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ORGANIZATIONAL ECONOMICS AND THE FOOD PROCESSING INDUSTRY

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ABSTRACT OF THESIS

ORGANIZATIONAL ECONOMICS AND THE FOOD PROCESSING INDUSTRY

The food processing industry is dominated by large corporations. These firms play a critical role in forming the derived demand faced by agricultural producers, but little is understood about how these companies make strategic choices. Organizational economics provides a framework for exploring the firm's decision process. However, several theories exist in this discipline, operating in fundamentally different ways. This paper examines the two prevalent organizational theories, Transaction Cost Economics and Agency Theory, through a study of the food processing industry. This sector is thoroughly analyzed in order to make predictions from each theory regarding the aspects of capital structure and firm expansion. With accounting data for a sample of food processing firms, these predictions are then tested empirically using an ICAPM model in a cross-section of expected stock returns. Our results indicate that Agency Theory is the relevant organizational model for food manufacturers, making it the appropriate tool for evaluating the actions of these firms in agricultural markets.

KEYWORDS: Organizational Economics, Food Processing Industry, Transaction Cost Economics, Agency Theory, ICAPM

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THESIS

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The Graduate School

University of Kentucky

2004

ORGANIZATIONAL ECONOMICS AND THE FOOD PROCESSING INDUSTRY

THESIS

A thesis submitted in partial fulfillment of the requirements
of the degree of Master of Science in the College of
Agriculture at the University of Kentucky

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Table of Contents

List of Tables

List of Figures

List of Files

CHAPTER ONE

INTRODUCTION

1.1 Objective

Industrialization of the US food system has fundamentally changed the relationship between agricultural producers and food manufacturers. The strategic actions of food processing firms now have a direct effect on agriculture. Farmers are often part of a vast network of suppliers coordinated by a large food manufacturer (Menard and Klein 2004, 753; Knoeber 1989, 281). Therefore, the strategies of agricultural producers are dictated in large part by the actions of food manufacturing companies. Understanding the motivations that drive food processing firms is then crucial to farm managers. All firms are organized in some manner, and different organizational structures create different behavioral incentives for decisions (Sykuta and James 2004, 758). As a result, organizational economics is an effective tool for analyzing the dynamics of food processor decision-making, providing needed guidance for farmers and other parties involved in the agrifood sector (Cook and Barry 2004, 743).

The two most widely accepted organizational theories are Transaction Cost Economics and Agency Theory. The objective of this study was to determine which theory, Transaction Cost Economics or Agency Theory, better describes the actions of food processors. Little is understood about organization of the modern food manufacturing corporation. Yet, the strategies chosen by these companies are a function of their organizational designs. Thus, understanding the organization of these firms will allow us to make substantial inferences about their intra-firm decision processes.

1.2 Hypotheses

Transaction Cost Economics has long been the accepted rationale for firm decision-making (Macdonald 2004, 745). Yet, to explore the truth of this assumption we will investigate two specific firm choices. First, we hypothesize that Transaction Cost Economics explains selection of capital structure in the food processing industry. Second, we propose the hypothesis that Transaction Cost Economics better describes firm expansion decisions in this sector. These two null hypotheses will be tested in order to reach our objective of determining which prevalent organizational model has more relevance in the food processing industry.

To define our first hypothesis more specifically, we outline the predictions that will later be developed and tested. Transaction Cost Economics predicts capital structure based on the

nature of the firm's transactions. Because of specificity, frequency, and uncertainty in both the upstream and downstream transactions of food processors, this model suggests that an increase in debt will decrease firm value, while more free cash flow would only increase firm value. Conversely, Agency Theory predicts capital structure choice through the governance abilities of financial mechanisms. Relatively weak internal and external discipline being applied to food manufacturers will result in the expectation of increased firm value with additional debt, and a decrease in firm value with larger amounts of free cash flow. These divergent predictions about how food processors select capital structures then provide a test of whether Transaction Cost Economics is the more powerful model.

It will also be helpful to convey our second hypothesis in greater detail. Transaction Cost Economics predicts that firm expansion will occur only to minimize on the costs of exchange. The nature of the food processing industry suggests few such opportunities, but this theory indicates that any acquisitions that do occur must be value-building. Agency Theory expects the outcome of firm expansion to depend on the strength of governance structures involved. The nature of governance in this sector implies a value-destroying effect from acquisitions. Thus, the contrast in predictions concerning firm expansion offers another test of whether Transaction Cost Economics is the dominant organizational paradigm in the food manufacturing industry.

Through a detailed analysis of the food processing industry based on the principles of Transaction Cost Economics and Agency Theory, we will be able to develop the above predictions about capital structure and acquisition. These predictions form the basis of our null hypotheses, and will then be compared to empirical tests on a sample of food processing firms. The model that most accurately describes the observed actions of food processors will be the one that correctly represents organization in this industry. The contradictory predictions of these models will be used to resolve whether we must reject the null hypotheses of Transaction Cost Economic organization. This experiment will thus meet our objective of discovering which organizational model, Transaction Cost Economics or Agency Theory, best applies to the food manufacturing industry.

1.3 Industry Trends

Organizational research relating to food processing firms currently has added importance due to the evolution of this industry in recent years. Several major structural changes have occurred in this sector. First, food demand has fragmented, leading to a new, consumer-driven,

marketing channel. Processors must stay abreast of current shifts in tastes, demographics, and health concerns (Barkema et al. 1991, 26). Second, the food supply chain is being reengineered, further complicating tasks for the food manufacturer. New technologies, business practices, and market conditions are all causing significant changes in companies' operations (King and Phumpiu 1996, 1182). Finally, retail firms are gradually concentrating (Connor and Schiek 1997, 325). All of these factors are relevant in agricultural markets to the extent they alter food processor decisions. Food manufacturers eventually handle over 90% of the value of US farm production, so impact of this industry on the demand for agricultural products is far from trivial (Connor and Schiek 1997, 60).

This transformation of the food processing industry will ultimately have a significant impact on every stage of production and marketing in the food channel. Unfortunately, this industry has evolved so quickly that surprisingly little is known about how firm strategy is chosen. Numerous small food processors exist, but the vast majority of manufacturing is done by larger companies organized in the corporate structure common to other sectors of the economy. This creates a situation where recognizing the decision-making process in this industry quite challenging, making it difficult for farmers and other parties in the food system to position themselves. Corporations are multidimensional organizations, and to truly understand their behavior we must seek to learn the basic rationale that guides everyday firm operation.

1.4 Procedure

We will use organizational economics to examine the food processing industry. Organizational economics can be broadly defined as the construction of firm relations. That is, the structure that defines how actors within or between organizations behave. Understanding how actors work within the dynamics of the firm allows for a much deeper appreciation of firm activities. In this paper, through an examination of capital structure and acquisition activity within the food processing industry, we will conduct a test of the two main theories in the field of organizational economics. This study should help explain why large food processing firms undertake certain activities. Markets are made up of competing actors who attempt to respond to the desires of buyers. Analyzing the food manufacturing firms that use such a large proportion of farm production will help us better understand agricultural markets. Yet, very little research has been done by agricultural economists using the principles of economic organization.

Study is warranted given the practical importance of these concepts to the current food channel. If it could be determined which model best explains firm activity in this industry, then this knowledge could be exploited to more effectively analyze food markets. It is in this hope that we begin with an overview of the two prevalent economic organization theories in chapter two, followed by a discussion of the observable aspects of capital structure and firm expansion in chapter three. In chapter four, the food processing industry is examined in relation to each model, with ensuing organizational predictions about capital structure and firm expansion. Finally, these predictions are tested empirically and the results presented in chapter five. Chapter six discusses application of these results, and the study is concluded in chapter seven. Through this process we will be able to observe which organizational model best fits the food manufacturing industry, thereby explaining the firm actions noted as being so relevant to US agriculture.

CHAPTER TWO

ORGANIZATIONAL ECONOMICS

2.1 Prevalent Organizational Models

Two main theories dominate the field of organizational economics, Transaction Cost Economics and Agency Theory. Empirical examination of the influence of selected capital structure and acquisition activity on firm performance will attempt to show which of these theories of economic organization is supported in the marketplace. Organizational economics has a firm-specific quality, so this approach can only draw broad conclusions about the food processing industry. However, these conclusions could begin the process of building an organizational basis for understanding food manufacturing firms, and may provide methodology that could be incorporated into exploring other sectors as well.

To undertake this examination we must first discuss these two prevalent organizational theories in some detail. Neither idea is a new one. Agency Theory has existed since Adam Smith first pondered the problem of agency conflict in *The Wealth of Nations*. These ideas were expanded during the early 1900s by Berle and Means in their landmark work "The Modern Corporation and Private Property". Subsequently, these concepts have been considered by those such as Fama, Jensen, Meckling, and numerous others.

Transaction Cost Economics was first credited to Ronald Coase, who touched on the subject in the 1930s in his classic *The Nature of the Firm*. This theory has been advanced in recent decades by Williamson, who helped add a crucial degree of legal and mathematical rigor. Thus, both theories have had ample time to develop, and yet there is still no true understanding of which model best describes the real world. It should be noted that these theories have a number of similarities, both emerging from the assumption of seeking efficient contracting in an imperfect world where decisions are subject to the discretion of managers of both capital and human resources (Williamson 1988, 570). However, these models fundamentally operate in different ways, and in many cases come to very different conclusions. Accordingly, it will be necessary to fully understand these basic organizational theories if we are to examine their validity in the food processing industry.

2.2 Transaction Cost Economics

Transaction Cost Economics is a form of analysis focusing on the exchange of goods between economic actors. The focal point of this analysis is the transaction. Firms seek to find

the most economical governance structure (Williamson 1979, 235). Organizations will want to find the way in which the total cost of exchanging goods between themselves and other similar entities is lowest. This does not mean accounting for simple price characteristics alone, but also analyzing the costs of searching for, negotiating, and enforcing transaction agreements, as well as the accompanying costs of breach (Joskow 1985, 36). In considering these costs, a party must judge the frequency, uncertainty, and specificity involved with the transaction (Williamson 1979, 239). Frequency can lead to higher transaction costs through the shear number of transactions. Uncertainty increases costs by forcing firms to bear risk and to undertake measures protecting themselves from unknown events. Specificity can lead to higher costs through losses due to protecting against, or falling victim to, ex-post opportunism.

Firms must face production expenses, as well as the transaction costs involved (Williamson 1979, 245). The relevant form of organization chosen will be the one that minimizes these costs. Transaction Cost Economics suggests several methods of organizing exchange. These include market transactions, neoclassical contracting, or relational contracting (Williamson 1979, 253). Market transactions are simply unorganized exchanges. Neoclassical contracts are traditional written contracts, while relational contracts are more durable and complex agreements built on relationships established over time (Williamson 1979, 238). Respectively, each of these forms denotes a higher level of intensity in organizing the exchange.

If transaction costs are high in the open market, then transactions will be further organized in the form of a contract. If neoclassical contracting is not sufficient, the exchange will be more rigorously organized using relational contracting. Separate parties will bargain over this contract until it becomes desirable to organize the transaction internally. Based on the nature of the transaction's frequency, uncertainty, and specificity, the firm must decide how to most efficiently organize this exchange. Coase suggests that "the distinguishing mark of the firm is the suppression of the price mechanism" (Coase 1937, 389). The firm's boundaries exist where the transaction is no longer completed internally. We then have an appealing theory, a theory that accounts for the size and organization of firms or other business units, while also meshing perfectly with the basic economic tenets of profit maximization through the concept of duality.

The transaction cost approach views the firm as a nexus of contracts (Coase 1937, 391). Whether explicit or implicit, the entrepreneurial function is to create contracts of different forms and strengths. These methods of contracting will then persist because they are the cost-

minimizing form of exchange. According to Transaction Cost Economics, the industry has organized itself for reasons of cost minimization, with the least-cost forms surviving in an economic evolution process (Alchian 1950, 213). These decisions on how to minimize the costs of transacting ex-post form the basis of Transaction Cost Economics.

2.3 Agency Theory

A slightly different method called Agency Theory is also available for dissecting the organizational structure of firms. This approach is based on the idea that firms may not be acting to build shareholder value. Such a possibility occurs because firms are often not run by the owners, but rather by professional managers. The defining characteristic of the modern corporation is this separation of ownership from control (Berle and Means 1932, 8). This creates the agency problem, and losses result if agents' (employees') decisions diverge from those optimally desired by the principals (owners) (Jensen and Meckling 1976, 308). If asset ownership and risk were restricted to managers, there would be no agency problem (Fama and Jensen 1983, 322). Yet, there are inherent benefits in separating management and ownership. First, the limits on raising capital are far less restrictive. In addition, professional management allows for realization of specific knowledge in management functions throughout the firm, as well as a more even bearing of investment risk and nearly risk-neutral decision making (Fama and Jensen 1983, 308). For larger and more complex companies this seems a more efficient structure, but the cost is the agency problem.

However, the agency problem can be controlled through proper monitoring and incentives within the firm, as well as discipline from outside the firm. Nevertheless, deviations from optimal contracting (a perfectly efficient agency relationship) persist in the real world (Bebchuck and Fried 2003, 72). This allows for the possibility that different motives drive the firm. Maximizing shareholder wealth may not necessarily be the primary goal of management. Management has the opportunity to squander corporate wealth should it so choose (Morck 1988, 293). Managers can also naturally derive personal utility from some types of value-destroying behavior (Morck 1988, 294). The inclination for some managers is to attempt to reduce their employment risk, and increase their compensation (Bebchuck and Fried 2003, 72). Managers may also derive utility from the consumption of certain perquisites furnished by the firm (Jensen and Meckling 1976, 312). These conflicts between the owners and managers of the complex firm as they align incentives ex-ante form the basis of Agency Theory.

CHAPTER THREE

Capital Structure and Firm Expansion

3.1 Testable Aspects

Economics is a social science rooted in the actions of individuals who nearly always have divergent interests. Organizational economics considers these shortcomings, and how businesses are structured to deal with these features in an imperfect world. Whatever the structural issue, organizational economics is a useful tool in accounting for the imperfect traits inherent within the relationships that define the firm. Of course, there are numerous facets of the firm affected by the organizational form. Yet, in this paper we will utilize two aspects broadly associated with firm financing, capital structure and acquisition activity. Vickner points out that there appears to be a general void within the field of agricultural economics concerning financial management (Vickner 2001, 1). Nonetheless, we have not overlooked this area, as it affords readily observable data about key decisions of the company, making it well suited to empirical investigation. The development of capital structure and firm expansion decisions also provide excellent insight about the underlying organizational design.

The capital structure selected has an effect on nearly every activity of the firm. Strategic initiatives are always undertaken with some form of capital consideration inherent within the decision. This logically includes the decision to acquire other firms, surely one of the most crucial tactical options. Organizational economics deals with both constructing capital arrangements and expanding firm boundaries. Transaction Cost Economics and Agency Theory are broad organizational models that pertain to these issues as only a modest subset of the concepts they encompass. Importantly, both of these organizational theories make active predictions about these two firm aspects. Therefore, examining these characteristics will be a meaningful way to investigate the validity of these organizational paradigms.

3.2 Decision Context

Ideally, all projects with a positive net present value would be financed, while those destroying value would not. Yet, companies operate in an imperfect world with respect to financial theory. Investment in the economy is hindered by the presence of informational asymmetry and opportunism (Kochlar 1996, 714). Managers with bounded rationality must make timely decisions in an exceedingly complex world (Barton 1988, 623). Human actors invest in firms run by other equally flawed human actors. All markets are imperfect, and the highly-

efficient capital markets are still no exception. Thus, it is clear that the discipline of the financial system can be imperfect at monitoring the internal capital arrangements of firms (Gibbs 1993, 52).

One of the most important financial investment decisions is whether to expand the boundaries of the firm. Optimally, expansion of the firm increases the overall value of the company. The firm may realize economies of scale, gain market power, or achieve various other synergies. Once again the real world does not exactly follow economic theory, and acquisition decisions may be subject to similar market imperfections. Some value-creating acquisitions may not be undertaken, while other value-destroying acquisitions could be completed.

Capital structure and firm expansion are then two key decisions for the firm, but they are also decisions steeped in complexity. Within the market there is some method by which firms make such choices. The design of firm relations will matter when information and actors are imperfect. Theoretical market perfection will never hold, and thus organizational structure plays some role in these decisions. We will now look to our organizational paradigms to find their respective predictions about capital structure and firm expansion. There are clearly some significant differences between these models, and nowhere is this more obvious than in these two aspects.

3.3 Organizational Determinants of Capital Structure

Capital structure is an area where these theories make divergent predictions, and thereby provides an excellent perspective from which to examine their validity. Capital structure choice is, for the most part, readily observable in firms. Publicly-traded firms are required to submit quarterly and annual reports, making much of the firm's raw financial data accessible. In this regard, we can see the foundations for a discussion of economic organization through the observed capital structures selected by firms. To undertake such an analysis, it will be necessary to examine the differences in the predictions of these models for the optimal capital structure.

Both of these theories exert that capital structure is a function of the nature of the firm. Like many other aspects of economic organization, capital structure can simply be viewed as the result of economic relationships, here between suppliers and users of capital (Kochar 1996, 715). Capital is an undifferentiated commodity input to production, and as such nothing suggests that one type of financing is naturally better suited to some activities in a world of perfect contracts (Williamson 1988, 579). Yet, as we have discussed, financial exchanges are subject to

complexities induced by imperfect contracting conditions. The objective in financial agreements, as in any other type of contracting, will then be to choose the form that economizes on costs in an imperfect world. The costs considered will differ in the model being utilized, but in the most general sense financial structure is selected by considering a trade-off between required outlays and governance characteristics (Kochar 1996, 716).

It should be noted that the financial literature identifies several other factors such as tax considerations, growth, industry effects, size, volatility, and profitability as other determinants of capital structure (Titman 1988, 2). Yet, our analysis focuses only on the application of organizational theory. Organizational economics argues that firms finance themselves in the way that minimizes cost, encompassing other exogenous considerations. The relevant question is what costs, and similarly what model, dominate these choices? This type of examination is possible when the models make different predictions, as is exactly the case with firm capital structure.

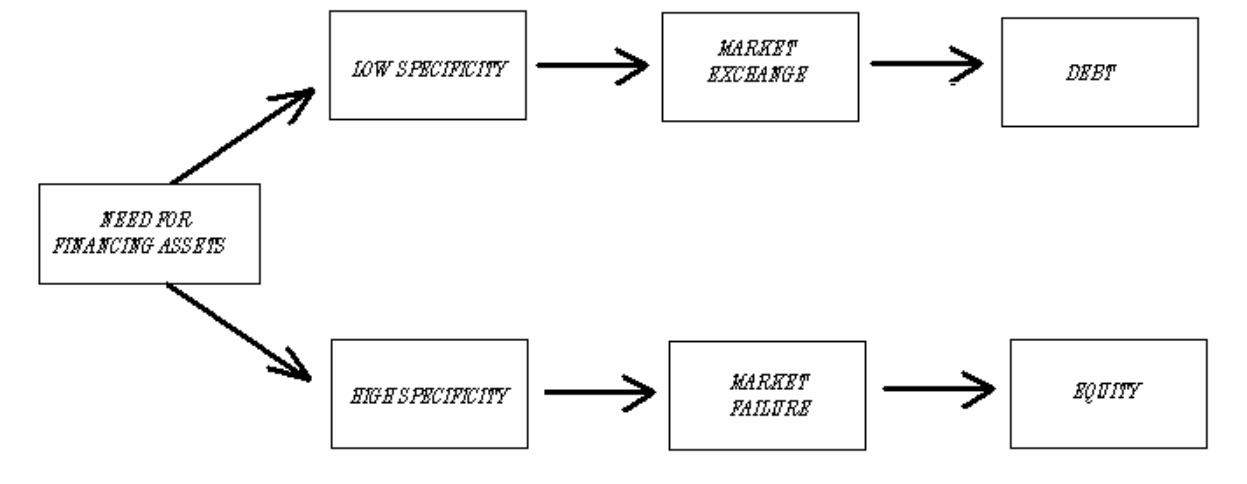
3.3.1 Transaction Cost Economics' Capital Structure Prescriptions

The differences in prescribed capital arrangements are manifested in the most basic determinants of this structure. Transaction cost analysis puts forth that capital structure is driven by the asset nature of the firm. Harking back to our earlier discussion, we know that this theory deals with the nature of transactions. In finance, Transaction Cost Economics now focuses on the specificity of assets used in production and exchange. Transaction Cost Economics considers the idiosyncratic nature of resources throughout the firm, and thus predicts capital structure in relation to the characteristics of these inputs. Under this theory, capital structure will be chosen to minimize costs given the uniqueness of firm resources. However, debt and equity finance will have disparate costs due to the differences in the way these mechanisms operate.

Transaction Cost Economics suggests that equity will apply the more restrictive form of governance (Kochar 1996, 716). The more intrusive system of monitoring managerial actions in equity financing will make this system less desirable. However, the resource nature of the firm may make this form of finance necessary. The use of the more market-like debt mechanism will be overly costly when the resources of the firm are of a very specific nature (Williamson 1988, 580). The salvage value of these highly idiosyncratic assets would be low in the event of default. This will provide little asset collateral to the bond holder, and will thus make debt financing very costly. Debt will then be precluded, and the obtrusive monitoring and control systems inherent in

equity will have to be employed, as it provides the low-cost form of financing in these cases. The capital structure decision in Transaction Cost Economics is depicted below in figure 1.

Figure 1 Capital Structure Choice in Transaction Cost Economics



Source: Kochar1996, 717

3.3.2 Agency Theory's Capital Structure Prescriptions

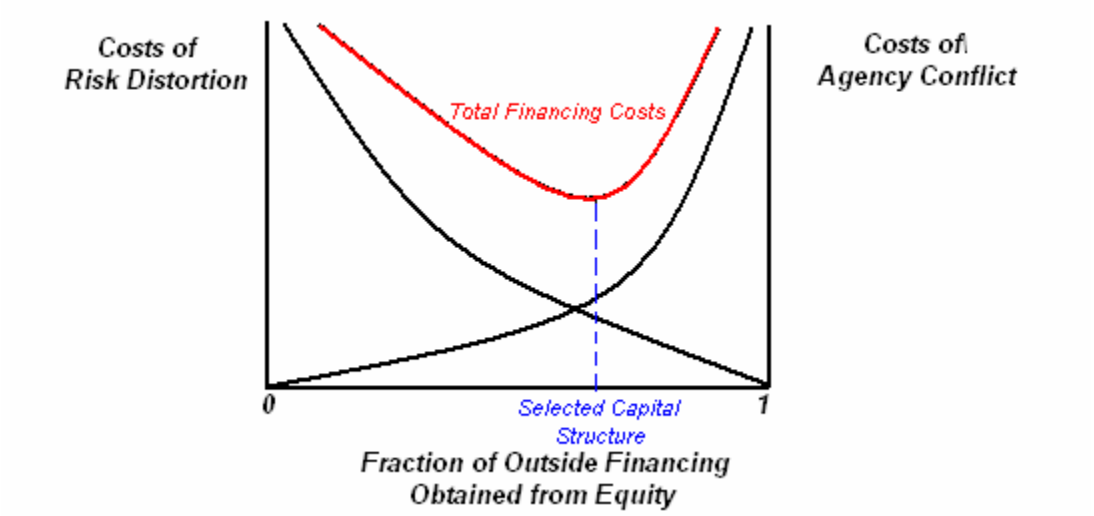
The perspective of Agency Theory is quite different. This model is based on the idea of minimizing losses occurring due to the disconnect that exists between the desires of principles and the actions of agents. Given these considerations, this theory then focuses on capital structure as a mechanism to provide a measure of governance. Financial commitments can provide a more intense pressure on management to be diligent. Coercion and threats have added credibility due to certain legal rights endowed under various financial mechanisms (Jensen 1986, 324). Managers will then have little recourse but to meet these financial obligations, which if structured correctly can greatly diminish the set of opportunities for agents to shirk or cheat principles. Thus, capital structure is sought as a way to reduce moral hazards by applying outside financial discipline to those managing the firm.

In accordance with this theory, debt is viewed as the more restrictive form of financial governance. Debt holders have stronger claims on the firm's assets in the case of default, and thus impose the risk of managers losing their employment and control of the firm in the case of bankruptcy (Kochar 1996, 715). Meeting debt obligations is a way to enforce responsible action on the part of the agent, making these parties pay cash flows to bond holders, even if accumulating cash would otherwise have been utility maximizing. Free cash flows are distributed, and diligent management is undertaken to maintain the firm's solvency. In this

manner, increasing firm debt acts as a type of bond on managers because of the threat of default (Jensen 1986, 324). This will reduce agency costs, making debt a powerful governance mechanism in Agency Theory.

However, this theory does allow for the existence of equity financing. This method becomes necessary because of the risk distortion that could occur with an extremely heavy debt load. Bondholders retain the downside risk in any investment, possibly leading firms to consider riskier projects that have positive expected values only after these downside risks have been subtracted (Jensen and Meckling 1976, 335). Thus, we can see that Agency Theory also suggests that use of both of these financial mechanisms will likely be present. The optimal mix of debt and equity is simply the one where agency costs are minimized, occurring when the marginal incentive dilution effects of equity are equal to the risk distortion effects of debt in the financial market (Williamson 1988, 578). The capital structure decision under Agency Theory is summarized in figure 2.

Figure 2 **Capital Structure Choice in Agency Theory**



Source: Jensen and Meckling 1976, 344

3.3.3 Previous Empirical Findings Regarding Capital Structure

Prior research has been done in this area. Barton empirically shows that, in choosing a capital structure, firms with different strategies react differently to financial measures (Barton 1988, 629). Further, managers appear to desire freedom from debt whenever possible (Barton 1988, 630). These results indicate that pure economic features are not the sole determinants of capital structure (Barton 1988, 630). This work lends strong support to Agency Theory.

However, other research in this area provides equal validation for the Transaction Cost Economics approach. Titman finds that firms which can potentially impose high costs on markets, customers, or suppliers in the event of bankruptcy, tend to choose lower debt ratios (Titman 1988, 14). Thus, debt is found to be negatively related to the level of "uniqueness" in the firm's business, as transaction analysis would suggest (Titman 1988, 17). Overall, there seems to be evidence supporting both theories in the financial literature, but no true conclusions.

3.4 Organizational Determinants of Firm Expansion

Organizational economics also deals with the concept of firm expansion. Therefore, another method by which we can readily examine the ideas of organizational theory is through acquisition activity. Firms have the opportunity to expand or contract their boundaries. This choice is also a function of the organizational structure of the company. The decision to adjust the boundaries of the firm is internal, that is made by management, although sometimes with voting approval by shareholders. Thus, the firm's organizational structure plays a big role in these decisions as well.

Some companies have been and will continue to be more prone to such activities than others. This trait can be due to industry characteristics, or other firm-specific opportunities. Yet, organizational structure of the firm plays an important role. Clearly acquisitions come in different types, such as horizontal (i.e. geographic) or vertical (i.e. suppliers and retailers). These assorted categories of expansion activity may have very different underlying motivations. In some instances both theories predict the same effect for a type of acquisition. Yet, the main overall difference is in the end results of these strategic maneuvers.

3.4.1 Transaction Cost Economics' Prescriptions for Acquisition

In accordance with Transaction Cost Economics, firm expansion is undertaken if doing so minimizes the cost of transactions. As discussed earlier, this theory considers several different dimensions of transactions by the firm. Should frequency, uncertainty, or specificity make transaction by open market or contracting costly, then it may become beneficial to extend the boundaries of the firm. The complexity and costs involved in such problematic transactions make it cheaper for the firm to internalize them, substituting market exchange for coordination by firm management (Coase 1937, 388).

Following this paradigm, this is the only circumstance where firm boundaries will be manipulated. Horizontal acquisitions may be undertaken to capture market power, economies of

scale, or other tangible economic benefits. Vertical acquisitions will be undertaken only to the extent they decrease costs of exchange. Unrelated acquisition is almost an unconsidered possibility under this theory. Firms seek to capture value, and will only undertake acquisitions when transaction costs can be minimized in some way by suppression of the open market price mechanism (Coase 1937, 390). This theory then predicts that acquisitions will always build firm value.

3.4.2 Agency Theory's Prescriptions for Acquisition

Agency Theory also makes predictions about expansion of firm boundaries. Agency Theory does not exclude value-creating acquisitions, such as those found in Transaction Cost Economics. However, Agency Theory does allow for firm expansion that is value-destroying, as it points out that these internal decisions may be subject to agency conflict since they are made by managers with divergent motives. Agency Theory in finance focuses on the costs associated with the free cash flows of the firm. Free cash flows are the cash flows in excess of that required to fund all projects that have positive net present values (Mann 1991, 214). Under Agency Theory, the system of monitoring and control is imperfect, resulting in losses to the principals from the misuse of these uncommitted cash flows. Managers will have incentive to use free cash flows to finance projects within the firm that fit their own motives, instead of distributing this cash to stockholders. The objective of owners in this context is to curtail the harm caused by undesired investment decisions, again minimizing the overall cost of operations.

These managerial decisions are an important aspect of the agency conflict in firm expansion. Expanding the boundaries of the firm may serve some ulterior motives held by the agent. Meeting growth requirements for bonuses, or simply the hubris of "empire building" are possible examples of management objectives (Jensen 1986, 323). Although expansions for such reasons are not desired by the principles, they can be undertaken in some circumstances. Horizontal and vertical acquisitions can still be completed on the same value-creating grounds, but there is the additional possibility that such acquisitions are done for other selfish reasons. In addition, Agency Theory also allows for acquisitions that are completely unrelated to the company's current business. The overall point is that, although acquisition may be value-building, it is possible for agency conflict to lead to value-destroying expansion activity by the firm.

3.4.3 Previous Empirical Findings Regarding Firm Expansion

Research has been done in this area as well, focusing primarily on the "free cash flow hypothesis". This idea is closely related to Agency Theory. Excess cash flows provide managers with the opportunity to avoid financial market monitoring, allowing for expansion and diversification of the firm in ways not necessarily desired by the company's principles (Gibbs 1993, 52). Gibbs examines the relationship of capital arrangements to the firm in restructuring and diversifying, finding that restructuring is correlated with increased debt and stronger governance mechanisms (Gibbs 1993, 63). Similarly, Harford finds that cash-rich firms undertake a greater number of acquisitions, and that these are more likely to be value-destroying (Harford 1999, 1995). Morck et al. conclude that managerial objectives drive value-destroying firm expansion activity (Morck et al. 1990, 47). Thus, this body of research lends some support to the presence of agency problems in firm expansion. Yet, this research is far from conclusive, and falls very short of forming the basis to reject Transaction Cost Economics.

CHAPTER FOUR

The Food Processing Industry

4.1 Industry Overview

Organizational Economics suggests that existing forms of organization persist for a reason, and that ineffective structures fall to the wayside (Alchian 1950, 213). Many organizational forms then become quite industry specific, based on unique characteristics within the sector that cause a structure to evolve over time. Jensen and Meckling argue that in industries where incentive effects of outside equity or debt are widely different, we would expect to see specialization in the use of the low agency-cost financing arrangement (Jensen and Meckling 1976, 355). Similarly, industry traits can be expected to strongly influence the nature of acquisition activity within a sector. Understanding industry specifics is crucial for interpreting any structural tendencies. The food processing industry has its own unique characteristics that affect its organization. We will now undertake an examination of the specific features of the food manufacturing industry, and how this makeup might translate into organizational predictions about capital structure and firm expansion.

Food manufacturers are firms that transform animal, vegetable, or marine material into intermediate or edible products (Connor and Schiek 1997, 3). Food processing is a large segment of the US manufacturing sector, comprising the biggest overall industry group and accounting for over 11% of the value-added (Connor and Schiek 1997, 68). It is not surprising that food processors take on many of the qualities typically associated with a general manufacturing company. Any illusions about firms engaged in “kitchen” preparation should be quickly dispelled. The food processing industry operates at a tremendous volume, employing over 1.6 million workers and accounting for shipments worth over 450 billion dollars in 1995 (Connor and Schiek 1997, 121). To accomplish this, the industry has become very capital intensive and highly “industrialized”. US food manufacturers are the most efficient in the world, benefiting Americans who now pay consistently lower prices for their processed food (Connor and Schiek 1997, 75). Food processing today is not an antiquated offshoot of agricultural production, but rather a technology-driven and highly complex global industry.

Food processors combine agricultural inputs, labor, and capital to form food products. Not all these products are end goods for consumers, as approximately 25% are sold as semi-processed products to be further manufactured by other companies (Connor and Schiek 1997,

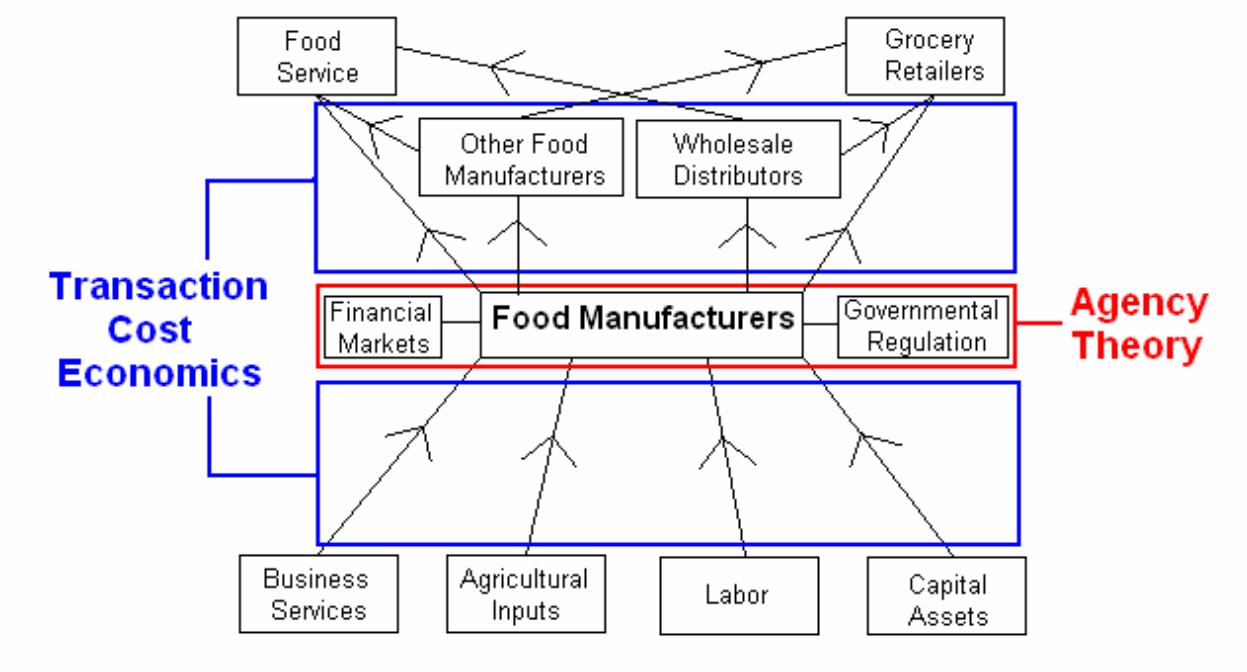
304). Yet, aside from this intermediate business, food manufacturers also sell to wholesale distributors, retail grocers, or food service firms (this flow of goods will later be depicted in figure 3). Products come in all shapes, sizes, and varieties, with subsequent effects on the chosen distribution channel. Regardless of the product or market channel, it is clear that the system is becoming more intricate. Technology has been injected into the system in recent years, and has revolutionized warehousing and logistics (King and Phumpiu 1996, 1182). This has led to a much more streamlined supply chain that cuts waste at every opportunity.

Adding to the complexity of these supply side changes are the evolving demands by consumers. Food demand has splintered, with consumers desiring an increasing variety of products, and a higher degree of processing than ever before (Barkema et al. 1991, 126). Greater ethnic diversity and increased income have led to a push for a larger assortment of food products, many with some traditional ethnic attributes. Meeting the demands for convenience in the American home is also becoming an ever more arduous task, as time strapped consumers desire an array of products that require barely any preparation. Furthermore, product uniformity is of growing importance in a supply chain that values consistency. Thus, the food system has not only become more cost focused in recent years, but more sensitive to quality control as well (Kinsey and Senauer 1996, 1190).

We will now examine this industry and its current trends using the two organizational economic theories already espoused. These models focus on very different aspects of the food manufacturing industry, as shown in figure 3. Food manufacturers purchase inputs from numerous sources, while at the same time selling product to many destinations. The nature of these exchanges is considered by Transaction Cost Economics, represented in the figure by the blue boxes. The firm is subject to an internal system of control, as well as discipline from external sources. The characteristics of these governance structures are dealt with in Agency Theory, shown in the figure by the red box. Both theories predict firm decisions as a function of economic relationships, but figure 3 demonstrates how the relationships of interest are distinct.

The crux of each model is fundamentally different from that of the other. In striving to reach our study objective, we must determine which area of focus is more effective at predicting firm activity in the food processing industry. It will be necessary to choose a logical approach to this rather formidable task. The only reasonable manner in which to attempt this analysis is to separately and methodically examine this industry from the perspective of each theory.

Figure 3 Agency Theory, Transaction Cost Economics, and the Food Processing Industry



4.2 Transaction Cost Economics in the Food Processing Industry

We have discussed the elements that compose the nature of the transaction. Yet, it will be necessary to further expound on some facets of these concepts that will have an industry specific dimension. To analyze the food processing industry, we must closely examine these elements within it. Searching for, negotiating, and enforcing contracts, along with the subsequent cost of a breach of contract, must all be considered in an industry context. These are all relevant costs to any transaction that must be equally weighted when considering a form of organization.

Yet, it is also clear that contracts, no matter what the strength, do not always work. Informational asymmetries can lead one party to dupe the other, or in some way take advantage of their situation (Cooter and Ulen 2000, 43). Even if perfect information exists, no matter how thoroughly negotiated and explicit the terms, there will always be some chance of an unforeseeable event occurring. Some detail will be omitted from the contract, and thus complete contracting is a theoretical fallacy. The tradeoff in contracting is one of the costs of added complexity, versus the losses due to ex-post opportunism (Williamson 1979, 246). The process of coordinating transactions is not as simple as it may first appear, depending on many industry characteristics that influence this level of contracting hazard.

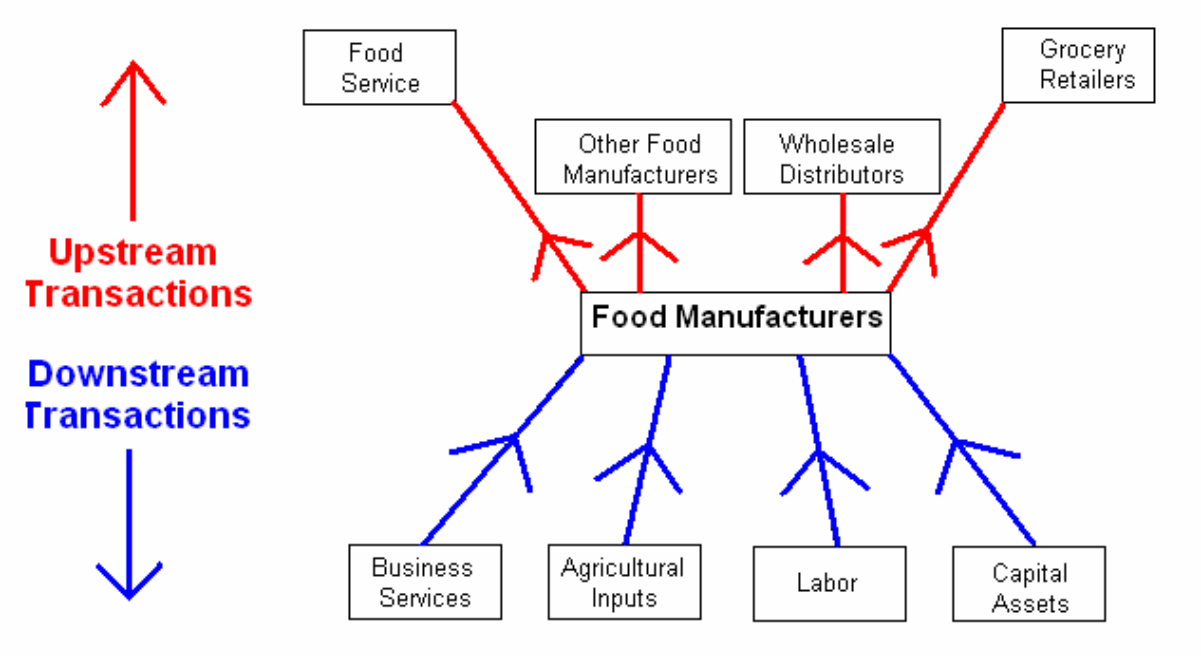
However, non-contract aspects also play a role in ensuring performance in any particular firm or industry. Everything may not be written into a contract, but other factors serve to bond the parties. Reputations, brand names, and even a profitable business relationship can all be powerful non-contract terms in certain industries. Firms have sunk investments into building reputations associated with their activities (Klein and Leffler 1981, 626). These allow trust in a company to keep its promises, trust that may be far more valuable to a business than any one-time appropriation. A premium income stream will also serve as a bond to control activities (Klein and Leffler 1981, 617). If the value of this exceptionally profitable relationship over time is worth more than a single default, then the company will perform as properly as if they were contractually compelled to do so.

Yet, in any economic sector contracts and non-contract incentives will ultimately fail at times, allowing for ex-post opportunism, or the appropriation of quasi rents (Klein et al. 1998, 298). This means that one party to a contract can exploit the other's reliance on their performance (Cooter and Ulen 2000, 193). These rents are the result of one party taking advantage of the other after sunk investments have been made. Site specificity, physical asset specificity, human capital specificity, and dedicated assets are all sunk investments that may lead to appropriable quasi-rents in any given industry (Joskow 1985, 38). For investments to occur in this framework there needs to be some type of resolution mechanism in place. This may differ significantly between industries, but can include third-party arbitrators, the legal system, or various other methods. Parties must have confidence in the settlement machinery if any type of contract is to be reached (Williamson 1979, 238).

Contractual forms develop based on the type of environment from which they arise, and must be considered within the contexts upon which they exist. In Transaction Cost Economics, efficient organization of economic activities then means matching governance structures with transactional attributes (Williamson 1979, 261). To understand the unique types of organization that Transaction Cost Economics prescribes in the food processing industry, we first must understand the specific nature of these transactions. In examining food processing industry conditions, we will break analysis into two levels. The first level will be transactions taking place between processors and input suppliers, which will be called "Downstream Transactions". The second level will encompass transactions between processors and output buyers, which will be called "Upstream Transactions". These two stages of food manufacturer transactions are shown

below in figure 4. Downstream and Upstream transactions are quite different in this case, and noting this difference will help in understanding the specific predictions of Transaction Costs Economics about the food processing industry.

Figure 4 **Downstream and Upstream Transactions**



4.3 Downstream Transactions

4.3.1 Downstream Specificity

The main input purchases of food processors are commodity agricultural products, labor, business services, and physical machinery. Transactions conducted by food processors are dominated by purchasing unspecialized labor and commodity inputs, making up approximately 13% and 58% of total costs respectively (Connor and Schiek 1997, 220). The people and materials that make up this process are not highly idiosyncratic resources, but the same cannot be said of the food processing industry's physical capital. It is important to observe the degree of physical asset specificity in the capital inputs used in food processing (Morrison 1997, 110). Buildings and processing equipment are the most ready examples of specialized assets. Processing plants are continually growing more automated to realize economies of industrialization (Harris et al. 2002, 3). Outside of the rapid processing of commodity inputs into food outputs, these machines have little, if any, second best use. Other less obvious specific assets include packaging technologies, or even genetic lines used by contracted producers.

Assets involved in downstream transactions could often be considered either to be site-specific or dedicated assets. Dedicated or site-specific assets are not uncommon in the food processing industry, given the difficulties and inefficiencies inherent in shipping some products long distances (Martinez 2002, 3). In addition, though most human capital may not be a specific asset in downstream transactions, some unique knowledge is required in procuring a steady and consistent supply of the often perishable inputs needed to meet efficient quality and capacity levels. Physical assets will be the most idiosyncratic resources in the food processing industry, but these other types of specificity may be important to individual firms.

An important overall distinction exists between the level of asset specificity present before the food processor, and that present at the manufacturing level. The trend has been for farm assets to become more idiosyncratic as producers become more specialized. However, much of the machinery, livestock, and land involved in agriculture could be readily employed by numerous producers. Some farm resources will be highly specific, but the problems of procuring and redeploying idiosyncratic assets are usually much more critical for the food manufacturer. The nature of resources is still relatively common at the farm production level, but at the processing stage of this channel we begin to see the combination of highly specific capital. The fact that the processing stage holds a disproportionate share of specific assets will be a distinguishing feature of this industry's organizational structure.

4.3.2 Downstream Frequency

In the purchases of commodity inputs required for food manufacturing, we see transactions that are very frequent. Agricultural products are often perishable goods that must be purchased on a frequent basis, although this frequency certainly varies. Some products are seasonal, making frequency exceptionally high for brief periods. Yet, food processors have traditionally organized their production systems in way that they were able to produce extremely large quantities for as long as possible (Pieter van Donk 2000, 739). The nature of food processing then entails a large scale of operations, requiring equally large amounts of inputs on the most consistent basis logistically practicable. The characteristics of commodity transport make bulk shipment not only feasible, but also economically necessary to be competitive. Aside from material inputs, a considerable amount of human resources are also required in the food manufacturing process. Labor for many production jobs is readily available (often immigrant), and turnover in these jobs can be extremely high. Many food processors are then constantly

buying agriculture inputs and relatively unskilled labor. There is a distinction in the machines and other capital involved. Capital items are very durable, and can be made to last as long as decades. Overall, while material inputs and labor are purchased frequently, capital infrastructure and machinery is purchased only occasionally.

4.3.3 Downstream Uncertainty

Uncertainty is an inherent consideration for the food processing firm. Farm commodity production fluctuates over time, leaving supply and price uncertainty within the market. Many producers exist for nearly every farm item, so finding these inputs and having them transported is not usually a great concern, although in a specific year price may be an issue. When processors must compete for limited inputs, enough of the input item must be available to keep plants operating at near capacity and to meet sales commitments (Connor and Schiek 1997, 250). The commodity futures markets can be used to manage such risks. These markets act to disperse price and quantity risk, minimizing the overall amount of uncertainty the food processor is forced to bear.

Nevertheless, quality and other characteristics can be quite a different story. For some products quality is readily observable to a satisfactory level, while for others it can be exceedingly difficult or impossible to judge (Kilmer and Stevens 2002, 41). Characteristics, such as freshness and safety of the input, may add some element of uncertainty to the transaction. These aspects of input supply can cause unpredictability or bottle necks in the production process (Pieter van Donk 2000, 744). However, government intervention (i.e. regulations, inspection, and grading) and scientific advances in processing technology help in alleviating this issue.

It does seem clear that this uncertainty is becoming a growing concern for the food processor. In today's consumer culture, processors are being forced to implement higher standards and bear the risks for ensuring that the inputs they buy are safe. As this trend continues, it will mean increasing complexity in the food processor's relationship with agricultural producers in order to eliminate the information asymmetry that currently exists about many quality aspects (Hennessy 1996, 1037). There will also be a measure of uncertainty imposed upon transactions with suppliers of machinery inputs. With increased pressure on food processors, there is an even greater strain on this infrequent and highly specific transaction. In particular, food-safety related equipment must work properly, and firms producing such machines must convince processors that they will be around in the future to service these

products. These transactions are already highly susceptible to ex-post opportunism, and increased uncertainty only serves to compound this problem.

4.3.4 Downstream Example of Transaction Cost Economics

An example might better illustrate the concepts. Consider the downstream transactions of food processors in the chicken industry, in which many types of specificity are combined with frequent transactions and a degree of uncertainty. Unique assets exist within this sector including production facilities, specialized processing plants, and breeding stock engineered especially for broiler production (Martinez 2002, 3). These assets have limited redeployability in other uses. To further complicate, limited shipping distances create a relationship-specific or site-specific investment in these transactions (Martinez 2002, 3). Similar levels of frequency and uncertainty to those found in the broader food processing industry are also present in chicken manufacturing.

Chicken processors operate on a very large scale and require a continuous flow of live broilers, but these firms must also carefully manage risks, including salmonella poisoning or other avian disease issues. Given these characteristics, this is an industry in which the vast majority of broiler production is contracted. These contracts give producers strong incentives to consistently meet quality and cost standards, ultimately fostering long-term investments that discourage opportunism (Knoeber 1989, 276). The complexity of these exchanges may even lead to further coordination in some cases, resulting in vertical integration. Currently around 80% of broiler production is contracted, while integration has risen to around 20% in recent years (Martinez 2002, 2). In this example we can then see how the nature of transactions affects the downstream organization of the food processing industry.

4.4 Upstream Transactions

4.4.1 Upstream Specificity

The asset specificity involved in the upstream movement of food products once again seems relatively high. Large food processors operate with significant economies of scale, and produce massive quantities of goods in order to reduce per-unit costs. Many processors sell very similar products to every outlet in which they do business. This leads to the long production runs and accumulated stocks of end products common to food processors (Pieter van Donk 2000, 743). However, this is not merely the nature of food processing. Retail chains want a dependable supplier of standardized products in all stores. Even consumers value consistency in food products. For processors undertaking private-label production there is an additional element of

specificity in these products, but it seems that even this is not great. Aside from some labeling or batch recipe differences, the transaction is not much more relationship-specific than for brand name producers (Connor and Schiek 1997, 332).

Although the transactions may become routine, the resources required to logistically accomplish moving large quantities of products through this system are not. Shipping, handling, and other marketing functions involved in food processing are not in themselves highly specialized. In most instances little service is required, with the possible exception of basic transportation, which could itself be rather specific if the product is perishable. Overall, what is specific are the assets required to coordinate these operations with efficient costs. Electronic data interchange (EDI), computer assisted ordering (CAO) and other developments are becoming increasingly necessary to integrate into the mainstream food supply chain (King and Phumpiu 1996, 1181). Information and logistical technology will then clearly be important forms of physical asset specificity.

Site specificity seems likely to be low in upstream transactions, as processed food products are often relatively easy to ship. However, human asset specificity may be noticeably greater in this case since the skills of category managers, logistical personal, packaging experts, and marketing specialists will be very important (King and Phumpiu 1996, 1183). Dedicated assets abound and overlap everywhere in these transactions, as we notice a large amount of physical and human capital devoted solely to working with large retailers. The overall disparity of specific assets between food processors and retailers is not as great as we saw in the downstream channel. Yet, compared to buildings, sales technology, and inventory equipment used by retailers, the assets of the food processor are of a slightly more idiosyncratic nature. Again, the nature of transactions is not highly specific for the majority of the goods involved, but we must characterize the assets needed to facilitate these upstream transactions as being quite specialized.

4.4.2 Upstream Frequency

There is frequent interaction between food processors and upstream buyers, although this aspect can vary by product. Transactions of fresh products are necessarily more frequent, while dry goods can be purchased far less frequently. However, transactions throughout the food system for nearly every type of good are becoming more frequent (Vickner 2001, 6). Recent retail methods such as “efficient consumer response” and “efficient replenishment” have

revolutionized the way logistics operate in the market (King and Phumpiu 1996, 1181). Keeping inventories down is cost minimizing, while closely tracking purchases ensures that limited shelf space is fully utilized. Delivery times tend to be short, and reliability needs to be high in the food processing industry (Pieter van Donk 2000, 743). Frequent shipments entail efficient inventory management, while cutting down on spoiled product. These factors combine to make frequency very high for food processors in their upstream transactions.

4.4.3 Upstream Uncertainty

Uncertainty is fast becoming an area of concern for food processors in dealing with their upstream buyers. Here processors face a derived demand that fluctuates. Retailers have historically passed almost all of this uncertainty onto processors, leaving them with a "lumpy" demand (Pieter van Donk 2000, 743). Yet, with increased concerns about contamination and the need to trace back tainted items within the food system, pressure is being applied from consumers via retailers as well. Publicly visible retailers are highly concerned about the quality and safety of products they sell (Kilmer and Stevens 2002, 43). Processors then must bear some substantial risk for ensuring the quality of both incoming materials and outgoing products. In many cases, a small amount of unsafe input can contaminate a large amount of food through dispersion in preparation processes. For example, one diseased cattle carcass can contaminate thousands of pounds of ground beef as the carcasses are co-mingled. It is vital that a processor meet retailer requirements, as a shipment of contaminated or inferior food can endanger an economic relationship in a fashion inconceivable for most other manufactured products.

Nevertheless, the food processor does have a type of equity with the retailer in their often well established brand names. As Joskow points out, "reputational constraints will mitigate hold-up incentives" (Joskow 1985, 39). In fact, over 80% of US grocery products are nationally or regionally branded (Harris et al. 2002, 8). Retailers will have incentive to trust the quality guarantees of the food processor, given the firm's reputation and the specific business relationship that has developed. Maintaining this brand equity is crucial to ensuring quality food products, shown by the fact that average food firms spend between 25% and 35% of sales on advertising (Weston and Chiu 1996, 2). However, one serious recall can destroy the goodwill associated with a processor. The retailer's reputation is at stake as well, adding greatly to the importance of this uncertainty within transactions. Food processing is a mature sector with established firms, but the problems of uncertainty and liability are increasing dramatically.

4.4.4 Upstream Example of Transaction Cost Economics

An example might once again be illustrative. In keeping with our chicken example, one processor that might characterize these upstream transactions as highly specific would be the US's leading chicken manufacturer, Tyson Foods. In many parts of the country, Tyson is the chicken supplier to Wal-Mart. Although the scale offered by Wal-Mart is unparalleled, Tyson can also realize efficiencies in marketing and shipping (Cotterill 2001, 49). Yet, to participate in this venture Tyson has undoubtedly been forced to undertake significant investments in capital and relationship-specific assets to integrate itself into the Wal-Mart supply chain. These investments likely include data management technology, human resources, and other physical capital devoted solely to serving the needs of this massive business partner (King and Phumpiu 1996, 1182). This relationship has also certainly increased the frequency within Tyson's supply chain. Though Wal-Mart is hardly a high-end retailer, enforcement of quality and safety measures are also likely to be much stricter in order to preserve this important relationship. Neither company has an interest in integrating into the other's business, both know their limits. This then is indicative of the nature of upstream transactions in the food processing industry, characterized by very idiosyncratic assets, high frequency, and some measure of uncertainty in meeting powerful buyer demands through open market transactions.

4.5 Predictions of Transaction Cost Economics

4.5.1 Transaction Cost Economics' Expectations of Acquisition

Given these general conditions within the sector, we can then draw some conclusions about what type of organization we would expect food processors to maintain. Transactions in the food processing industry are either common and frequent, or specific and occasional. Food processors hold key specialized assets in both sets of transactions, though the transactions themselves are generally not complex. These aspects would then lead us to expect the food processor to maintain an independent status in terms of firm boundaries.

Some increase in the monitoring required for food products could lead to an increase in integration, but arms-length contracting should be sufficient in most regards (Lawrence et al. 2001, 372). Even in extreme cases where product must be tested, this complexity could be handled through neoclassical or relational contracting. As technology improves testing and grading techniques, incentives to vertically integrate will further weaken (Barkema et al. 1991, 33). There seems little economic reason why it would be cost effective for food processors to

undertake more intensive vertical coordination. The realistic assumption of diminishing returns to management suggests that the costs of organizing these activities internally will continue to rise, while the benefits in this industry seem negligible (Coase 1937, 394). Even in considering more restrictive forms of contracting, the costs seem to outweigh the potential benefits in many cases. This concept appears especially relevant to the food processor, as specifications are often contractually manifested at a threshold level, showing the exact point where costs of added detail equal costs of broken agreements.

However, we can expect to see wide use of implicit contracts in this market. The name of the food manufacturing firm will signal quality to both retailers and consumers, and thus the unwillingness to shirk in terms of contract performance. Given the intense competition in the food processing industry, we might expect to see relatively small price premiums to ensure this performance (Klein and Leffler 1981, 622). Price premiums are effective in ensuring quality when they guarantee a positive income stream over the gains from a one time default. Yet, in a mature industry firms will compete and drive premiums down, leaving companies to find other ways in which to contend for market share. This will lead companies to undertake firm-specific capital investments in brand name or goodwill (Klein and Leffler 1981, 626). Sunk costs involved in building implicit contracts are important to the food processor. The average food processor has been in business for a long time, and in many cases these investments are already significant. Nevertheless, maintenance of these brand names and reputations will be key. These firms have, and will continue to require, large amounts of brand-name capital with which to bond themselves to the supply of safe foods.

We can then draw conclusions about the optimal firm organization within the food processing sector suggested by Transaction Cost Economics. The food processor engages in frequent transactions of common goods, but also infrequent transactions of costly and highly idiosyncratic assets. These infrequent capital purchases will seldom lead the food manufacturer to integrate into machinery production, although the nature of these transactions may lead processors to develop their own components in some instances. Even though overall industry exchange terms are not overly complex, meeting minimum standards is very important. These costs are allayed by the fact that food processors often have fixed brand-name investments acting as good faith bonds. We would thereby expect to see neoclassical or relational contracting, but little vertical integration into other stages of the food supply chain. Under this rationale, we

expect to observe an industry structure with little incentive to organize more transactions inside the firm. The basic tenets of Transaction Cost Economics are quite clear, the firm's boundaries will be expanded to the extent, and only to the extent, that it builds the value of the firm by minimizing on the costs of transactions with suppliers or buyers (Coase 1937, 390). In this industry, little value is expected to be created through expansion, but any acquisitions that occur should be special cases where firm profitability can be increased.

4.5.2 Transaction Cost Economics' Expectations of Capital Structure

Given the highly specific nature of some of the transactions and assets in this industry, we can also make some predictions about capital structure. There are a number of extremely costly and idiosyncratic assets involved in both upstream and downstream transactions. Given this characteristic, Transaction Cost Economics would predict an industry dominated by equity financing. This theory finds equity financing more intrusive, and thus where possible this form will not be chosen over the less invasive debt mechanism. Regardless, this equity dominated capital structure would be expected to persist in the food manufacturing industry, as it is the low-cost form of financing under this theory.

With highly specific assets and considerable risk, bondholders would expect risk distortion in the food manufacturing firm's decisions, and consequently having downside risk projected upon themselves. Investors would then factor this into their decisions, thereby demanding a higher yield on bonds issued by food processors. This should make debt more expensive, leading firms to opt for cheaper equity financing. The nature of financial transactions in this sector should make it such that equity would come with the lower overall costs, making it the dominant component of the food processing industry's capital structure. Our a priori prediction would then be for more highly leveraged firms in this industry to have higher capital costs, and thus perform comparatively worse.

4.6 Agency Theory in the Food Processing Industry

We now turn to Agency Theory to get a very different perspective about organization of the food processing industry. A key aspect in evaluating industry-specific agency conflict is the unique construction of monitoring and incentive schemes meant to assuage the agency problem. Within every complex firm where ownership and decision-making is not consolidated, there is some structure for both monitoring and incentives. In addition, several mechanisms also exist to apply discipline from outside the firm. These external arrangements also vary by industry, and

therefore we must understand the specific strengths and weaknesses of these forces within the food processing sector to obtain predictions from this theory.

Yet, first we must discuss in detail several aspects of these systems that are especially relevant to the food manufacturing industry. The idea behind monitoring is that decision control and decision management should be separated within the firm (Fama and Jensen 1983, 304). This means that managers should have some sort of authoritative entity overseeing their decisions. The decision control function is then a cost born by shareholders to ensure that managers undertake appropriate actions. This task is usually undertaken by a compensated board of directors. Additional structures, such as "mutual monitoring systems" where managers monitor each other or "decision hierarchies" requiring a process of decision validation, will help ensure agents behave as desired (Fama and Jensen 1983, 310).

Incentives most often come in the form of various compensation schemes. Performance-based pay requires that the manager undertake certain actions in order to realize gains. Professional managers are economic actors, and incentives are a strong way of tying their welfare to those of the principles. The problem with incentives is not that they are ineffective, but rather that they are often too effective (Baker et al. 1988, 597). Caution must be used, as these systems are so powerful that the principle must be certain they are giving incentive for precisely what they desire accomplished. Another similar form of incentive that can be forced upon the manager is that of the managerial labor market. If managers desire promotion or simply a quality reference, they have reason not to tarnish their own reputations (Rosen 1990, 14). Agents can also be subject to incentives that invoke a sort of bonding action. This concept is a bit more evasive, but the idea is that the manager put up some sort of tangible or intangible bond that can be seized in the event of default on their managerial duties. Some suggestions of the form this might take include backloaded wages, benefit schemes, and vested option plans (Hutchens 1989, 61). Bonding can also have adverse effects, since at some point it may become desirable for the manager to actively pursue "golden parachutes" or other lucrative severance compensation.

If monitoring and incentives functioned perfectly, there would be no agency problem. The only losses would be costs associated with providing monitoring and incentive systems. Yet, there are almost always some residual losses from being unable to completely reconcile the agency problem (Jensen and Meckling 1976, 308). In reality these tools are effective, but are

unable to fully rectify the agency conflict for numerous reasons. This contracting between principles and agents is ultimately imperfect like any other contract. Terms can never completely encompass the complexity of real world jobs, especially when services or multiple tasks are involved (Holmstrom and Milgrom 1991, 25). Job design is thus fundamental to applying any type of incentives or monitoring (Holmstrom and Milgrom 1991, 26). Incentives and monitoring may be powerful tools, but they must be designed and implemented very carefully in order not to do more damage than good.

Monitoring schemes are subject to bias that makes them ineffectual through the very process by which they are constructed, let alone in their challenging implementation. The monitoring function is most often biased because it is subject to the influence of the managers of the firm. Boards are often chosen by the director's slate put forth by top management. Compensated directors wishing to retain their positions will then have an incentive not to cause trouble for the management. In fact, the management can even affect directors' compensation and perks. Hence, it is clear that directors will often have a reason to favor the current management team (Bebchuck and Fried 2003, 74). Thus, the effectiveness of monitoring begins to break down when management becomes entrenched or in some other manner gains a disproportionate amount of power within the firm.

Incentives can also be rendered ineffective. Pay-for-performance is the desirable compensation structure to encourage diligent effort. Of course, there are typically other components of executive pay that allow the manager to escape some employment risk. A base salary and incentive pay usually compose the management's compensation, with a higher salary component being found in industries subject to a greater degree of risk (Garen 1994, 1177). The exact makeup of pay can be hard to determine, as pay can be camouflaged to a significant degree. This allows wages with very little incentive attached to be dispersed under complex compensation schemes that disguise components and levels of pay (Bebchuck and Fried 2003, 76). Firms with poorly designed incentive systems will provide pay that is costly to the principle, both in terms of lower effort and wasted profits doled out as ineffective compensation. Under the influence of managerial power, executive pay may not be a way of addressing the agency problem, but rather a part of the problem itself (Bebchuck and Fried 2003, 72).

In combination with internal monitoring and incentives, the firm is also subject to some measure of external discipline. As we have discussed, the financial structure of the firm not only

contributes to the operation of the firm, but also to the way it is organized and managed (Sandberg et al. 1987, 15). Financial markets have incentive to monitor a company to the extent that they have a relevant stake in the firm. Thus, in addition to the type of financing present, the characteristics and concentration of investors are also extremely important factors (Demsetz and Lehn 1985, 1156). Larger institutional investors or persons with highly consolidated holdings will likely play a bigger role in the firm. These actors are certainly important in the monitoring and oversight they perform, but also in the sheer financial and voting clout they wield.

The basic point is that organization of the firm to manage agency problems not only includes the within-firm guidelines created, but also has to do with the firm's needs, obligations, and opportunities in the broader financial market. The governance applied by debt is nearly universal, but the discipline applied in equity markets will have a highly industry-specific aspect. Underperforming firms are ultimately subject to the market for corporate control, although more promptly in some sectors than others (Jensen 1986, 329). The opportunity for such outside discipline may be weakened by the construction of defensive measures such as litigation by target management, block stock repurchases, "poison pills", and numerous other mechanisms used by entrenched executives (Jarrell et al. 1988, 63). Nonetheless, in cases of exceedingly poor management the financial markets will apply considerable discipline within any industry.

For the most part, outside discipline originates in the financial markets, but some is applied by the presence of governmental regulation (Demsetz and Lehn 1985, 1161). In most sectors government regulation is not a major issue, but it does have an unusually strong impact on activities of food processors. Aside from basic market regulation by entities like the Securities and Exchange Commission (SEC), food processors are also subject to the specific regulations and standards of organizations such as the United States Department of Agriculture (USDA), the Food and Drug Administration (FDA), and the Grain Inspection, Packers and Stockyard Administration (GIPSA). These are powerful agencies that have significant influence over the actions of food processors. It then seems that the food manufacturing industry is subject to an additional measure of external discipline that other manufacturing sectors are not.

Agency Theory certainly provides another very distinct vantage point from which to view organization of the food processing industry. The firm is not an individual, and thus determining the cause of this entity's actions is far more complex, driven by the discipline to which the firm is subject. Both internal and external disciplinary forces are clearly influenced by specific

industry characteristics, although individual firm traits certainly play a major role as well. We will again find it beneficial to examine the food processing industry, breaking our analysis into more focused segments. Considering the Agency Theory approach and its predictions, discussion will be divided into "Internal" and "External" sources of discipline. The origins of these two types of discipline within the food processing industry are shown in figure 3. This partition will allow us to observe the array of industry factors coming into play in Agency Theory, and should help us understand the decision process of the food manufacturing firm. Knowledge of this process may then be used to make industry predictions about capital structure and expansion activity.

Figure 5 **Internal and External Sources of Discipline**

4.7 Internal Firm Discipline

4.7.1 Monitoring

Food processors have gradually consolidated over time, with plant numbers falling and plant sizes growing (Connor and Schiek 1997, 91). Although approximately 16,000 food processors still exist in the US, the 50 biggest firms account for well over 50% of sales and control over 80% of the industry's assets (Connor and Schiek 1997, 95). These major firms are almost invariably organized as corporations, because of significant financial needs in this capital-intensive industry. Therefore, in food manufacturing we see an industry characterized by the separation of ownership from control, and a resulting susceptibility to internal agency conflict.

Ineffective monitoring systems seem likely to be a real problem in the food processing industry with its rather established management teams. Minority and management control, as defined by Berle and Means, are the industry standard (Berle and Means 1932, 75). Stagnant industry growth can also create situations where it is difficult to tell if the agent is performing.

Mature markets are ripe for agency problems, since it is hard to distinguish between sluggish management and sluggish industry performance. The food processing industry is certainly mature, as its basic domestic growth determinant is the mere 1% annual increase in US population (Weston and Chiu 1996, 1). Growth and profitability have been higher for pre-pared food and other "healthy" products, but overall expansion of the food manufacturing sector has been modest for decades. This industry is reliably profitable, but growth expectations are not high, making it hard to monitor firms and distinguish poor management performance.

In addition, entrenchment and ineffective monitoring can be an even greater problem when founders or members of the founding family hold prominent positions (Morck 1988, 310). This, of course, is not an uncommon characteristic in the food manufacturing industry, with several founding families playing a role in food corporations that were once family businesses. Whether boards are relatively weaker in this industry is uncertain, but we find no evidence that these bodies are especially effective. Overall, we observe conditions in the food processing industry that typically lead to weak within-firm monitoring. These problems are inherent in many industries, and it is not clear by any means that food processors suffer from notoriously bad agency conflict. What is clear though, is that this industry is at least equally vulnerable to ineffective monitoring and the agency problems that result.

4.7.2 Incentives

We have already addressed the presence of risk in the food processing industry. This sector is quite non-cyclical, but there are still considerable uncertainties. We correspondingly see a significant proportion of base salary pay in this industry, as opposed to compensation derived from performance. This will lead to weaker incentive systems in these firms, resulting in somewhat higher levels of agency costs. In addition, the use of options and other equity-based compensation is becoming increasingly prevalent in food processing, as has been true in nearly every industry in recent years. However, the incentives created by these measures are a perfect example of compensation that may not be overly effective.

"At the money" options can be repeatedly cashed out, forcing the principle to continually rebuild these incorrectly structured incentives. Options can be useful, but only when vested "out of the money". This stipulates effort by agents to make options valuable, and does not entail principles having to continually pay to realign incentives (Bebchuck and Fried 2003, 86). Compared to say technology companies, the effectiveness of stock options is further diminished

in the food processing industry since their value will rarely increase quickly. Information on other performance pay structures is not easy to obtain, but again the important fact is that there is no indication that these schemes are extraordinarily successful within the food processing industry. With large firms organized in the typical corporate structure, there appears to be an at least average likelihood of ineffective incentive systems in this sector. Agency Theory would then predict agency costs to ensue for the food processor.

4.7.3 Internal Discipline Example of Agency Theory

An example from the food processing industry once again seems warranted. In keeping with our chicken processing example, we will again use Tyson Foods to illustrate these concepts. In terms of within-firm discipline, it does not seem that Tyson is different from many food processors. The firm's CEO is John Tyson, grandson and namesake of founder John Tyson who started the company in 1935. The father of John Tyson, Don Tyson, sits on the board and currently holds 80.3% of the firm's aggregate voting shares (SEC 2004). This is due in large part to the company's dual-class stock structure, which allows the Tyson family almost unopposed control of the firm. Directors are elected through proxy votes, and the result should be no surprise given this distribution of voting power. On the nine member board, John, Don, and Barbara Tyson round out a well-represented Tyson family. We can then clearly expect to see some deficiencies and bias in the monitoring of this firm.

In terms of incentives, Tyson executives are paid base salaries ranging from $475,000 to $993,000, with bonuses ranging from $240,000 to $2.5 million (SEC 2004). It can also be observed that options are used extensively in this firm, although likely somewhat ineffectively as they are vested at only 10% over face value for management. Executive officers as a group received over 3.1 million options in fiscal 2003, with John Tyson claiming a generous 1.6 million of these (SEC 2004). Incentives then also appear to be relatively weak and significantly biased in this firm. It should be noted that the grouping of incentives, control, and ownership could diminish the agency problem to some extent in this case. However, outside stockholders have provided a large share of this company's total capital, with little ability to assuage losses due to agency problems. Overall, this firm provides a perfect example of a food manufacturing company where agency conflict is likely due to ineffective or biased monitoring and incentives. Within-firm discipline is often hard to judge, but in the current example it is quite obvious that this food processor could face some very serious agency problems.

4.8 External Firm Discipline

4.8.1 Financial Markets

In the food processing sector, outside discipline seems to be a somewhat stronger force than within-firm governance. The legal rights of debt holders in the food processing industry are the same as they are in every other sector. Yet, unusually strong discipline is applied to this industry through the equity mechanism. The reputation for food firms as "cash cows" makes them especially attractive for takeover attempts (Vickner 2001, 5). Food manufacturers are a non-cyclical group that pumps out a consistent amount of cash each year. As we have discussed, growth is likely to be sluggish in the food processing industry, resulting in stock prices that fail to meet the Standard and Poor's 500 Index (S&P 500). This makes food processors prime targets for takeover attempts. Even within the industry itself, firms are constantly seeking growth through acquisition, and are always looking for bargains. It should then be no surprise that food processors are very prone to mergers and acquisitions, with between 3% and 6% of total assets changing hands per year (Connor and Schiek 1997, 113).

4.8.2 Government

Further intensifying external discipline for food manufacturers is the significant presence of governmental agencies in this sector. In most US industries governmental discipline is a minimal consideration, but this is clearly not the case throughout the food system. The government has undertaken the task of ensuring a safe and dependable food supply. The effect of this public policy on firms has been strict control of some activities. For the most part, this intervention is in place to protect the safety of the consuming public. Rules about food preparation or packaging are most common. Although this control often comes in the form of specific constraints on production methods, overall regulation of the market on behalf of producers or consumers is certainly not unheard of. Government rules and regulations then add a strict form of discipline to that already applied by financial markets.

4.8.3 External Discipline Example of Agency Theory

An example of outside discipline will once again be helpful, as we choose to further utilize our Tyson example. However, this time the effects transcend the chicken industry in scope. Tyson has been making inroads into the beef business for some time. In 1997, Tyson purchased a Nebraska-based beef packer called Hudson Foods. What is remarkable about this example is that it displays both of the main forms of external discipline facing food processors.

This example certainly shows the discipline applied by the market for corporate control. Hudson was making thin or negative margins producing ground beef for Burger King. The company was performing poorly, and powerful Tyson made an unsolicited offer to buy Hudson's assets.

Yet, what was perhaps more key in bringing about this acquisition was discipline applied by the government. A month after 15 people in Colorado became sick from E.coli contaminated meat, Hudson was forced to recall an incredible 25 million pounds of hamburger (CNNfn 1997). In addition, the offending plant was shut down by Secretary of Agriculture Dan Glickman until safety standards were met (CNNfn 1997). The move of pulling USDA inspectors from the plant was criticized by those at Hudson as being far too drastic. Yet, the damage was done, leaving Hudson with little alternative when Tyson made its play for the company several weeks later. Both the market for corporate control and federal intervention combined to doom Hudson. In this example, we can see how financial markets and governmental regulation can combine to provide governance for firms in the food manufacturing industry.

4.9 Predictions of Agency Theory

4.9.1 Agency Theory's Expectations of Acquisition

Given this analysis of food processor characteristics, we can again make some predictions using organizational theory. We have seen that the food processing industry has the potential for agency problems, resulting from both the internal and external disciplines applied. We found the overall level of internal discipline to be relatively weak, but also determined external discipline to be a more serious consideration. Unexceptional internal monitoring and incentive systems, along with some mild discipline applied by the government and financial markets, will lead to some unusual types of expansion activity.

In a mature cash-rich industry like this one, especially with less than intense discipline being applied internally, we can expect to see traditional free cash flow agency problems. This industry trait will lead executives to undertake acquisitions for the purposes of "empire building", to diversify their own employment risk, or to meet growth objectives in a stagnant market. At the whim of rebellious managers, many firm expansions in this particular industry will likely be unrelated acquisitions with little vertical or horizontal justification. These expansions will probably not be beneficial to the company, only serving to disperse management effort in areas where the firm does not have competencies.

Yet, some considerable external discipline has been noted in this industry. We usually think of discipline as forcing managers to take the proper actions. Although the market for corporate control and governmental intercession are generally reserved for only the most egregious offenders, even in these cases external discipline might have an alternative effect. Food processing firms sometimes engage in types of defensive acquisitions to counter the power of competitors or companies looking to integrate (Harris et al. 2002, 6).These acquisitions may be last ditch actions of desperate management, rather than logically considered firm expansion. Though external discipline is a factor in the food processing industry, combined with weak internal governance it may have a detrimental effect.

In either of these cases, we witness firm expansion that is undesirable. Agency Theory certainly allows for productive firm expansions, but to the extent that they are not it indicates an agency problem. Overall, acquisition activity in the sector could still be value-creating. Yet, Agency Theory allows for, and even predicts, firm expansion in the food processing industry that is value-destroying.

4.9.2 Agency Theory's Expectations of Capital Structure

Knowing the characteristics of this industry, we can also draw some conclusions about the capital structure we might expect to witness. There are tremendous economies of scale in food manufacturing, thus requiring substantial capital investments. For most processors, this burden would be unrealistic for any one person or small group to take on. Therefore, outside sources of funding should be absolutely vital to this industry. Considerable financial needs will make it efficient to secure outside investment, and hence to separate the management and ownership functions.

While food manufacturing may not be the most complex industry, the process of creating consistent-quality food products on a large scale certainly takes some specific scientific knowledge. It is also clear from our industry discussion that risk will be a consideration. There then seem to be further gains from separating management from ownership here. Requirements of knowledge and capital, along with the risk inherent in this market, will make it efficient to have professional managers making educated and risk-neutral decisions on the behalf of outside investors.

Given that professional management and outside investment appear necessary, it will then depend on the strength of the governance systems to determine what type of capital

structure is selected. In our discussion, we found nothing exceptionally strong about these systems in the food processing industry. Management will therefore choose the less restrictive financial form, and utilize a high proportion of equity. Much of the outside discipline in this kind of capital configuration is applied in the market for corporate control, but as we have mentioned this market generally targets only the most egregious offenders. Equity then often provides relatively weak governance, relying primarily on the internal structure of monitoring and incentives. When these systems are impotent, like they are in the food processing industry, significant agency losses will ensue. Some debt can still be expected, but Agency Theory would predict its presence only in firms with stronger internal governance. In sum, Agency Theory clearly anticipates an equity-based capital structure in the food processing industry, but with some debt still used as a mechanism to improve performance by alleviating agency losses.

4.10 Comparing Predictions to the Observed Food Processing Industry

How then do these theoretical predictions compare to what we see in the US food processing industry? We will undertake only a brief overview, but both paradigms make some accurate predictions. In terms of capital structure, food processors use a large amount of equity financing, with generally around 70% of total assets being financed in this manner (Vickner 2001, 3). However, it is not clear why this type of financing is the preferred one. Since both theories make the same prediction about capital structure, it is very hard to determine which best explains the reasons for this outcome. Measurement of the effects from different capital structure choices will have to be undertaken to draw any conclusions about these theories.

The picture becomes even more muddled in terms of acquisition activity. Transaction Cost Economics predicts an industry where vertical integration is unlikely, but contracting is important. In 1996 37% of farm output was purchased through either market or production contracts, while only 8% was produced under vertical integration (Harris et al. 2002, 4). In the downstream market this theory seems quite strong, but in the upstream market it is nearly impossible to determine. Information on the specifics of these arrangements is closely guarded, and almost impossible to obtain. However, it does seem quite likely that even less integration is present in upstream transactions, although contracting could be far greater. Transaction Cost Economics seems to correctly predict little justification for further firm expansion, as we can observe the number of acquisitions falling substantially in recent years (Harris et al. 2002, 4).

Frank and Henderson even find empirical evidence that transaction costs are a primary motivation for coordination in US food industries (Frank and Henderson 1992, 941).

Nevertheless, there is also some support for the merit of Agency Theory in explaining food processor acquisition activity. Weston and Chiu find that related acquisitions in the aggregate food industry build value, while unrelated acquisitions do not (Weston and Chiu 1996, 5). Bhuyan even specifically studies the vertical integration of food processors, finding a negative impact on firm value that leads him to the belief that these expansions fail to create efficiency gains (Bhuyan 2002, 72). These studies uncover persuasive evidence of agency costs associated with firm expansion. Such findings seem to support the ideas of Agency Theory, while presenting value-destroying acquisition activity that strongly contradicts the tenets of Transaction Cost Economics.

The literature on acquisitions in the food processing industry is unclear. Cotterill even suggests that there is a significant need for further vertical coordination in wholesale markets to increase overall performance (Cotterill 2001, 35). The literature is more divided over acquisitions than capital structure, perhaps because financial principles have been overlooked within agricultural economics. At any rate, neither capital structure nor acquisition activity are truly understood in any economic discipline, and this is because economists do not have a solid understanding of the organizational principles that guide these choices. This is the task upon which we now embark.

CHAPTER FIVE

Empirical Analysis

5.1 Outline of the Experiment

The contrast is quite apparent between the Transaction Cost Economics approach to organizational decision-making, and the just dispelled Agency Theory perspective. It is clear that both theoretically explain some of the decisions that we see in the real world, but they do so in very different ways. Both concepts are relevant within the economy to some degree. However, the divergence in these theories concerning the determinants of capital structure and firm expansion is glaring. Throughout this paper we have established theoretical predictions about these aspects for the food processing industry. These contrasts are observable in the industry today, and can then be examined empirically to determine which theory has greater explanatory power for this sector.

Differences in acquisition activity and capital structure between firms can easily be obtained from accounting data. Using these differences, we can examine how these coincide with the performance organizational theory would suggest. To this end, a quantitative measure of firm performance is needed. The US securities market provides this resource, embodying performance information for nearly all large food manufacturers. Using measures of capital structure, acquisitions, and historical performance in the equity markets, we can test which paradigm more nearly predicts where value will be created. In observing these relationships in a cross-section of food processing firms, we can then examine the crucial question of which organizational model explains the actions of food manufacturers.

5.2 Data Collection and Sample Characteristics

Our empirical analysis will be built on the basic tenets of equity markets that are efficient in at least the semi-strong form (Fama 1970, 414). Hence, we assume that capital markets are functioning properly, and thus seek to extract some of the wealth of information that exists therein. We use observed capital structure and acquisition activity to test these organizational paradigms through a cross-sectional financial study. Data on a sample of firms were derived from Standard and Poor's COMPUSTAT database, with firms selected by Standard Industry Classification (SIC) codes as being those involved in food processing. Firms were utilized from the food and kindred products manufacturing sector (SIC 20--), representing companies that process food or beverages.

For these firms, relevant data was compiled for the period from 1999 to 2002. A major challenge in this study was deciding how to construct accurate cross-sections over this period. A cross-section is a sample with a number of observational units all drawn at the same moment in time (Green 2003, 878). Yet, companies issue annual reports at various times of the year. Thus, using a calendar year would clearly not provide an appropriate cross-section. The correct specification of the time period was determined to be the compilation interval for which data will be used by firms to make strategic choices, and by investors to evaluate prior decisions. Data from calendar years may reveal statistically significant relationships, but is ultimately irrelevant to the operation of the firm. Fiscal years seemed to most closely coincide with our requirements, and as such data was gathered on this basis. We utilize the COMPUSTAT convention of defining the fiscal year as the calendar year in which the majority of the months covered in an annual report occurred. In the end, this choice is possibly no better at aligning our cross-section at a common point in time, but if the fiscal year is the period by which firms make decisions, it is then clearly the relevant unit for analyzing economic organization.

Our food processing firms were then filtered for those that were listed on either the New York Stock Exchange (NYSE) or the National Association of Securities Dealers Automated Quotation System (NASDAQ). Information should be fully captured within security prices in these markets, as opposed to more thinly traded exchanges like the American Stock Exchange (AMEX). This process yielded an initial sample of 117 large, widely-traded food processing companies. 34 firms were eliminated for not being actively traded over the entire four year period. In addition, several firms had missing data within the COMPUSTAT archive. The US Securities and Exchange Commission's Electronic Data Gathering, and Retrieval system (EDGAR) was used to find absent figures. Two foreign-based firms had missing values that could not be rectified using EDGAR, and one domestic firm had inadequate cash flow statements. These companies were subsequently dropped from the sample. In the end, a balanced panel of data on 80 firms was found and utilized in this analysis. The SIC codes represented in the final sample, along with two example firms from each, are shown in table 1.

Table 1

Final Sample: SIC Codes and Example Firms

SIC CODE	Description	Example Firms
2011	**Meat Packing Plants**	*-Hormel Foods* *-Tyson Foods*
2013	**Sausages & Other Prepared Meats**	*-Bridgeford Foods**
2015	**Poultry Slaughter & Processing**	*-Pilgrims Pride* *-Sanderson Farms*
2020	**Dairy Products**	*-Bravo Foods Intl* *-Lucille Farms*
2024	**Ice Cream & Frozen Desserts**	*-Dreyer's Grand Ice Cream* *-Hibernia Foods*
2030	**Canned, Frozen, & Preserved Fruit, Veg & Food Specialties**	*-Campbell Soup* *-Gardenburger*
2033	**Canned, Fruits, Veg, Preserves, Jams, and Jellies**	*-Hanover Foods* *-Smucker (JM)*
2040	**Grain Mill Products**	*-Kellogg* *-Penford*
2050	**Bakery Products**	*-Interstate Bakeries* *-Tasty Baking*
2052	**Cookies & Crackers**	*-Lance**
2060	**Sugar & Confectionary Products**	*-Cadbury Schweppes* *-Hershey Foods*
2070	**Fats & Oils**	*-Archer Daniels Midland* *-Omega Protein*
2080	**Beverages**	*-Pure World**
2082	**Malt Beverages**	*-Anheuser Busch* *-Coors*
2084	**Wine, Brandy & Brandy Spirits**	*-Chalone Wine Group* *-Golden St Vintners*
2085	**Distilled & Blended Liqour**	*-Brown Forman* *-Diageo*
2086	**Bottled & Canned Soft Drinks & Carbonated Waters**	*-Coca-Cola Enterprises* *-Pepsi Americas*
2090	**Miscellaneous Food Preparations & Kindred Products**	*-Monterey Pasta* *-Starbucks*

Source: Standard and Poor's. *COMPUSTAT: North America*. (October 2003).
*Note: * denotes only firm with this SIC code in final sample*

5.3 Data Issues

The COMPUSTAT database then readily produced a large and nearly complete sample of food manufacturing firms. Unfortunately, there has been a well documented possibility of generating bias by employing this resource. It has been suggested that use of the COMPUSTAT database may cause *ex-post selection bias* in choosing larger or only publicly traded firms (Jaffe et al. 1989, 136). All food processors are certainly not publicly traded corporations, and thus we may have an unrepresentative sample. Yet, additional bias has also been proposed by financial economists. *Selection bias* has been a suggested result of COMPUSTAT choosing to list firms

only after several years of data can be collected (Banz and Breen 1986, 779). Similarly, *survival bias* may be incurred due to failing firms being dropped from the database (Kothari et al. 1995, 204). Thus, the resulting COMPUSTAT archive is restricted to firms that are currently viable, and have been so for several periods. To these problems, further bias may occur in relation to the time period selection problems that we have already discussed. *Look-ahead bias* is a dating problem, wherein data reported at a certain time may not actually be available to investors until a later period (Banz and Breen 1986, 780). This would create substantial bias in the relationships between these measures and the firm's returns.

Several remedies have been suggested for these problems, such as merged databases that help dispel selection and survival problems, or by confining analysis to firms with similar fiscal years to eliminate timing issues. However, such alternatives may not always be possible or appropriate. Neither remedy is viable in our case, as arbitrary exclusion of part of the sample or discretionary timing assumptions cannot be used in conjunction with an asset pricing model (Banz and Breen 1986, 792). In the end, the severity of these sources of bias is even a point of some contention. We have consequently used the COMPUSTAT data, believing our sample to be generally representative of the food processing industry, and that any persisting bias is quite minimal.

5.4 Model Specification

5.4.1 Base Model Selection

The basic model specification for this study was drawn directly from the substantial body of literature devoted to financial economics. A specification was desired that would be theoretically appealing, while also allowing for examination of organizational theory. Two main opinions dominate the financial discipline today concerning the specification of models exploring the cross-section of expected stock returns. The first position supports a "capital asset pricing model" based on the work of Sharpe, Merton, and others. This model is based on the use of β, and is grounded in the fundamental relationship between risk and return. The second viewpoint has emerged in very recent years with the innovative work of Fama and French, respectively favoring an "empirical asset pricing model". This approach is based on the observed success of alternative measures, such as book-to-market ratios, in explaining returns. The current debate over this issue in finance is rather heated, with strong empirical support existing for both positions.

In this study, we have chosen a general "capital asset pricing model" for its theoretically appealing, somewhat intuitive nature. However, it should be noted that a Fama and French "empirical asset pricing model" was also constructed in conjunction with the preferred specification. The Fama and French model is based on the use of market-to-book ratios and market values to explain stock returns. These measures were also readily available in the COMPUSTAT database, and thus an alternate specification was straightforward. The results have not been reported, but the reader should simply note that the two specifications performed similarly. For our sample, the explanatory power of the Fama and French model was not quite as consistent, although signs on the parameter estimates of our organizational variables were nearly identical. This then gives credence to our examination of economic organization, but does little to settle the debate over proper specification for cross-sections of expected stock returns.

5.4.2 Asset Pricing Theory

We have chosen an Intertemporal Capital Asset Pricing Model (ICAPM) as the appropriate theoretical basis for our study. The foundation for this type of model is the original Capital Asset Pricing Model (CAPM) of William Sharpe, which addresses the issues of risk and return in investment. This theory states that the prices of assets will adjust so that assets with higher systematic risk will have higher expected returns (Sharpe 1964, 440). The measure of this systematic risk is an asset or portfolio's market β, which is the parameter estimate obtained when regressing a particular investment's returns against those of the market (or commonly a market index). Prices will then adjust until there is a linear relationship between the magnitude of these β's and expected returns for all investments, thus forming the theoretical "capital market line" (Sharpe 1964, 434). Hence, if trying to explain the returns on a security in the CAPM, all we should need is the market β, since all other risk would be diversifiable. This means a simple econometric form for the CAPM can be written as in equation (1), where $E(R_J)$ is asset *J*'s expected return, R_F is the risk-free rate, λ_{JM} is the market (*M*) risk premium, and ε is a random error component.

$$(1) \qquad E(R_J) = R_F + \beta_{JM}\lambda_{JM} + \varepsilon$$

However, inconsistencies with this highly theoretical model have been noted on countless occasions. This is where the Intertemporal Capital Asset Pricing Model (ICAPM) becomes appealing. The ICAPM is simply an extension of the CAPM put forth by Robert Merton,

allowing for shifts in the investment opportunity set over time (Merton 1973, 868). The intertemporal investor will take account of relationships between current returns and those available in the future, subsequently hedging against these effects (Merton 1973, 870). This means that investors recognize other factors affecting the riskiness of an asset, and will incorporate these into their investment decisions. Elements having a covariance with expected future returns will then be factored into the risk premium demanded. A basic econometric specification for the ICAPM can be observed in equation (2), where β's and λ's are the sensitivities and premiums associated with intertemporal risk factors *N*, *O*, and *P*.

$$(2) \qquad E(R_J) = R_F + \beta_{JM}\lambda_{JM} + \beta_{JN}\lambda_{JN} + \beta_{JO}\lambda_{JO} + \beta_{JP}\lambda_{JP} + \varepsilon$$

5.4.3 Variable Selection and Compilation

The ICAPM then allows for additional factors besides β to be incorporated into the model as long as they are correlated with changes in the investment opportunity set (Brennan et al. 2003, 1). Of course, we could never hope to capture all the considerations on the minds of investors, but prior empirical research provides two measures that act as excellent proxies for many general effects. In the literature, market value and price-to-earnings ratios can add to the explanation of a firm's stock returns (Cook and Rozeff 1984, 464). The size effect, represented by a firm's market value of equity, has been found to be a strong force in explaining cross-sectional returns as a proxy for other factors involved (Fama and French 1992, 452). In the same way, price-to-earnings ratios have been suggested as a catch-all for omitted risk factors (Basu 1977, 672). These alternative measures should capture intertemporal risk effects that may not be inherent in β. With these additional variables, we have the basis for an ICAPM to explain food processor performance in the equity market.

Once this basic specification had been determined, data on all variables was gathered from the COMPUSTAT archive. The standard form of the dependant variable in this type of study is the average returns for a stock, either at the monthly or yearly level. We have followed this methodology, using monthly closing prices provided by COMPUSTAT to construct yearly averages of the month-to-month percentage price changes in each stock, a variable we will refer to as AVPC. Our other basic independent variables were also gathered at the monthly level from this database, but some of these had to be put in an annual form comparable to our dependent variable. COMPUSTAT provides monthly β values measuring the sensitivity of a company's

stock price to movements in the Standard and Poor's 500 Index (S&P 500). Yet, annual values have the advantage of decreasing the stability problems often associated with β and other proxies for risk (Harrington 1983, 80). A simple yearly average was then taken of the monthly β values, while the January market value (MV) was believed to be sufficient to capture the size effect in a given year.

However, gathering the price-to-earnings ratios was not as simple. COMPUSTAT provides monthly price-to-earnings ratios, but these ratios are not defined in the database when earnings are negative. Were these even available, negative price-to-earnings ratios would pose serious problems for econometric analysis. Yet, exclusion of poorly performing firms would almost certainly cause serious bias, especially since companies with negative earnings composed approximately 20% of our sample on a yearly basis. Commonly, these offending observations are simply put into a separate portfolio (Basu 1977, 665). In other studies, a dummy variable has been incorporated for these observations (Lakonishok 1994, 1558). Our sample is much too small for the first alternative, and we favored simply inverting these ratios to the option of adding dummy variables. Thus, our price-to-earnings ratios were flipped, and data was collected for those firms realizing losses.

Earnings-to-price ratios (or earnings yields) were then utilized in our analysis, rather than price-to-earnings ratios. This method has been used in numerous studies, most often with a good deal of success (Jaffe et al. 1989, 138; Cook and Rozeff 1984, 455). Logically, there now can be a linear relationship in the earnings-to-price variable, regardless of the sign on earnings. Furthermore, there is no reason why a simple inverse should not still capture the risk effects that we seek in specifying this variable. Yet, it has been suggested that price-to-earnings and market value may be correlated, as they are both scaled versions of price (Fama and French 1992, 428). This possibility was investigated by finding the correlation of market value and our new earnings yield variable. The earnings-to-price variable was also averaged for the fiscal year, but collinearity between these two variables does not appear to be a problem in the data, even after aggregation. Earnings yields were subsequently added to our model as the EP variable, and formed one of the final elements of our base ICAPM specification.

5.4.4 Other Base Model Specification

It is common in financial analysis to divide companies into portfolios. Size, β, or other measures can be used to separate firms into groups that are more comparable in terms of the

independent variables (Fama and French 1992, 430). However, we have not done this for two main reasons. First, it seems infeasible to create groups having any kind of statistical meaning with a sample of this size. Secondly, we are already using similar firms in the food processing industry, and as such these firms represent a single possible grouping. Some substantial differences in firm size and product characteristics will certainly persist, but overall it seems that this sample already forms an adequate portfolio.

Nevertheless, it is quite true that lumping firms into a "food processor" category by the broad SIC manufacturing sector (the first two digits of the code) is not a highly discerning approach, as many very different product sub-sectors exist within this broad classification. To partially correct for this weakness, dummy variables were included in the model. These dummy variables were constructed to group companies by full SIC code into more precise business segments within the larger food processing sector. Eight such variables were constructed, with the excluded group containing a combination of those firms in the SIC 2090 "Miscellaneous" and SIC 2070 "Fats and Oils" categories, for which no other suitable groupings could be found. These dummy variables are listed in table 2.

Table 2

Dummy Variables

Name	Description
DDAIRY	Dairy Products
DFVJJ	Fruit, Vegatable, Jellies or Jams
DBPCC	Bakery Products, Cookies, or Crackers
DSUGAR	Sugar or Confectionary
DBEV	Malt or Other Beverages
DWBL	Wine, Brandy, or Liqour
DSFTDR	Soft Drinks
DMEAT	Meat Processing or Packing

Note: Various combinations of full SIC codes were used by the author to form each of these business segments

5.5 Theoretic Organizational Variables

To this base specification, we added the variables with which we hoped to empirically investigate the organization of the food processing industry. The very nature of cross-sectional studies allowed for this. Even after specifying the basic ICAPM model with dummy variables, there was still a large amount of unexplained variation in the dependant variable. This is almost always the case in cross-sections of stock returns. We were then not simply adding extraneous variables to an already true model, but rather such theoretical variables could serve to explain

some of the randomness of price movements. It was hoped that these variables would successfully account for at least some small portion of this remaining white noise, and thus provide some insight into the organizational structure of the food processing industry.

To analyze organizational theory, we selected three measures to proxy for elements of capital structure and firm expansion. Specifically, we utilized discounted free cash flow over debt (CFD), the relative debt-to-equity ratio (RDE), and acquisitions as a percent of firm market value (PAQ). CFD and RDE were selected as being representative of firm capital structure, while PAQ embodies firm expansion activity. We then sought to add these variables to our ICAPM in order to investigate the organizational underpinnings of the food processing industry.

Data on these variables was available within the COMPUSTAT database, but once again some manipulation was required. CFD was available on a yearly basis, but this ratio was undefined for those firms that had no debt. We again chose to invert this measure, ultimately using a ratio of debt-to-free cash flow that we will call DCF. RDE was taken directly from the database, but some calculation was also required for our PAQ variable. This measure was found by simply taking yearly acquisitions in dollars, and dividing by the company's market value. With these steps completed, we then had a full panel of organizationally pertinent data for the 80 firms in our sample. The full model estimated for each year *T* is then depicted in equation (3), with the entire set of dummy variables and their parameter estimates represented by *DV*.

$$(3) \quad AVPC_T = \alpha_0 + \alpha_1\beta_T + \alpha_2 MV_T + \alpha_3 EP_T + + \alpha_4 DCF_T + \alpha_5 RDE_T + \alpha_6 PAQ_T + DV + \varepsilon$$

Yearly descriptive statistics for the variables in this model are presented in table 3.

Table 3

Descriptive Statistics for Final Sample

	Fiscal 1999		Fiscal 2000		Fiscal 2001		Fiscal 2002	
	Mean	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*	*Mean*	*Standard Deviation*
AVPC	0.01859	0.03791	0.02190	0.10083	0.01080	0.04433	0.00112	0.05676
β	0.63665	0.85475	0.50695	0.66278	0.48351	0.52827	0.42549	0.41347
MV *in millions $*	2,185	5,945.21	2,516.88	6,491.13	2,711.78	7,169.70	2,746.17	6,600.17
EP	0.00324	0.23954	-0.12739	0.65562	-0.23665	1.36324	-0.73159	5.64736
DCF	0.03112	0.39297	-0.06978	1.12872	0.06658	0.47989	0.03100	0.27031
RDE	0.50188	2.92673	0.45671	1.64905	0.67846	5.73940	2.48883	9.02364
PAQ	0.03321	0.08813	0.02393	0.07813	0.05274	0.15072	0.02270	0.10601

Source: Author's calculations from Standard and Poor's. *COMPUSTAT: North America.* (October 2003).

5.6 Theoretic Variable Expectations

Before we discuss our model results, we can make some ex-ante predictions about each of these organizational variables under both theories. We have already discussed the expectations of both of these theories in determining capital structure and firm boundaries. In addition, we have discussed the specific characteristics of the food processing industry relevant to these organizational paradigms. Thus, we can now use our organizational predictions about the capital structure and firm expansion decisions of food manufacturers to redefine our original null hypotheses in terms of these chosen theoretic variables.

Under the tenets of Transaction Cost Economics, we would expect that the effect of an increase in the ratio of debt-to-free cash flow (DCF) would only have a negative impact on firm value. This measure will rise only with an increase in firm debt or with a decrease in free cash flow. In an industry with highly specific assets like this one, an increase in debt would be very costly. On the other hand, less cash flow would only suggest fewer investment opportunities, and thereby decreased value for the firm. Thus, Transaction Cost Economics predicts a negative relationship between DCF and average monthly returns (AVPC). Likewise, Transaction Cost Economics suggests that specificities will cause an increase in the relative proportion of debt within the capital structure to decrease firm value. This means there should be a negative correlation between RDE and AVPC. Finally, Transaction Cost Economics suggests that acquisitions should always have a positive effect on firm value, even in industries like food processing where there appears little justification. This theory then predicts a positive relationship between our PAQ variable and AVPC.

Our expectations under Agency Theory are a bit different. In terms of the ratio of debt-to-free cash flow (DCF), this theory would predict a positive effect on firm returns. An increase in this ratio means the company either has more debt bonding management's activities, or less free cash flow for management to squander. Such a change will have a favorable effect in sectors like food manufacturing, sectors that are relatively vulnerable to agency conflict. This means Agency Theory conversely predicts a positive correlation between DCF and AVPC. The relative debt-to-equity ratio (RDE) could also be expected to have an opposite effect under the Agency Theory paradigm. An increase in RDE should increase shareholder value through stronger financial discipline, resulting in a positive correlation between RDE and AVPC. Finally, acquisitions with a positive effect are certainly possible under Agency Theory, but this paradigm does allow for

firm expansions that destroy value. The nature of the food processing industry might lead us to expect some acquisitions that do not create value for shareholders, due to the unexceptional governance of these firms. In experimentation, we would then allow PAQ to take either sign under Agency Theory, although somewhat anticipating a negative relationship with AVPC.

Using these predictions, we can return to describe our original null hypotheses much more explicitly. These hypotheses can now be presented in terms of the chosen theoretic variables. The null hypothesis concerning capital structure was that Transaction Cost Economics accurately explained these choices, as shown in equations (4) and (5). Similarly, the null hypothesis regarding firm expansion was that Transaction Cost Economics correctly described this activity, as in equation (6).

$$(4)\ H_O^{TCE} = \overset{(-)}{DCF}$$

$$(5)\ H_O^{TCE} = \overset{(-)}{RDE}$$

$$(6)\ H_O^{TCE} = \overset{(+)}{PAQ}$$

One possible alternative to these traditional assumptions is Agency Theory. Hypotheses for capital structure are given in equations (7) and (8), while acquisition is depicted in equation (9).

$$(7)\ H^{AT} = \overset{(+)}{DCF}$$

$$(8)\ H^{AT} = \overset{(+)}{RDE}$$

$$(9)\ H^{AT} = \overset{(+,-)}{PAQ}$$

Clearly, these hypotheses offer a test of which theory better describes the actual food processing industry. Using these hypotheses, we now set out to determine which organizational paradigm is relevant to food manufacturers.

5.7 Statistical Procedures

The possibility of multicollinearity was investigated by examining the correlation among the independent variables. This matter is always a concern, but was especially worrying with the use of debt in two of these variables. Yet, with no serious relationships over the years of this sample being found, multicollinearity was not considered to be an issue in this data, and was consequently ignored. This model was then estimated using Ordinary Least Squares (OLS) regression in the SAS system.

Heteroskedasticity was found to be a problem in this data, and was correspondingly addressed using the Harvey Two-Step Method (Greene 2003, 233). The log of the squared residuals was collected from the original OLS regression. The independent variables were then regressed on these residuals for each year, with statistically significant parameter estimates (at the 0.10 level) being multiplied by the value of the respective independent variable for each observation. These figures were then summed, and the exponent taken. The square root of the resulting measure then served as a weight for correcting multiplicative heteroskedasticity. A Weighted Least Squares (WLS) estimation was then conducted, yielding the results in table 4.

Table 4

Full ICAPM Parameter Estimates

	Fiscal 1999	Fiscal 2000	Fiscal 2001	Fiscal 2002
Intercept	-.01082	.01277	-.00019772	-.01823
	(.2840)	(.1451)	(.9852)	(.1319)
β	.00643	.010179	.01455*	.00459
	(.3608)	(.1722)	(.0683)	(.6069)
MV	-.0976	-.02287	-.04287	.02387
x 100,000	(.0054)	(.4235)	(.4536)	(.5520)
EP	-.10101***	-.10535***	-.02463***	-.00180**
	(.0006)	(<.0001)	(<.0001)	(.0232)
DCF	.0478	-.0023956	-.0411	.5181***
x 10	(.6317)	(.9324)	(.6499)	(<.0001)
RDE	.02405*	-.01664	.00662	.01997***
x 1,000	(.0839)	(.7117)	(.3562)	(.0001)
PAQ	-.02967	.03799	.02978	.17946***
	(.4767)	(.3288)	(.3275)	(.0002)
DDAIRY	.02084	-.00328	-.01103	.08963**
	(.1677)	(.8066)	(.4960)	(.0435)
DFVJJ	.04495***	.01736	.00388	-.01325
	(.0011)	(.1339)	(.7966)	(.4443)
DGRAIN	.04990***	.00887	-.02712	-.00433
	(.0009)	(.4828)	(.1469)	(.8133)
DBPCC	.10568	.12698	.02143	.03015
	(.3575)	(.2279)	(.1973)	(.1032)
DSUGAR	.02331*	.00250	-.00000760	-.01015
	(.0765)	(.8289)	(.9996)	(.1881)
DBEV	.02610**	.02223*	.00131	-.01604
	(.0438)	(.0556)	(.9313)	(.3540)
DWBL	.02785**	.01208	.01269	-.01704
	(.0344)	(.2920)	(.4093)	(.0309)
DSFIDR	.05851	.04781	-.02717*	.01613
	(.1515)	(.1942)	(.0840)	(.3242)
DMEAT	.02588*	.00426	.00175	-.00622
	(.0918)	(.7344)	(.9167)	(.7205)
Model F-statistic	2.44***	3.12***	5.66***	5.17***
R^2	0.3634	0.4224	0.5700	0.5480

*Note: p-values in parenthesis, * denotes significance at the 0.10 level, ** denotes significance at the 0.05 level,* *** denotes significance at the 0.01 level

5.8 ICAPM Performance

Four separate regressions were undertaken on this set of companies, one for each of the years in our sample. Some differences were found, but overall the results are fairly robust. An important initial result was that the basic ICAPM specification performs quite well. In all four years β takes the expected positive sign, though only once becoming statistically significant at the 0.10 level. The fact that β is always positive is reassuring, although its lack of significance might be worrisome. However, this is an acceptable result in the ICAPM model, as β is a useful explanatory variable, but certainly does not explain the entire movement of securities' prices (Merton 1973, 868).

This fact seems obvious here, as our proxy variables from the financial literature perform much better. The expectation for the market value variable (MV) is not extremely clear, but a negative relationship has traditionally been suggested due to the notion that larger firms will have slower growth prospects in the future. Yet, the real purpose of this variable was to identify broad trends in the market affecting firms of various sizes in different ways. Our results show that market value is negative in three years, but is statistically significant only once, at the 0.01 level during fiscal 1999. Unarguably, the MV variable is only mildly effective at picking up these broader market trends in our regressions, but the same cannot be said for the earnings yield variable.

Our ex-ante prediction for the sign on the earnings-to-price variable (EP) is positive, suggesting that a stock with a higher earnings yield would signal value, and could therefore expect superior equity price growth in the future. The parameter estimates on this variable are significant at the 0.05 level during all four years, but with the surprising result that signs are negative in all cases. Given the consistency of this result, this finding must be more than a simple aberration, but it does require some explanation. Upon considering this outcome, it becomes apparent the sign may not be unreasonable.

Lakonishok et al. classify such low-value investments as being "glamour" assets, based on the extrapolation of past growth in earnings (Lakonishok et al. 1994, 1542). In most sectors, this "tagging along" in the market is an ill-advised strategy, but this tactic appears effective in the food processing industry. However, throughout much of this paper we have discussed the importance of reputation and brand names in the food industry. With little growth in this sector from which to extrapolate, it seems that the profitable strategy is to invest in well established

companies. As we have discussed, firms with substantial brand-equity will likely have less risk and greater opportunity in the food manufacturing industry. It then seems logical that this is one case where the "glamour" strategy of investing in reputable firms trumps the typical "value" strategies of contrarian investors (Lakonishok et al. 1994, 1575).

The market value and earnings yield variables should capture many of the broader market trends occurring in these four years. Changes in these variables may represent concerns about food safety, economies of scale, or numerous other factors. The dummy variables in this model also pick up some substantial industry effects across this period. Several of these variables are statistically significant during different years, representing unique industry changes that occurred. Given the acceptable performance of β, EP, MV and the dummy variables, it appears that we have controlled for many of the risk effects in this industry, allowing us to properly examine our organizational variables.

5.9 Yearly Findings

Each yearly model performs quite well, as all four are statistically significant at the 0.01 level. With respective R^2 values of 0.36, 0.42, 0.57, and 0.54, our four yearly cross-sections from 1999 to 2002 explain a substantial portion of the variation in average monthly equity returns (AVPC). The earlier years are noticeably weaker in their explanatory power, but all four years perform relatively well for such cross-sectional regressions. Yet, the overall strength of these results is what we would expect, given the use of this traditionally effective financial model for explaining stock returns. The ICAPM is a rather flexible model, and has consequently been successful in numerous circumstances (Brennan et al. 2003, 25). Perhaps most importantly, the theoretically intuitive signs and general significance of the basic ICAPM specification give us added confidence in our results concerning the experimental variables within this model.

In examining these results, it must be remembered that there is little prior empirical support for any of these theoretic variables being related to firm performance. Acquisitions have been researched, but not often in this type of study. The collection of results on this subject is also quite ambiguous, providing little guidance for this variable. Work has been done using debt-to-equity ratios in financial cross-sections, finding this ratio to have a positive effect on firm returns as a proxy for risk or other inexplicable premiums (Bhandari 1988, 527). However, no work has been conducted using the free cash flow-to-debt ratio, much less the inverse of this figure that we employ here. No consistent relationship has been found between any of these

variables and firm performance. Moreover, it appears that none of these measures have been explicitly applied to a food industry. We then had no ex-ante convictions for any of these variables, but it was hoped that, when used with the established base specification, these variables would have a discernable effect on firm performance and could shed some light on the organization of food manufacturers.

5.9.1 Fiscal 1999

The model for fiscal 1999 is the worst overall performer of any in the sample period, with a model F-statistic that is significant at the 0.01 level, but is only 2.44. In this year, the dominant variables are earnings yield and market value, both becoming significantly negative at the 0.01 level. Other statistically significant variables during this year include the DFVJJ, DGRAIN, DSUGAR, DBEV, DWBL, and DMEAT dummy variables, all of which are positive and significant at the 0.10 level or greater. One of our theoretical variables is statistically significant in this year, the relative debt-to-equity variable (RDE). The coefficient on this variable is positive and statistically significant at the 0.10 level. The PAQ variable is negative in this case, but is not significant at any reasonable level. The estimate on the DCF variable is positive, but is also not significant. Though perhaps not as convincing as we might hope, the signs on these organizational variables are exactly what Agency Theory would predict. This fact, combined with the significantly positive effect of debt on firm returns, must lend some initial support to the validity of Agency Theory in this industry.

5.9.2 Fiscal 2000

Our model results become a bit stronger in fiscal 2000, as the F-statistic now increases to 3.12. The negative earnings yield variable once again dominates this model, with an absolute *t*-statistic of over 5. However, only one other variable is significant at the 0.10 level, the DBEV dummy variable. None of our theoretic variables are significant in this case, but examining their signs we do find some rather weak support for the Transaction Cost Economics null hypotheses. The sign on RDE is negative, as is the sign on DCF. At the same time, the sign of the PAQ variable has now become positive. These signs are just as Transaction Cost Economics would predict in the food manufacturing sector. Yet, the generally mediocre performance of these variables in 2000 lends only very weak support to this theory. Overall, this year gives us very little insight into the relevant organizational model for this industry.

5.9.3 Fiscal 2001

The resulting parameter estimates on our organizational variables are similarly vague in fiscal 2001. Our model performs quite well during this year, with an F-statistic of 5.66. This yearly model explains the greatest proportion of variation in the dependant variable of any of our four regressions. Once more, the negative parameter estimate on the earnings yield variable dominates, with an absolute *t*-statistic now over 7. For this year, β is also positive and statistically significant at the 0.10 level. The DSFTDR dummy is the only such variable significant in 2001, producing a negative coefficient at the 0.10 level. Yet, despite the generally strong performance of the model, none of our organizational variables are statistically significant. The estimates on RDE and PAQ are positive, while the coefficient on the DCF variable takes a negative sign. This really gives us a mixed message about the pervading organizational structure. The RDE variable supports Agency Theory, while the DCF variable supports Transaction Cost Economics. The PAQ variable is rather inconclusive in the case when it is positive, being acceptable to either theory. Therefore, although our model performs quite well, the theoretical variables provide little understanding of the organizational design of this industry.

5.9.4 Fiscal 2002

Up to this point, the organizational paradigm seems to have been nearly latent, and definitely problematic. However, in fiscal 2002 a dramatic change occurs. This model is somewhat congruent to the others, with an overall F-statistic of 5.17. Earnings yield is still negative and statistically significant at the 0.05 level, with an absolute *t*-statistic of over 2.3. Our DDAIRY and DWBL dummies are both significant at the 0.05 level, taking positive and negative signs respectively. Yet, none of these variables dominate our model. Rather, the most significant variables during this year are the organizational variables. All three have *t*-statistics of over 4, making them easily significant at the 0.01 level. Moreover, these variables are almost unanimous in their verdict about the organization of this sector. The PAQ variable takes a positive sign, which is acceptable under either theory, simply stating that the majority of those acquisitions that occurred were value-creating during this year. Yet, the signs on both RDE and DCF are also positive. This lends support to the presence of agency conflict in this industry. While the majority of acquisitions built firm value, capital structure was clearly used as a tool to bond management's actions during 2002. Hence, this finding represents considerable evidence

for the authority of Agency Theory in explaining organization of the food manufacturing industry.

5.10 Results Discussion

What overall judgments can we then make from these results? We have set out to examine which organizational economic theory pervades in the food processing industry. In reality, both theories likely contain credible ideas and concepts. Yet, as economic models we must strive to improve upon them, forsaking those with less ability to explain the complex and dynamic world in which we live. According to the scientific method, one must have valid contradictory evidence in order to reject a theory. This is precisely the case here, as we will only reject the null hypotheses of Transaction Cost Economic organization if we have statistically significant evidence indicating otherwise.

In two out of four years, we reject our capital structure null hypothesis. However, we fail to reject our firm expansion null hypothesis during all four years. Capital structure selection indicates agency problems, but we do not find value-destroying acquisition activity. Yet, this is not necessary under the tenets of Agency Theory. The findings about capital structure provide evidence for Agency Theory, while the results on firm expansion do not disagree with this model. Overall, it seems that Agency Theory has some ability to account for observed activity in this industry. At the same time, we find little support for our null hypotheses. In the entire sample, only one theoretic variable during fiscal 2002 is statistically significant in the direction predicted by Transaction Cost Economics. It is obvious that the predictive ability of Transaction Cost Economics in the food processing sector is weak at best, making the traditional reliance on this rationale a dangerous precept. When the theoretic variables are significant, they point to agency conflicts in this industry.

To scientifically investigate the validity of Transaction Cost Economics, single-tailed F-tests of the null hypotheses for each theoretic variable were conducted simultaneously over all four years of the sample. The results of these tests are displayed below in table 5. The null hypothesis that DCF is less than zero is rejected at the 0.01 level, while we fail to reject that RDE is negative over this period. We also fail to reject the null hypothesis that PAQ is positive, although this finding provides little organizational insight. Given these results, we must reject the null hypothesis of Transaction Cost Economic organization in the food processing industry, due to evidence that capital structure is incorrectly described by this theory. The outcome concerning

acquisition does not contradict Agency Theory, and this model correctly explains these capital structure choices. Therefore, agency problems may exist in these firms, and as such analysts should consider Agency Theory when examining this industry.

Table 5

F-tests of Null Hypotheses for 1999-2002

Null Hypothesis	F_S F-statistic	F_C Critical Value[a]	*p* -value	Result
$H_O^{TCE} = \overset{(-)}{DCF}$	8.33*	6.63	$Pr > F_S$ $(.0042)$	$F_S > F_C \Rightarrow$ *Reject*
$H_O^{TCE} = \overset{(-)}{RDE}$	0.42	6.63	$Pr > F_S$ $(.5191)$	$F_S < F_C \Rightarrow$ *Fail to Reject*
$H_O^{TCE} = \overset{(+)}{PAQ}$	6.87	-6.63	$Pr < F_S$ $(.9907)$	$F_S > F_C \Rightarrow$ *Fail to Reject*

Note: [a] at the 0.01 level, denotes significance at the 0.01 level*

Upon initial examination of our results, this type of conclusion might seem a bit bold. Even though we provide notable support for Agency Theory, there is still less consistency in these results than might be hoped. The last year of our analysis seems to be far more theoretically compelling than the earlier years. Yet, using historical knowledge of US equity markets, this would actually be the expected result. Markets are certainly dynamic, and it appears obvious that a structural change has occurred in the US during the past few years. Our theoretical variables are absolutely decisive in fiscal 2002, but why would this be?

This is likely because 2001 was approximately the period when this structural change occurred. 2001 witnessed the collapse of energy giant Enron, and the beginning of a string of corporate scandals. These scandals rocked the investing world, and almost certainly caused a fundamental change in investor sentiment within the US. In light of these scandals, Agency Theory has taken on an entirely new level of importance for the economy. The issues of governance and agency conflict are now foremost on the minds of investors. It is then no surprise that Agency Theory currently has significant explanatory power as an organizational model, much more so than before this structural change.

There have not yet been any large corporate scandals in the food processing industry, but the sector is potentially vulnerable to such events. When examining the ramifications of this structural change in the food processing industry, the nature of its investors must be considered. Food manufacturing companies typically have low β's (refer back to table 3), leading to industry

returns that are less volatile than the broader market. Those investing in food processing firms are typically long-term investors, counting on measured growth and shelter from market downturns. These investors are now concerned with protecting their long positions, looking toward governance reforms to prevent firm implosions. Given this recent structural change and the characteristics of both firms and investors in this industry, it is not surprising that Agency Theory has gained explanatory power. Perhaps Agency Theory has not always been the dominant organizational model in the food processing industry, but it seems clear that it is today.

There is one other very important consideration that must be remembered in weighing these theories. In this debate, it appears that Transaction Cost Economics is a sort of all or nothing argument. If we admit the presence of some agency conflict, then we must admit the existence of agency problems in general. Even if our results had not been as conclusive, just one year indicating discord between principles and agents would theoretically doom Transaction Cost Economics. Our empirical results are much stronger, but at the bare minimum they indicate that agency problems do persist to some degree in the food processing industry. This, in and of itself, is a major result that suggests the tenets of Agency Theory should be considered when analyzing the strategic actions of firms in this sector.

CHAPTER SIX

Application

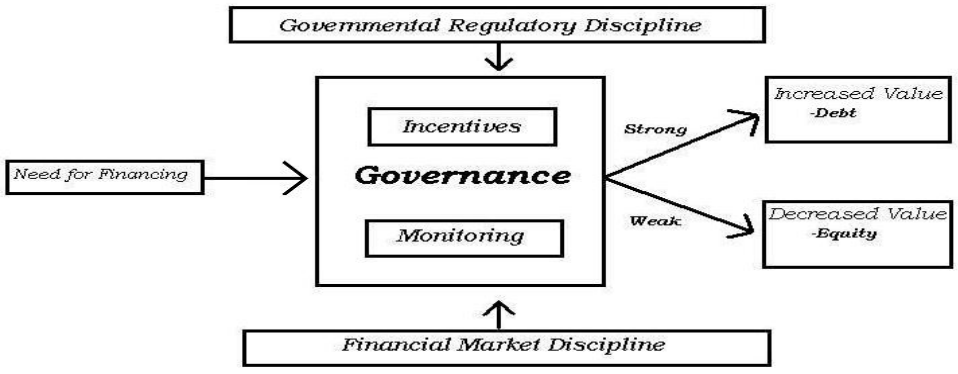
6.1 Organizational Analysis

How then are these results relevant? This paper began with a discussion of why it is vital for agricultural producers to understand the food processing firm's decision process, but we also noted how little is currently known. Yet, if the appropriate organizational model can be determined, then one can predict the activity of an individual firm as a function of that firm's specific organizational characteristics. We call this type of approach "organizational analysis". This tool may also be helpful in explaining firm actions ex-post. For example, since we have shown that Agency Theory has relevance in the food processing industry, we can then productively analyze firm activity using observed governance structures and the principles of this paradigm. Strongly governed firms will pursue the objectives of owners, while weakly governed firms will pursue the interests of management. The decisions of food manufacturers can then be explained or predicted in relation to these aspects by farmers or other interested parties. In any case where an organizational model can be proven relevant, a great deal can be inferred about the firm's decision process. We are unaware of the concept of organizational analysis appearing previously, but it is only a logical extension of this type of research.

6.1.1 Capital Structure Analysis

Our study has dealt specifically with the aspects of capital structure and acquisition. Using our results about organization in this industry, we can then provide some simple diagrams of how organizational analysis might be conducted. In terms of capital structure, our results indicate that we can expect firms with stronger governance to increase value by bonding management with more debt, as diagramed in figure 4.

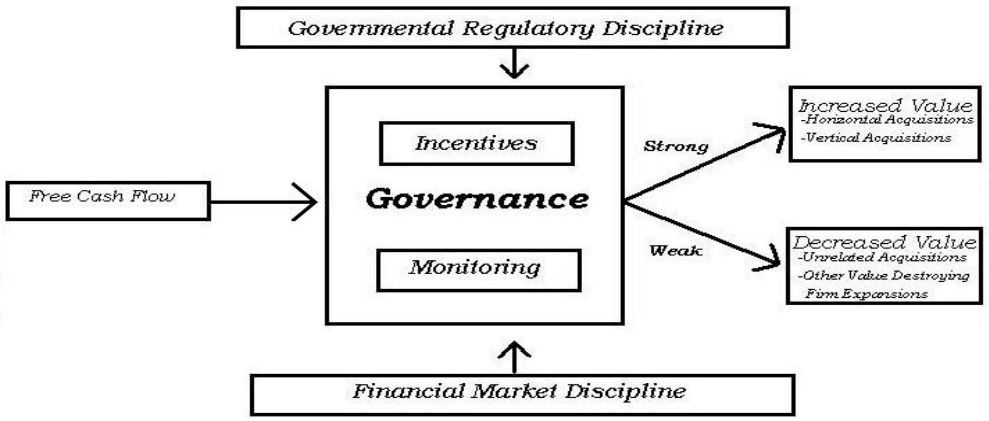
Figure 6 Organizational Analysis of the Capital Structure Decision



6.1.2 Acquisition Analysis

As far as firm expansion is concerned, Agency Theory suggests that companies with stronger governance structures will undertake acquisitions that increase firm value, while those with weak governance will engage in value-destroying acquisition, as shown in figure 5. We have found acquisitions to be value-building in this industry, but if agency problems exist then such undesirable actions are still a distinct possibility.

Figure 7 Organizational Analysis of the Acquisition Decision



Though merely simplistic layouts for how these problems can be considered, such diagrams are constructive in showing the manner in which organizational analysis can be undertaken. Once we know the underlying organizational paradigm, we then have insight into numerous aspects of the firm.

6.1.3 Organizational Analysis Example

To illustrate this concept, we will return a final time to our chicken industry example. As we have already discussed, chicken producers will often be part of a network of suppliers dominated by one local processor. A hypothetical scenario where organizational analysis might be invaluable thus includes an independent chicken grower's decision to adopt a new breed of broilers. These chicks have slightly higher purchase costs, but improved carcass yields make these genetics profitable to the grower. However, gains from this broiler variety can only be realized if the processor invests in new cutting technologies capable of harvesting the additional yields. This decision then becomes completely dependant on the actions of the food processor.

Organizational analysis can be used to infer whether the chicken processor will undertake this investment. Suppose it is even clear that purchasing modern cutting equipment has transactional justification in this case, leading to increased profitability for the manufacturer.

This investment decision might seem straightforward, but we have shown that Agency Theory must also be considered in the food processing industry. This particular chicken manufacturing firm is subject to weak internal and external governance, and is believed to suffer from serious agency conflicts. Given such a governance structure, the producer consequently may not be confidant that this company's management is acting to maximize profits. The grower will then be unwilling to rely on the processor's investment, and will adopt strategy accordingly by retaining conventional broiler genetics in their operation. By using organizational analysis, the grower is able to choose their optimal non-cooperative strategy and maximize returns in the market.

This truly shows the practical value of organizational research. Specifically, our diagrams and example demonstrate how the principles of Agency Theory can be used to undertake a methodical examination of individual firms in the food processing industry. This is useful to agricultural producers and other actors in the food channel, as it allows for inference about the future actions of these firms. These smaller players will no longer find themselves completely unapprised of new initiatives in the food system, but rather can make preemptive decisions to counter the expected strategies of powerful food manufacturing firms.

The modern corporation is certainly one of the most veiled and impenetrable economic actors. Yet, using organizational analysis and some endowment of relevant information about the firm's governance structure and opportunity set, we should be able to successfully predict or explain many firm strategies. This then provides a basic theoretical framework for analyzing the actions of complex firms, something sorely missing from the field of agricultural economics at the current time.

6.2 Implications for Future Empirical Studies

There is another specific application for these results. Nearly as important as our findings indicating the efficacy of Agency Theory, are simply those indicating the fundamental relevance of organizational economics. Firm organization has often been overlooked in economics and finance. Financial markets are full of various types of information that make stock price movements very difficult to explain. It is important to notice the usefulness of these organizational proxies in explaining some of this market randomness. This shows that these theories are capable of analyzing the rather opaque firm decision-making process. Our models lend support to the idea that organizational structure affects firm performance, regardless of

whether these factors are explicitly considered by investors. Consequently, the presented results provide some credence for including organizational variables in future financial studies.

CHAPTER SEVEN

Conclusion

7.1 Summary

The objective of this paper was to determine which prevalent organizational model, Transaction Cost Economics or Agency Theory, best describes the actions of food processors. To explore this question, we have developed logical predictions from these theories through a detailed examination of the food processing industry. Our null hypotheses were that the traditional Transaction Cost Economic model would best describe capital structure and expansion activity in the food manufacturing industry. To meet our study objective, we have empirically tested these hypotheses in a sample of food processing firms.

Our empirical results lead us to reject the first null hypothesis of Transaction Cost Economics explaining capital structure in this sector. The positive effects of debt on firm value suggest its use to bond management. The negative impact of free cash flow supports the idea that weakly governed managers are pursuing undesired investments. These empirical results closely match the predictions of Agency Theory, and refute the widely accepted Transaction Cost Economics rationale.

However, our findings also support failing to reject the second null hypothesis, which states that Transaction Cost Economics describes firm expansion in this industry. Acquisition activity has a positive impact on firm value in our sample. This defends the idea that these expansions are undertaken to reduce the costs associated with exchange. Yet, this does not mean that we accept Transaction Cost Economics as the correct theory. The empirical evidence supports the predictions of this model, but does not necessarily contradict Agency Theory.

In terms of our study objective, it seems that we can draw some important conclusions about organization of the food manufacturing industry. Capital structure seems to be a tool for assuaging agency losses, but the majority of acquisitions are revealed to be value-building. Agency Theory allows for value-destroying expansion, but certainly does not preclude acquisitions that increase firm value. Thus, the rejection of the first null hypothesis supports Agency Theory, while the failure to reject the second does not disagree with it. Therefore, Agency Theory appears to be the better organizational model for explaining the actions of food processors.

The results concur with recent developments in the US securities market. The evidence for Agency Theory is much stronger in 2002. Organizational structures certainly evolve over time, and it is logical that the highly publicized corporate scandals beginning in late 2001 had a substantial effect. The market, and more generally public opinion, blamed losses on agency problems. Sentiment was fundamentally altered, as investors started to ponder how great the misalignment of incentives between managers and shareholders might be. There appears little reason why these events would not have impacted the food manufacturing industry. Agency Theory may have only recently become meaningful to food processors, but it seems that resolving agency conflict is currently an important consideration in firm decision-making. This makes Agency Theory the appropriate organizational model for analyzing activity in the food processing industry.

This information can now be used by agricultural producers and other parties in the food system. Food processors often have a strong influence on smaller players, especially farmers. With increased knowledge of how these firms make decisions, agricultural producers can adopt improved strategies. Marketing channels for agricultural commodities will continue to be coordinated by food manufacturers, but farmers can now better understand these actions and position themselves accordingly.

7.2 Research Opportunities

This study is a starting point for further research in this field. What has been provided is merely an initial overview and simple test of these powerful organizational theories. Our experiments were exceedingly broad, lacking data with pure organizational meaning. Initial results indicate the appropriateness of Agency Theory for describing organization of the food processing industry. However, different tests in other sectors need to be undertaken in order to verify the general robustness of this finding. Numerous predictions of organizational theory could be applied, preferably using more specific data tied directly to firm organizational structure. There is a massive amount of work to be done in this area, with room for vastly improved tests of these theories. Unfortunately, firm specific data on organizational characteristics can be quite difficult to obtain. Though this information may be hard to come by, it appears that the rewards for such endeavors could be a substantial expansion of our basic understanding of economic organization.

Organizational principles are tied to nearly every economic discipline, and as such research in this area should be widely beneficial. Large corporations dominate the US economy. It appears this fact will become even truer in the food processing industry, where consolidation and industrialization continue to raise the level of concentration (Harris et al. 2002, 6). The interaction between agricultural producers and food manufacturers is becoming increasingly important to the evolution of the US food system. Coordination has increased substantially in recent years, forcing farmers to work more closely with food processing firms. This bargaining process has been difficult for agricultural producers, as it is hard enough to predict the actions of supposedly rational individuals, let alone companies filled with thousands of such actors.

The problem can become nearly intractable, and as a result has been almost ignored, even in academia. Yet, beyond its importance to agriculture or even the US economy, our understanding of how complex firms operate and why they undertake certain activities is fundamental to the field of economics. If we as economists are to truly have an understanding of our science that goes beyond the proverbial “black box” of introductory production courses, then the theories of economic organization must be the foundation.

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