of competitive advantage.

P_9a: Firm market share and strength of firm competitive strategy are positively related.

P_9b: Firm market share and strength of firm competitive advantage are positively related.

P_9c: Firm market share and ROS are positively related.

P_9d: Firm market share and ROA are positively related.

TEST: Relative market share (MS) was regressed against CS and CA to evaluate the relationship between market share and competitive strategy. If related, it is logical to expect that profitability is also related to market share. These four propositions are shown below:

Prop.	Dep	Ind	R	R^2	b_1	t=	
P_9a	MS	CS	.23	.05	.0540	1.39	[Eq. 26]
P_9b	MS	CA	.04	.01	.0086	.13	[Eq. 27]
P_9c	ROS	MS	.33	.11	.0615	1.16	[Eq. 28]
P_9d	ROA	MS	.52	.27	.1772	1.55	[Eq. 29]

Conclusion: None of these regression models indicate a significant relationship existing between ROS or ROA profitability, competitive strategy or competitive

advantage and firm market share. Market share, therefore, was not found to be significant in this research.

SUMMARY -- The analysis presented above indicates that the propositions are, in general, supported. Propositions 6, 7 and 8, while not strong, tend to favor accepting the basic tenents supporting these propositions. The results found in this study do not lead to supporting Proposition 9 relating market share with profitability. Overall, it is more likely that competitive strategy, based on competitive advantage, explains the profitability results.

CHAPTER VI

CONCLUSIONS AND AREA FOR FURTHER RESEARCH

Chapter Outline

This chapter is organized into four sections. These are described as:

1) A Theoretical Contributions section which examines how the objectives of the dissertation were achieved and how they add to knowledge in the marketing field

2) A Managerial Contributions section which illustrates how the theoretical developments are applicable to strategy formulation.

3) An Areas For Future Research section which indicates avenues for research involving this theoretical approach to strategy and competition problems.

4) A Summary section which brings together an overview of the accomplishments of the dissertation.

Theoretical Contributions

The first objective was to develop a formal definition of competitive advantage. This was achieved by examining the origins of the concept from Chamberlain, J.M. Clark and Alderson. While other writers have addressed the topic at length, no formal definition of competitive advantage has been outlined. A formal definition of competitive advantage is provided based on Alderson's (1957) discussion of the subject.

A list of sources of potential competitive advantages were provided by examining the marketing and other business literatures interested in competitive advantage. The varied sources were found to be more than marketing policies; they encompass the breadth of functions performed by the business firm.

The third objective of the dissertation is a theory of competitive strategy drawing from a number of theories and models provided from other academic fields. The Hierarchy Of Strategies Model presented in Chapter III addresses the question of which level competitive strategy is placed and outlines the key elements which competitive strategy is concerned.

This approach to examining strategy cross-fertilizes and integrates ideas contributed from management, marketing, economics and finance. Academic fields normally outside the business domain that make important contributions include military theory and population ecology.

The proposed theory of competitive strategy rests on the premise that competitive advantage is the foundation for a strong competitive strategy. Establishing a "fit" between firm and environment requires finding a market position that satisfactorily serves customers but can also be defended from competitor attack if the strategy is to be sustainable over time.

A method for operationalizing competitive advantage was provided as the fourth objective. Competitive advantage

variables are defined as those firm-specific policies whose coefficients exceed the corresponding market value by at least one positive standard deviations. This method serves to objectively identify a competitive advantage rather than relying on management judgement.

A model of competitive strategy was developed allowing for inclusion of marketing mix, lagged mix, operational policies, market effect and competitor variables. A set of firm-specific equations in this econometric modeling system were specified in multiplicative, logarithmic form. The approach is in line with the trend in response model research found in the literature. Using this format, the coefficients are expressed as elasticities which facilitates comparisons for testing propositions.

A study of the non-rubber footwear market provides a basis for demonstrating the effectiveness of competitive strategy. The system of equations were estimated employing seemingly unrelated regression, an appropriate method when the disturbance terms are correlated across equations. This problem would be expected in oligopolistic markets such as the non-rubber footwear market.

The tests of propositions relate firm profitability with competitive strategy. The results show that competitive strategy was positively and significantly related with two profit measures, ROS and ROA, supported at the $p \leq 0.05$ level and $p \leq 0.01$ level of significance respectively. Testing competitive advantage against ROA, positive results were

found at the $p \leq 0.05$ level but ROS was only marginally significant at the $p \leq 0.15$ level. When market share was tested against ROS and ROA, neither was significant.

Managerial Contributions

The theory of competitive strategy provided in this research outlines key elements which affect firm profits and proposes an objective method for estimating their effects. The value of this procedure to management is its ability to directly measure the effect of policy variables on profits. The strength of competitive strategy can then be evaluated by objective means rather than relying solely on judgement and/or past experience.

Factors which impact firm profits can be expanded to include environmental and competitor variables. With this specification, the impact is directly captured, eliminating assumptions sometimes conveniently made in strategy, (e.g.), market growth affects profits with a value of unity. With competitor effects, the source and degree are measured directly by their coefficient values. Building effective strategies to counter competitor actions can be formulated knowing their effect, and (with sufficient data), the time duration of the effect.

Sources of competitive advantage should be considered from all aspects of business operations. The list provides a broad perspective for identifying "advantages" and should reduce the tendency to view advantages from a limited number

of "generic" choices. Understanding that strategy is based on unique, important differences between rivals rather than trying to "out-muscle" competitors should point managers in a different direction for strategy formulation.

The identification of competitive advantages is enhanced by providing a formal definition. The estimation procedure proposed objectively identifies sources and enables direct comparisons to be made between different policies before the strategy is implemented.

Lastly, a competitive advantage is demonstrated to have a positive impact on firm profitability. Although the study of the U.S. non-rubber footwear market was based on a small sample, the evidence in encouraging of the relationship between competitive advantage and competitive strategy.

An plot of each firm's operating profit trend over the period of this study is illustrated in **Figure 3 - Footwear Operating Profits By Firm: 1960-1987 In 1967 Real Dollars**. When this graph is coupled with the coefficients presented in **Table 12- SUR Equation Evaluation: Coefficient Values At Market And Firm Levels**, along with the observations provided in **Table 17 - Observations Regarding Firm Profit Equations**, a number of conclusions regarding each firm's competitive strategy direction can be reached. In addition, a plot of each firm's footwear sales is also illustrated in **Figure 4 - Footwear Sales By Firm: 1960-1987 In 1967 Real Dollars** for the interest of the reader.

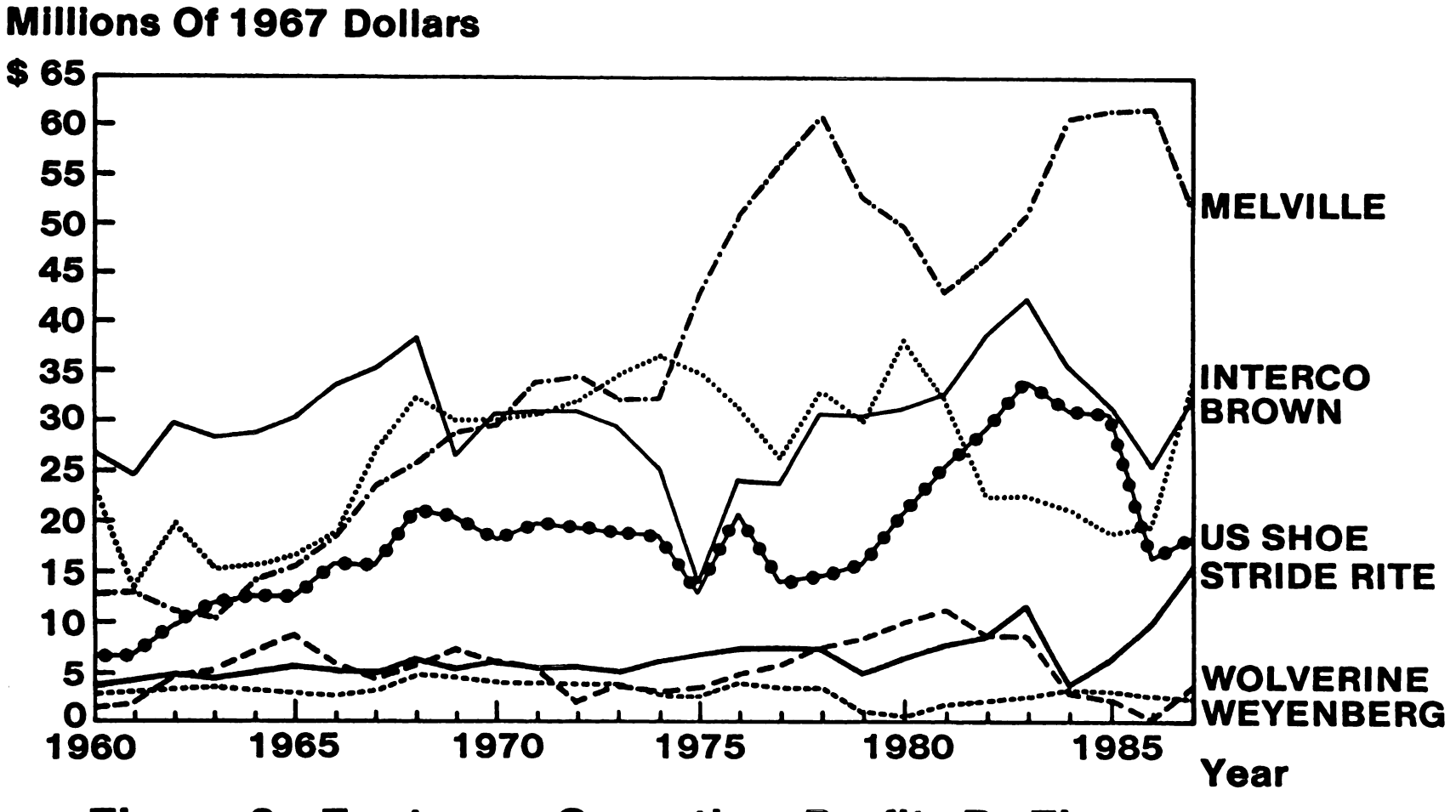

Figure 3. Footwear Operating Profits By Firm: 1960-1987 In 1967 Real Dollars

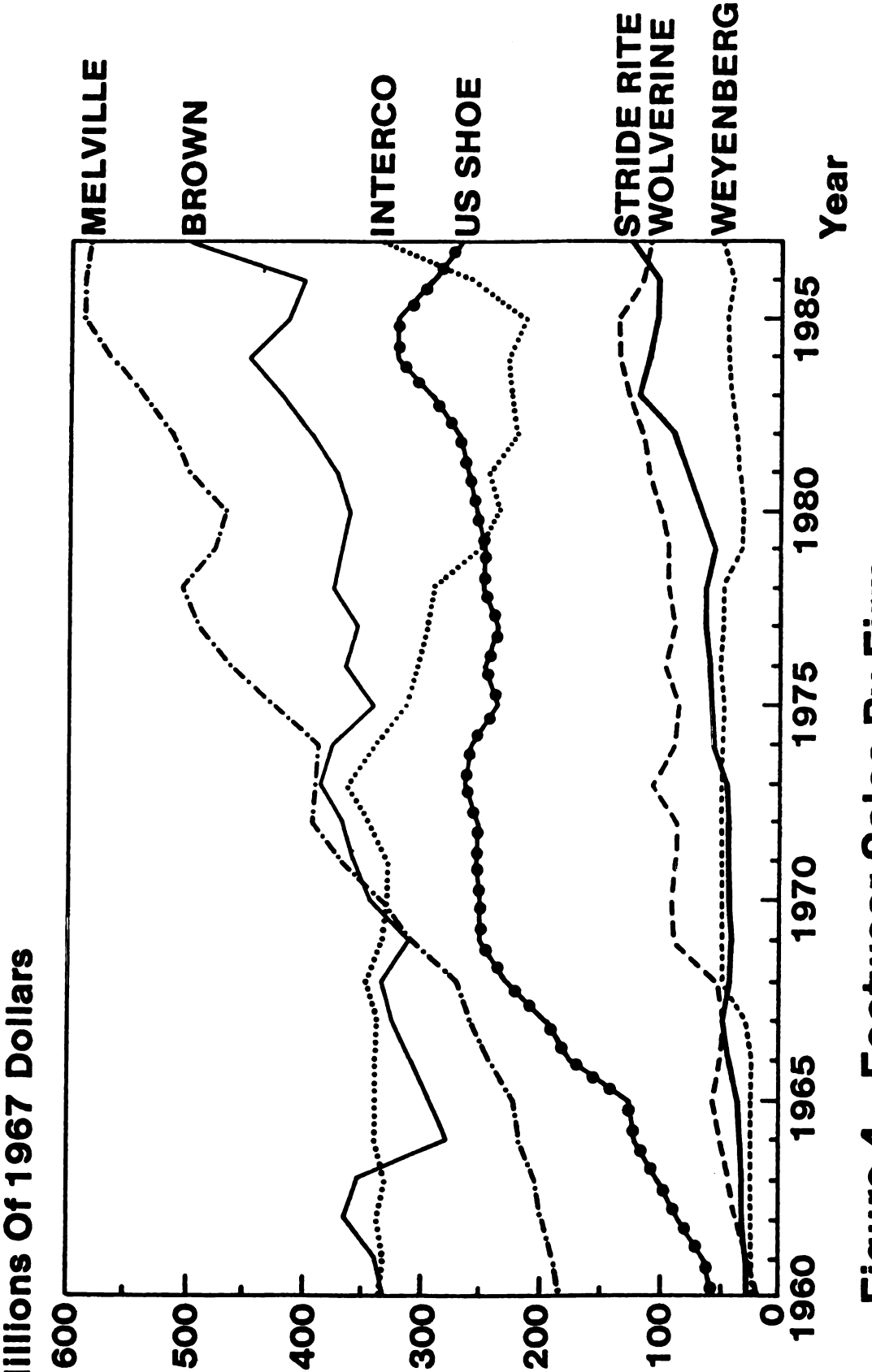

Figure 4. Footwear Sales By Firm: 1960-1987 In 1967 Real Dollars

An analysis provided for each firm begins with a few comments regarding the trend in its operating profit level and sales level over time. Observations regarding its own competitive strategy complete the discussion.

BROWN - Operating profits for this firm are practically invarient with time. Its sales level had, however, grown at a small (second lowest) but significant rate. Market share has slipped over time as a result but has managed to retain the number two position (among firms in this study).

The basis of its competitive strategy is its advertising which has produced a competitive advantage for Brown. The effect of market growth has been favorable as well, a factor reflecting its ability to exploit new market opportunities. The strength of this strategy has been sufficient enough to offset the competitive effect of U.S. Shoe's advertising policy.

INTERCO - Its profit level has continued to increase over time at the expense of market share. This is the only firm which has had a long term decline in real dollar sales, experiencing a slip in market share from number one in 1960 to number three by 1987. Only during the last few years has Interco managed to change this situation around.

The main competitive strategy problem for Interco, as reflected in it share erosion, has been its pricing policy. The astute use of debt leverage provides a small competitive advantage but not enough to offset the price disadvantage or

the effect of the strong advertising competition coming from Wolverine's well known advertised brand of products.

MELVILLE - The most outstanding performance of all firms in this market is reflected with Melville. Its profit level and sales increased faster than other firm with its margins likewise improving (ROS from 7.0% in 1960 to 9.0% in 1987). As a result, its market share has gone from third to first.

The key to its strategy, and the strongest competitive advantage among all firms, is its operating cost control. This is reflective of two policies: (1) its sourcing from overseas suppliers, and (2) the elimination of all but one domestic plant which has significantly cut its operational costs. The policy of store expansion, however, has been costly in terms of profits. The effect of Wolverine's price policy is substantial but much less when compared to its own pricing strategy effect on Wolverine.

STRIDE RITE - A long term increase in profits and sales has been experienced. Its record is one of the best among firms in this research. Likewise, share has increased from 2.7% in 1960 to 6.3% in 1987 (among firms in this study).

The key to its strategy is its product variety policy which provides a competitive advantage. At the same time, however, the effect of Brown's product policy offsets this advantage where the two compete with brand name products in children's shoes. Likewise, the effect of rising leather costs has been detrimental. Product development in the

direction of non-leather materials would appear to offer on approach around this problem.

U.S. SHOE - The direction for this firm has been upwards for the full period of this study. It has shown one of the best growth rates in terms of profits and sales with share rising 7.9% (among the firms included here).

Operating cost control has been a positive factor which has contributed to its improvement with economies of scale being found. The effectiveness of its advertising strategy has been a drawback, however, although an effective weapon competing against Brown where both are active in brand name quality women's shoes. Additionally, Melville's advertising has been detrimental which may explain the overspending by U.S. Shoe regarding this strategy element.

WEYENBERG - Over the long term, the profits of this firm have declined, due in part to a recent period of decline in the last three years. Its sales have continued to improve at a pace matching the market as its share is practically the same as in 1960.

The key for maintaining profitability rests with its product policy. It has a niche position in men's dress and work shoes with a respectable brand name in the dress line. At the same time leather costs have had a very detrimental effect on profits. The effect of Interco's product policy has been particulary bothersome since men's shoes is one of Interco's strongest weapons and competes directly against the Weyenberg line.

WOLVERINE - Long term, the profit level has remained at the same level. In the past few years, a restructuring has occurred which has had a significant effect on profits. Its market share has increased over time reflecting the growth of sales.

The major competitive problem is seen with price. The significant negative effect of its own pricing strategy is compounded by price competition from Melville, one of the low price competitors in the market. A second major negative competitive effect comes from Brown with a stronger product line than Wolverine's well known line.

Another element is worth noting -- because of its lack of significance -- is its tannery operations. Called one of the largest tanning firms in the country, the correlation between leather cost and operating profit for Wolverine was found at r=0.04, an insignificant factor, and contrasts to the expectation of a positive effect.

CONCLUSIONS -- An examination of the profit trends for each firm combined with their competitive strategies, along with market and competitive effects, provides a richer and more accurate understanding of what impacts the particular firm's profit results. Each was individually examined revealing that different approaches were emphasized. The importance of competitive effects, both simple and mixed, were shown to vary across firms.

It is observed in this analysis that the small firms are more heavily impacted by competitive effects than are the

larger firms judging by the size of the competitor variable coefficients. This fact explains why ROS and ROA profit margins have declined for the small firms while increasing for the large firms (as seen in **Table 19 -- Comparison Of Large Versus Small Footwear Firms: ROS And ROA For 1960 And 1987**, found in Appendix A).

Areas For Further Research

Research interests point to the study of other markets to test the propositions generated from the theory of competitive strategy outlined in Chapter III. Markets which appear appropriate for duplicating this type of study include: (1) fresh and processed meats market, (2) the paint, varnish and shellac market, (3) food retailing market, (4) the chemical market and, (5) the forest products market.

The study of the non-rubber footwear market can also be expanded to include additional producers. The addition of two or three small firms is possible and would broaden the scope of the study and improve the tests of propositions. As more time periods are added the tests should also improve.

Addressing the problem using a cross-sectional approach allows for more markets to be studied and reduces the need for time series data. This type of study requires utilizing estimation procedures other than SUR to directly measure the effects of variables.

Additional information was gather during this study for investigating other questions related to strategy. One such

topic involves vertical integration. Another is the effect of firm diversification, a path which the larger firms have taken.

Identifying competitive advantage using methods other than regression presents a challenge. Regression was used because the coefficients directly measure the effect of the policies, and being dimensionless, they can also be directly compared. Finding procedures for estimating the size of the coefficients and which also enable comparisons to be made directly should receive attention in research.

The dissertation presents interesting possibilities for studying models and theories of strategy and competition. The overview provided in Chapter II can be expanded in each field to gain a deeper understanding of their contributions. Developing a common framework for comparing between these disciplines is a realizable goal which would take advantage of cross-fertilization of ideas from different academic disciplines.

Summary

This dissertation provided a basis for the definition and objective measurement of the concept of "differential competitive advantage". These advantages were demonstrated to be firm-specific and were found to cover a variety of sources. The theory of competitive strategy proposed here suggest formulating a strategy which reflects the unique

nature of the organization based on its firm-specific competitive advantages.

A market study of the U.S. non-rubber footwear market was conducted to test the propositions of this theory. The results demonstrated support for two main propositions of this research: (1) competitive advantage can be objectively identified and measured, and (2) when serving as the basis of the firm's competitive strategy, profitability will show a positive relationship with competitive advantage.

The dissertation has added to knowledge of competitive advantage and competitive strategy in a meaningful way, both theoretically and empirically. It has also help answer the recurring question asked by business practitioners: "How do I identify important firm policies, market factors and competitive effects so I am able to formulate a strong competitive strategy?"

APPENDICES

APPENDIX A

STUDY OF THE U.S. NON-RUBBER FOOTWEAR MARKET

APPENDIX A

STUDY OF THE U.S. NON-RUBBER FOOTWEAR MARKET

Purpose Of The Study

Part of this dissertation includes the study of a market which satisfies the information requirements necessary for this dissertation. This study provides the qualitative and quantitative background needed to examine the major tenents of a theory of competitive strategy. The qualifications of such a market should include:

1) a market of sufficient size to ease the problem of data gathering and examination;

2) a dynamic environment demonstrating changes in market structure over time;

3) competitive conditions which included several firms of different sizes, with entry and exit occurring;

4) data variables which capture the major market and firm changes;

5) data available for both the market and competitor firms encompassings the full period of examination and which is reliable and consistently provided.

A market which meets the above conditions is the U.S. non-rubber footwear market (which excludes all-rubber and molded rubber-to-sole footwear products such as jogging shoes). As will become apparent in the remainder of this appendix, footwear represents a market which satisfies the description given above quite well.

Description Of The Market

The non-rubber footwear market was selected because it has demonstrated many interesting changes over the past three decades. A description of this market and the changes which have occurred is provided here with the intention of establishing an understanding for the reader of how these shifts have evolved. There are a number of topics which illustrate a market structure considerably different from the market found at the beginning of this study.

MARKET SIZE -- The market is substantial in size, nearly $27 billion of consumer spending for footwear and related items in 1987. Approximately 1.2 billion pairs were sold or 4.8 pair per capita (Statistical Abstract Of The U.S., 1988; Current Industrial Reports: Footwear, M-31A, 1987). This provides a growth rate in consumer spending of 2.8% per year over this period (author calculations). This market can be described as "mature" but steadily increasing.

CONSUMERS -- Footwear is a product which is purchased by consumers using an "occasion of use" criteria. A wide variety of products are available to satisfy different buyer tastes and interests. This variety factor has also presented considerable production inefficiencies for producers. If anything, an acceleration of divergent tastes has occurred, opening up opportunities in style, construction, materials and pricing.

SOCIAL TRENDS -- Two important social trends have occurred in the U.S. population which have impacted footwear.

First, the increased number of working women in the labor force occupying higher paying, white collar positions has increased the quantity, variety and quality demanded in women's dress and casual shoes. The second major trend is the increased emphasis on physical fitness and outdoor activities. This trend has spurred demand for outdoor boot-type products, casual shoes and athletic footwear.

FOREIGN TRADE -- The growth in the supply and percentage of total footwear demand accounted for by imports is impressive. Since the early 1960s when this figure was five percent, the import share has risen to 81% of total demand in 1987. The effects on the domestic market have been several: (1) lower priced footwear, (2) a decline in the quantity supplied by domestic firms, (3) a decline in the number of small domestic producers, and (4) a very aggressive foreign sourcing policy by major U.S. firms. An important reason for the climb of imported footwear has been its cost advantage at approximately 50% of domestic footwear prices (in 1986, author calculation). Export markets, on the other hand, have never received much attention from domestic producers, accounting for only about five percent of production in 1986.

DOMESTIC PRODUCTION -- Consequently, a restructuring of the U.S. industry has occurred. The number of footwear firms has declined from nearly 1000 to just over 200 by the mid-1980s. Employment has dropped as a result to about one-third of its 1960 level. The decline in the number of firms and the shift in sourcing from domestic to foreign suppliers had

considerably changed the competitive picture in the U.S. market.

Domestic footwear production operations have not been known as smooth-running and efficient. The breadth of items produced to satisfy consumer demand for variety has contributed to this problem. With the number of sizes, styles, colors, materials, etc. that are available, little economies of scale were believed accomplishable. As a result, unit costs tended to remain high, particularly due to labor content. Opening the way for cheaper imports was a natural consequence.

GOVERNMENT POLICY -- As a result of this shift in supply, the reduction in the number of domestic producers, and in the level of employment, the labor unions tried to put pressure on Congress to limit the quantity of imported footwear. It is ironic to note that this position was not backed by all domestic footwear companies. Some of the very large firms rely on foreign sourcing as key to their supply strategy in order to keep operating costs under control.

Finally in 1977, an "orderly marketing agreement" was reached which served to limit the rate of increase in the quantity of foreign supplies coming from Taiwan and South Korea. The reaction, of course, was to increase imports from Brazil, The Philippines and other Asian countries. Then in 1981 the Regan Administration ended this agreement. As a consequence, imported footwear resumed its rise to reach an

all-time high by 1987. (See: Yoffie, 1981, and Brody, 1985, who provide details of this information).

TECHNOLOGY -- A factor notable for its absence from this study is the role of research and development in technology. The reason for this is simple: until only recently, it has not been a major factor in the domestic industry as admitted by the firms themselves. With the involvement and approval of the government, the industry has undertaken steps to improve production techniques to become more cost competitive with imports. The results of this endeavor are only now becoming apparent. Technology is not, therefore, considered a major factor affecting the firms in this study.

MATERIALS -- Over the past three decades, the use of new materials, particularly fabrics and plastics, have replaced leather. One reason for this trend, is the style of shoe being produced. Another reason is cost as the "real" price of leather has climbed 5.6% annually since 1960 (author calculation). The "waste" factor using leather is greater than with plastic or fabric materials. The price of leather is more likely to be subject to wider swings than is true for other materials. In 1986, the percent of footwear made in the domestic industry with leather "uppers" was approximately 54% of total output.

VERTICAL INTEGRATION -- Both backward and forward vertical integration has shifted in this market with the movement in a direction towards the consumer. Few footwear firms remain vertically integrated in tannery operation and,

of the remaining participants, these have reduced their exposure in this segment. More assembly of shoes has moved offshore, particularly to lower wage Caribbean Basin countries. The practice is to export component parts, assemble these into final product form, and then ship the finished items back to the U.S. market. Duty is paid only the "value added" portion of the shoe. This type of sourcing arrangement has provided a low cost shoe supply for many domestic firms.

DISTRIBUTION -- The traditional channel of distribution in the early 1960s in the footwear market involved a large number of independent retail store locations, department store lease operations, and a few major retail shoes chains. Of the firms included in this study, only Brown and Melville participated in retail operations to any major extent in 1960. Interco and U.S. Shoe, two other major firms, were just entering shoe retailing about this time. None of the smaller firms took an interest in retail operations until several years later.

By the mid-1980s, retailing had become the major focus of these firms. The expansion of company owned or sponsored (franchise identified) retailing operations and department store lease operations was pervasive. Independent footwear chains also sprung up as cheap, available imported footwear was flooding the market. Ironically, some of this supply is provided by the footwear company wholesaling operations

themselves. The independent, single store operation has declined sharply according to market reports.

PRICES -- The extent of product variety and the extent of demand among consumers for quality and quantity makes the footwear market ideal for segmenting at different price levels. Additionally, the effect of imports on retail prices has been to keep prices from increasing as fast as the consumer price index. As a result, "real" shoe prices have declined by -1.8% per year since 1960 (author calculation).

Higher priced footwear and type of material used, particulary leather, has created a "niche" for U.S. firms. Many of the remaining domestic firms have focused on pricey, quality, designer lines where they have their natural "comparative advantage".

The Domestic Footwear Firms

INTERNAL STRUCTURE -- Stated earlier was the decline in the number of domestic producers. Of those remaining, their internal organizations have likewise changed considerably in several instances.

In the early 1960s, the vast majority of footwear firms could be characterized as "sleepy, little shoe producers", comfortable to produce shoes. For the most part, as a group, they were not very aggressive. Of the seven firms studied in this research, few participated in footwear retailing at this point. By the late 1980s this group had become more in tune

with market conditions and showed a much improved marketing orientation.

By the late 1960s the internal structure of the larger firms had begun to change. Diversification became an avenue for growth. The movement into retail shoe operations was expanded. Other retailing operations emerged, particularly with clothing and household items. Manufacturing remained a concentration with ventures into consumer products (some being disinvested in later years) such as playground equipment and furniture manufacturing and retailing. The four large firms in this study moved from a 100% footwear focus in 1960, to where by 1987, footwear accounted for 34% of total sales and 38% of total operating profits.

The three smaller firms have continued to concentrate in footwear as the main focus of their businesses. Each firm has moved into footwear retailing, although this appears to be more of a defensive move than as a major direction. Wolverine has been the only small footwear firm that has tried any really appreciable diversification. This attempt was into leather glove products, a natural outlet for its own tannery operations. The operation was later discontinued during the 1984-85 period after suffering disappointing results.

Both large and small firms continue to demonstrate changes in their organizations. Only Melville can be said to have really been successful with its diversification. The

others have had only spotty success in other lines of business.

FOOTWEAR OPERATIONS -- As the firms have expanded into other lines of business they have gradually withdrawn from the production side. The number of plants closed by these firms has been about parallel with the total industry. One example is Melville, the largest domestic footwear firm. In 1973 they reported having twenty-one domestic plants; by 1986 they had scaled down to a single modern, efficient plant. Instead, they have relied on buying their requirements from outside sources, particularly overseas. The reason for keeping the remaining domestic plant was, essentially, to keep a "pulse" on production costs when negotiating with suppliers.

Some firms have decided to specialize in only certain product lines. Weyenberg is an example of a firm which is specialized in two product categories, men's dress and work shoes. Another illustrative example (although not a firm included in this study) is Timberline. Concentrating at one time on work and military boots, they carved a "niche" as a producer of quality, outdoor hiking boots. Other similar examples abound where product specialization occurs.

COMPETITIVE EFFECTS -- This vastly changed market, quite different from the early 1960s, demanded significant changes for those firms which have remained. (For the others, these effects have been obvious and no longer matter). The most important of these are: (1) fewer numbers, particularly

smaller firms; (2) emphasis on cheaper supply sources with a need, almost mandatory, for a foreign connection; (3) much stronger "niche" positioning by smaller firms; (4) having a strong retailing operation or retail connections; (5) the ability to reduce overhead costs in manufacturing operations; and (6) greater efficiency gained from new technologies from the industry-wide research effort.

PROFIT RESULTS -- Profit results reflect the changes in market conditions which have taken place over the past three decades in this market. From the "life of comfort" position afforded these participants (looking only at the seven firms included in this study), the change from footwear to consumer goods is not one which speaks of any record breaking performance. Their results are compared for years 1960 versus 1987 in **Table 19 - Comparison Of Large Versus Small Footwear Firms: ROS And ROA For 1960 And 1987** shown below:

Table 19

Comparison Of Large Versus Small Footwear Firms: ROS And ROA For 1960 And 1987

	Year 1960			Year 1987		
	Large	Small	Total	Large	Small	Total
Total Firm:						
ROS =	7.6%	12.7%	7.9%	7.3%	7.7%	7.3%
ROA =	14.6	21.5	15.2	16.0	3.9	15.9
Footwear:						
ROS =	7.6%	12.7%	7.9%	8.2%	7.7%	8.2%
ROA =	14.6	21.5	15.2	18.2	14.2	17.5
Footwear % Total:						
Sales =	100%	100%	100%	34%	96%	38%
Assets =	100	100	100	38	98	42

The immediate observation is the decline for the small firms which have remained mainly in footwear. Overall, the large firms have not faired well either, slipping in terms of ROS but improving their ROA. They have, however, improved their footwear results. This is perhaps explained by their "cash cow" or "harvesting" investment strategies for their footwear operations in order to concentrate on their "star" retailing ventures.

Summary

The U.S. non-rubber footwear market provides a suitable "laboratory" for testing the propositions generated from the theory of competitive strategy presented in this research. The time needed to witness the effects of market changes and the availability of data to measure these effects was able to be gathered using this market.

The number and types of changes which took place show market conditions and competitive effects which require the firms to reformulate their competitive strategies. Additionally, these changes took place with little outside government interference in the process. This allows the "real" effects of competition and competitive strategy formulation to be observed with only a minimum of non-market effect having an influence on the outcome.

APPENDIX B

DATA DISSCUSSION

APPENDIX B

DATA DISCUSSION

This appendix is provided to give the reader knowledge regarding (1) the nature of the variables used, (2) their construction and measurement, (3) sources of data, and (4) problems encountered with their usage. These issues are described in this appendix so they would not distract from the methodological issues discussed in Chapter IV. With this approach, the advantage of providing a more comprehensive discussion of the data and related problems concerning the gathering and construction of variable is achieved.

Nature And Measurement Of Variables

The variables included in this study were selected for several reasons. These reasons include: (1) they reflect theoretical developments found with competitive market model building; (2) methodological research has previously indicated their inclusion in order to properly specify competitive models; (3) research and observations into the U.S. footwear market indicates their importance; and (4) the specific variables were available both cross-sectionally and longitudinally for period of this study.

Variables and their unit of measurement are included in **Table 20 - Dissertation Market And Company Variables And Unit Of Measurement**. There are two kinds of variables used. First, are those directly recorded from secondary

sources. Second, transformed variables are based on data found from the first set. These are primarily firm variables, although the price variables were calculated by transformation.

Table 20

Dissertation Market And Company Variables And Unit Of Measurement

Variable	Measurment
Market:	
1-market size	real $ PCE - footwear
2-imports	percent total quantity of shoes
3-social factor	number of employed women, age 18-34
4-leather cost	real PPI - leather
Company:	
5-sales	real $ shoe sales
6-profits	real $ shoe operating profits
7-assets	real $ identifited shoe assets
8-advertising	real $ advertising for shoes
9-shoe outlets	number of company controlled stores
10-product coverage	percent of total market covered
11-price	real $ average price per pair
12-operating cost	real $ shoe operating costs
13-foreign sourcing	purchases shoes overseas
14-debt leverage	long term debt used
15-diversification	percent non-shoe sales for firm
16-tannery	owns any tanneries
17-past advertising	carryover advertising effect $(t_{-1} + t_{-2}) / 2$

Price deflators include:
IPI - leather, assets and advertising expenditures
CPI - footwear - for personal consumption expenditures
PPI - footwear - for sales, operating costs, profits

Variables can also be classified into market and company factor categories. Market variables are identical for each

firm and potential for inclusion in each of the firm-specific equations. This would be expected since these effects constitute macro-environmental conditions which each firm must face. In the firm-specific profit equations, the specific variables included will differ across each model. The important differences are the values for the same variables which differ by firm for the same yearly observation. This reflects the variation among firms and, in essence, the particular nature of their competitive strategies.

Market And Company Data References And Sources

Several different sources of information were utilized to gather the data for this study. Fortunately, the same reference sources were accessible for a particular variable providing a limited degree of "face" validity for data quality. The consistency of using these recognized market, government, and company financial sources lends support to the reliability of the information as well.

A considerable amount of data was obtained by direct use of company supplied reports. These were primarily company annual report to stockholders and SEC 10-K reports filed to meet regulatory requirements. While these reports do not guarantee the accuracy of the data, it is encouraging (in the case of the latter at least) that the formats followed have received auditor certification. It is worth noting that none

of these reports were absent auditor certification when reviewing their SEC 10-K reports.

Company related sources include a listing of well known and respected references. Many of these have been available for decades and include those in **Table 21 - Data Information Sources Used In Dissertation**. The company annual reports to stockholders and SEC-10K reports were supplied by Disclosures, Inc. and directly from the companies themselves.

Data Problems And Resolutions

In certain instances data needed for the study was not available. This occurred mainly with firm variables, mostly with marketing mix factors. Several methods were used to resolve this issue:

1) Interpolation - this solution was used when observations in the time series had data both before and after a missing period. A simple arithmetic averaging of the raw data was applied.

2) Exponential Time Series Estimation - For instances where data was missing for a number of consecutive periods and was estimatable using this method, this procedure was preferred over the interpolation method.

3) Proxy - In a few cases estimation was made using rate of change or change in relation to some other factor related to the variable.

4) Assumption - when data was missing for a beginning time period and the value of the observation was believed small, the assumption was made that the missing value was the same as observed time period.

Table 21

Data Information Sources Used In Dissertation

Reference Sources:
- Moody's Industrial Manual
- Standard & Poor's Corporate Record
- Value Line Investment Service
- Standard Directory of Corporate Advertisers
- BAR/LNA Multi-Media Service: AD $ SUMMARY
- Disclosures, Inc. - company annual stockholder reports and SEC 10-K reports

Business and Trade Periodicals:
- Business Week
- Dun's Review
- The Wall Street Journal
- The Wall Street Transcript
- Footwear News
- Financial Analysts Journal
- Fairchild's Footwear Fact File: 1986, 1987
- Fortune Magazine
- Advertising Age
- Forbes Magazine
- Barron's
- Adweek

U.S. Government Sources:
- Statistical Abstract of the United States
- Employment and Earning Statistics
- Survey of Current Business
- Business Statistics - 1982, 1977
- Current Industrial Reports: Footwear, M31A
- Census of Manufactures, 1963 to 1982
- U.S. Industrial Outlook, 1960 to 1987
- Consumer Prices and Price Indexes
- Producer Prices and Price Indexes
- Economic Indicators

In no instances was it possible to simply ignore the missing data points or assume the values to be zero. Thus, each yearly observation had some value in place by using one of the above methods when the actual data was not available.

Calculation Of Certain Variables

In a limited number of instances calculation of missing values were made by estimation. This was particularly true with the shoe price data. To a lesser extent this type of question was also germane with advertising expenditures and estimation of total assets. Footwear sales and operating profits required some of this information to be obtained by using a combination of company SEC 10-K and annual reports to stockholders. Methods used for calculating missing data are described below.

PERCENT PRODUCT COVERAGE -- To serve as a representative product line variable six shoe categories were used where the quantity and value of domestic footwear shipments were calculated from the Current Industrial Report Series: Footwear (M31A) for each of the six groups. The six product categories were selected due to reporting consistency of the series and the general availability of the data reported by each firm.

For each of the categories, the number of units produced were summed and divided by the total shipments. This data provided a "percent of total product coverage" calculation. The six groups included: slippers, men's, women's, athletic, men's work, and a last category which consisted essentially of children's, infants, toddlers, and various miscellaneous lines.

SHOE PRICE -- The shoe price information combined both firm and market information to provide an estimated "revenue

per pair" calculation. This estimate was used rather than trying to obtain actual shoe prices. Three methods of "price" estimation are described below.

Where the quantity of shoes sold was given or could be reasonably calculated (using production, plant capacity, percent of sales purchased outside firm), shoe revenues were divided by quantity to arrive at a "calculated price" figure. This method was used extensively for Stride Rite and U.S. Shoe. To reach a "real" dollar price figure, the calculated data was divided by the PPI-footwear (as was done for other shoe price estimates as well).

Unfortunately, the data was generally not available. As an alternative the price variable utilized information for market quantities and dollar value of shipments. Price was estimated using a simple "average market revenue per unit shipped" for the categories in which the firm indicated selling. For Melville, this method had to be used since no other data was available. This did not seem to be a particular problem since Melville has continued selling popular priced lines in all six categories.

For the remaining four firms a modification of the two above methods was developed. Where a "calculated" estimate could be generated this figure was used. If not available, a ratio between "calculated price" and "average market shipment price" was applied. For the remaining years this ratio was applied to the "average market shipments price" to arrive at a "calculated price" estimate.

ADVERTISING -- This variable was estimated for the shoe portion of the business by multiplying the total advertising by the percent of total sales accounted for by the footwear segment of the firm.

For a few periods data had to be assumed. This method was used for very early years when Standard Directory of Advertisers data was not given. For the years 1986 and 1987 some firms did not report their advertising spending. In these cases the most recent year's percent of total sales calculation was applied to get a reasonable figure.

ASSETS -- This data was often reported in company annual reports and SEC 10-K reports, particularly for latter time periods in this study. During the 1960s the companies were nearly "pure plays" in footwear were total assets were able to be classified as shoe assets.

During the late 1960s and the early 1970s this data was not so clear. To solve this problem a "sales-asset ratio" was calculated for the years obtainable (generally more than two-thirds of the years could be obtained). This information was then used to estimate a "ratio" for years missing. By dividing shoes sales by the "sales-asset ratio" figures for the missing periods were estimated.

Special Notes

SHOE SALES -- This data is taken from available company reports and filings with the SEC. With years where specific dollar amounts were not given but percentage of total sales

for footwear were available, this percentage was applied to total firm sales. In a few instances this figure needed to be interpolated before a calculation could be made.

The dollar figures unfortunately mask the price level problem. Sales were generally only reported for the total amount and not separated wholesale versus retail (the retail portion representing "value added" to the company.) This is a factor which indicates a weakness in the data which, simply, has to be accepted.

SHOE OPERATING PROFITS -- This level of profits was used for several reasons: (1) it was the only profit information consistently available from both current as well as prior reports, (2) it includes interest return on total capital as well as profits, and (3) it was always a positive figure so that logarithms could be taken which facilitates estimating parameters in the specified models.

Sometimes a percentage of total firm operating profits was applied where the percent was the same as the shoe sales percentage figure. This would not seem a problem when the percentage was relatively high portion of the firm's total results. For later years this information was provided by the firm in its financial reports and filings.

DATA OUTLIERS -- Once the data had been transformed and estimated as "deviations" from the time trend, an inspection for data outliers was possible. It has been suggested by Neter, Wasserman and Kutner (1985, p. 114) and by Bowerman, O'Connell and Dickey (1986, p. 564) that a value found to be

four or more standard deviations from zero will, as a rule of thumb, indicate the presence of an outlier.

An inspection of the variables in this study indicates a few observations which qualify as outliers following this definition. In those few instances the outlier value was replaced with the estimated value for this point in the time series. No more than one point was needed to be replaced as an outlier in any variable.

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