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Doctoral Thesis:

Analyzing Business Models and Investment Decision Behavior,

The American Discount Retailing Sector

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To my parents, Leonte and Rosa

Acknowledgements

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Introduction

Retailing is an economic activity that consists of "selling commodities or goods in small quantities to ultimate consumers.[1]" There is a large diversity of economic activities that satisfy this definition. For instance, furniture stores, supermarkets, pharmacies and clothing stores all belong to the retail category. Traditionally, these stores buy large quantities of merchandise and sell them later to final consumers in exchange for a margin.

A general merchandise store is a special type of retailer categorized by the U.S. Census Bureau. This kind of store sells a large variety of goods rather than focusing on one or several items. A traditional general merchandise store is a department store. During the late nineteen fifties and early nineteen sixties a new category of general merchandise store emerged with the objective of satisfying the increasing needs of the American working class. The name of the concept was discount retailing. A discount store is characterized for selling a large diversity of goods at very low prices by controlling costs.

This dissertation, which was supervised by Professor Emili Grifell-Tatjé, is an effort to gain a better understanding of the evolution of the American discount retailing business. In particular, we are interested in the business models followed by the two major firms in the discount retailing industry as well as the motivation behind their investment decisions. We expect that the findings of our research will provide more insight not only to academics but to practitioners as well.

A business model is defined as "the logic of the firm" by Casadesus-Masanell and Ricart (2010). Firms in the same sector could have different business models. Some "logics" could have better results than others. A discount chain must choose elements of its business model such as where to locate the stores, pricing policies, human resources practices, governance of fixed assets, merchandise variety, store layout among other elements. It is possible to imagine a multitude of configurations that a discount chain could adopt regarding these choices.

The first and second chapters of the thesis focus on two extreme cases: Walmart's success and Kmart's failure. The reason is that by focusing on both extremes it is possible to

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[1] Merriam-Webster Online Dictionary http://www.merriam-webster.com/dictionary/retail Accessed on May 17th 2011.

better identify the factors that determine good performance. The third and final chapter of the thesis explores the issue of how a behavioral trait such as optimism affects the investment behavior of a firm and includes an empirical application in the discount retailing context.

Walmart and Kmart opened their first stores in 1962. Kmart was the result of a diversification process undertaken by S. S. Kresge. Conversely, Walmart was a business developed from scratch by Sam Walton, who previously franchised a Ben Franklin variety store (Walton, 1992). Kmart was the most successful discount retailer for a limited time period. Kmart's Annual Report of 1971 informed that the discount retailing business generated 2.5 billion dollars in sales that year. In 1971, Walmart was approximately forty times smaller than Kmart in terms of total sales that particular year.

Walmart was a rural competitor with difficulties accessing capital. The firm also struggled to convince vendors to replenish its stores (Walton, 1992, p.52). On the other hand, Kmart expanded the size and scope of its businesses enormously. Kmart's achievements provided prestige to the discount retailing industry and the company quickly became a household name. Walmart was, for many years, a follower that limited its role to the service of fringe markets such as rural and suburban areas in the southwestern part of the United States. Despite its shortcomings, Walmart progressed until achieving the game-changer status that still holds today. In contrast, Kmart wasted its leader advantages and declared bankruptcy in 2002.

As previously mentioned, Walmart's success story is analyzed in the first chapter of the thesis. Our analysis starts with the description of Walmart's business model based on the company's reports and studies on the subject. It is at this point that most strategic management case studies stop. We go a step further by quantifying the impact of the main elements of Walmart's business model on profit variation. Specifically, we measure how Walmart's business model configuration is reflected in the economic drivers that constitute profit change. These economic drivers are price effect, technical change, operating and efficiency change and activity effect. The price effect reveals how the changes in output and input prices affect profits. Technical change shows the alteration in the evolution of profits due to technological shocks. The operating and efficiency effect measures the impact of improvement or deterioration of the production efficiency. The activity effect is a component that embodies all policies aimed at the firm's growth. Our results show that Walmart's performance is explained mainly by this last component. Walmart did not achieve its current status by charging higher margins or by being more productive, but by continuously

expanding its business by opening new stores, increasing product variety and lowering prices to increase sales volume. The empirical analysis provides information about the current situation of the company. It reveals some stagnation in the firm's development, increments in costs and the difficulties that the warehouse division, Sam's Club, is facing.

Kmart's failure is examined in the second chapter of this thesis. Contrary to what occurred with Walmart, Kmart had different business models during the studied period. Kmart was a pioneer in many aspects of the discount retailing business. Harry Cunningham, Kmart's CEO from 1959 to 1972, was the manager that established many of the practices that today are commonly applied in the discount retailing sector. Sam Walton acknowledged in his autobiography that Kmart was a source of inspiration (Walton, 1992, p.48). Despite being the leader in the discount retailing business, the company modified its original business models several times in order to jolt their profit stream that was fading at the beginning of the 80s. Their adjustments failed to revitalize the company in a meaningful manner. The last CEO, Charles Connaway, embarked on a price war against Walmart that finished in Kmart's bankruptcy. We use a different methodology from the first chapter to quantify how these adjustments affect the evolution of profits. Our findings portray a company that changed its strategy every time there was a change in the CEO's position. Kmart's route to collapse is far from a downhill track. Kmart applied many incoherent policies that fractured the "virtuous cycles[2]" that it had and weakened its competitive position.

If the first and second chapters deal with the mechanics of the business models in the discount retailing industry, the last chapter goes a little further and focuses on the motivation behind the decisions made by the managers. In this chapter we focus on one particular element of the business model: the investment decision. After reading extensively about the different discount retailing chains in the United States, we found some of the choices made by the CEOs regarding investment to be intriguing. For example there was an "acquisition spree" during the first years of the 80s. The last CEO of Kmart waged a price war against Walmart and launched a program to boost the supply chain management, which required many resources. Annual reports were written optimistically with the idea that companies were heading towards a bright future. The reality was different, the newly acquired business failed to deliver the expected results and Kmart declared bankruptcy. Unrealistic optimism could be

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[2] A virtuous cycle corresponds to a feedback loop in which consequences reinforce the business choices that generate them. See Casadesus- Masanell and Ricart (2010).

the cause of this distorted view of reality. We modify the traditional Adaptive Expectation Model (Maddala, 2001) to include the possibility of bias due to optimism. The result is a stochastic frontier model of expectations in which the inefficiency term represents the optimistic bias. An empirical application was included using data from the main discount retailing chains: Walmart, Target and Kmart. Our results show that Walmart was the least optimistic and Target the most optimistic firm. Kmart was between Walmart and Target and it was especially optimistic in the years prior to the bankruptcy.

Importance of the American Discount Retailing Sector

The retailing sector is not as newsworthy as other industries such as online services, technology and finance. Nevertheless, this economic sector has commanded 6% of the Gross Domestic Product on average in the United States[3]. In the year 2009, the value added of the retailing industry was 819 billion dollars[4]. This industry employs 14 million people in the United States[5], approximately 10% of the total labor force. These statistics do not capture the complete magnitude of the retailing sector. Retailing has an intermediary function. It establishes a link between manufacturers and agricultural producers and final consumers. Therefore, retailing is vital for the survival of other industries within the economy.

The worldwide importance of the American discount retailing sector comes from two different sources. First, they have a direct influence by investing outside the United States. Both Walmart and Kmart had established branches in different countries. Walmart is currently present in fourteen countries other than the United States[6]. Furthermore, these companies have international sourcing operations that search for suppliers of manufactured goods. For instance, the relationship between Walmart and its Chinese vendors (Basker and Pham Hoang, 2008) has recently been the subject of analysis. On the other hand, discount retailing chains had an indirect influence by creating standards, developing best practices and modifying the characteristics of the products they sell. An example of this influence is what Fishman (2006) describes as the "Walmart effect." The Walmart effect is the impact that this company has on retailing business around the world. Therefore, the analysis of the American discount retailing sector could shed light on future retail practices that could be implemented by other companies in this business sector.

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[3] See Bureau of Economic Analysis : http://www.bea.gov/industry/gdpbyind_data.htm
[4] Ibid
[5] http://data.bls.gov/pdq/SurveyOutputServlet
[6] See Walmart's Annual Report 2011, pg. 11.

Source of Information

The main source of information for this doctoral dissertation is the accounting statements from seven firms that form our database (Walmart, Kmart, Target, Sears, Costco, May, Bradlees). We complement the data in the annual reports with information from the commercial database Osiris, the reports of Thompson-Financial and data included in case studies of Harvard Business School. Some of these firms went bankrupt and others merged; therefore we have an unbalance panel data. Our database has 215 data-points. The oldest information is from 1970 and the most recent is from 2008.

Our calculations are relevant if the subset of companies selected truly reflects the discount retailing business. One way to prove it is by measuring the market share that these firms have. It is difficult to quantify the market share of a discount retail chain since these firms compete in very different markets (clothing, groceries and pharmaceutical products among others). Nevertheless, we can measure the percentage that represents discount department stores' sales of the larger categories and the market share that the three largest firms (Walmart, Target and Kmart) have in the discount retailing business. Discount retailing corresponds approximately to 82% of the General Merchandise Stores and 12% of the retail business in 2008.[7,8] On average, the three largest firms represented 92.13% of the discount department store from 1998 to 2004.[9,10] These numbers reflect a very concentrated industry with only a few firms within the discount retailing category. Walmart commands almost 10% of all the retail sales in United States in 2008. Hence, we are confident that within the limits of discount retailing we have a representative subsample.

In addition to the firms' characteristics and accounting measures, we also used other variables that reflect the economic environment of the United States. These variables were mainly employed in the last chapter of the thesis in which we explore the behavioral motivations behind the investment decisions. The consulted sources are Bureau of Labor Statistics, the Federal Reserve of United States, U.S. Bureau of Economic Analysis,

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[7] See "Estimated Annual Sales of U.S. Retail and Food Services Firms by Kind of Business: 1998 through 2009" from the U. S. Census Bureau webpage http://www.census.gov/retail/index.html#arts accessed on June 1st 2011.

[8] In our calculations we add discount department stores and warehouse club and superstores categories since these last formats are variations of the traditional discount department store.

[9] Ibid 7.

[10] We only calculate the market share of the three largest firms until 2004 because Kmart merged with Sears in 2004. From 2005 to 2008, Walmart, Target and Sears controlled 82% of the General Merchandise Stores category.

Thompson-Reuter/University of Michigan and Freddie Mac Conventional Mortgage Home Price Index.

Methodology

In this doctoral thesis we have used nonparametric and parametric techniques for the empirical analysis. The first two chapters of the thesis rely on nonparametric methods while the last chapter includes parametric methodology.

The empirical framework of the first chapter of the thesis is a combination of the Index Number Theory and Production Theory. We use Bennet (1920) indicators to assess how the changes in prices and quantities impact profit variation. The quantity variation is further decomposed using Grifell-Tatjé and Lovell's (1999, 2008) proposed methodology. Quantity effect is broken down into operating efficiency effect, technical efficiency effect and activity effect. This methodology requires the calculation of distance functions using Data Envelopment Analysis (DEA) (Charnes et al, 1978; Färe et al, 1985). Furthermore, Grifell-Tatjé and Lovell (2012) proved that their productivity measure is related to the Malmquist productivity measure created by Caves et al. (1982). In this part of the thesis, we include Walmart's productivity measurement as proposed by Grifell-Tatjé and Lovell (1999) that can also be calculated as the sum of operating efficiency and technical efficiency effects.

The second chapter of the thesis focuses on Kmart. We apply a new methodology adapted from Grifell-Tatjé and Lovell's (2012) decomposition of the cost function based on the Konüs Index. Instead of relying on output oriented distance functions, we use cost and revenue functions. The use of cost or revenue functions depends on the nature of the business model studied. If managers implement a business model oriented towards cost leadership, we decompose costs. On the contrary, if managers concentrate on obtaining higher margins per unit sold we scrutinize revenues. Both approaches are fairly transparent and researchers could analyze results effectively by keeping in mind the "orientation" of the decomposition. We provide more robust results by applying order-m technique on cost and revenue functions based on Cazals et al. (2002, 2008).

Parametric methods were used in the last chapter of the thesis. We modify the Adaptive Expectation Model in order to model unrealistic optimism. In particular, we alter the Koyck (1954) model. Our estimations resemble a traditional stochastic frontier model with two caveats. The first caveat is that the dependent variable lagged one term on the right hand side of the equation. We solved this issue by using a grid search over a "lambda" parameter

after some mathematical manipulation. The second caveat is that the term that captures the excess optimism is positively biased and it is assumed that it follows a half-normal distribution.

Main Results

The results of the first chapter corroborate the general vision of Walmart; it is a company that sets low prices to sell large quantities of goods. This strategy pays off; the reduced mark-up is more than compensated by the sales volume. Nevertheless, recent years have presented a change in this trend. Walmart is now obtaining a higher mark-up and the influence of the "quantity effect" is decreasing. This situation may signal a shift in the business model and/or the deterioration of the current one. Additionally, the dissection of the quantity effect shows that the influence of improvements in productivity are mild compared to the importance of the activity effect that measures all policies that are aimed at the company's growth. Our outcome also reveals that capital input prices tend to reduce with time while labor prices tend to increase. The increment of labor cost might be the direct result of the pressure to raise the work benefits and salaries of Walmart's employees by the media and interest groups. We find that labor prices are significantly eroding Walmart's profits.

The second chapter provides evidence on how the adjustments of the business model of a company fail to deliver the expected results. Kmart's original business model resembles Walmart's current model. It was a company that offered cheap goods in order to generate a large sales volume and kept costs under control. In the early 70s the company's size increased significantly, but our results show a later decline in profits mainly explained by the inability to control input prices. Kmart changed the CEO in 1979, probably as a response to the stagnation of profits. The new CEO modified the original business model, trying to appeal to urban middle and upper classes. The outcome of the decomposition reveals that Kmart had a meager increment of profit as a result of this policy. The benefits for higher output prices were overcome by the downsizing of the firm's business. Furthermore, Kmart's productivity was reduced. The successor of this CEO tried a middle ground approach, output prices decreased, input prices were under control; productivity improved significantly but the net growth effect remained negative. In 1995, the company's board of directors and executives decided to reorganize the firm's structure. It sold all the special retail units and focused exclusively on discount retailing. This strategy had modest economic consequences in the beginning. However, the new CEO's policies failed to compensate the losses produced by low output prices. The last year of the second to last Kmart CEO was a debacle. The company

reported a reduction of profits due to lower output prices, increments in input prices, and a negative net volume effect. The last CEO decided to compete directly with Walmart by waging a price war to regain market share. This decision would bankrupt the company and our measurements illustrate the high toll of the price war: the significant reduction of profits due mainly to low output prices and lack of response of sales.

In this chapter of the thesis, we partially corroborate our initial assumptions. Our empirical results do not reject the idea of the existence of unrealistic optimism measured as the positive biased error term in a stochastic frontier equation. Kmart had a spike in its levels of optimism prior to its bankruptcy. However, Walmart and Target present abnormal levels of optimism after Kmart's bankruptcy. We believe that this excess optimism could be the direct result of Kmart's bankruptcy.

Divulgation of the Thesis Results

Some parts of this thesis have been presented in several seminars and workshops in Spain and elsewhere. The main objective was to obtain feedback that would help us to improve the thesis as well as gain experience in the scientific presentation procedure. We are very grateful for the good suggestions and commentaries provided in these events.

The content of the first chapter of the thesis was presented for the first time at the III DEMO June Workshop, Economics of Organizations, Corporate Governance and Competitiveness in Barcelona, Spain in June 2009. We also had the opportunity to present this work at the XI European Workshop of Efficiency and Productivity Analysis a couple of days later. A more refined version of this chapter was accepted at the "*Simposio de la Asociación de Economía Española* (SAEE)" that took place in Madrid in December 2010.

Some preliminary results of the second chapter of the thesis were presented at the IV DEMO June Workshop, Economics of Organizations, Corporate Governance and Competitiveness in June 2010 in Barcelona, Spain and at the VI North America Productivity Workshop organized in Houston, Texas in June 2010.

The outline of the idea for the third chapter of the thesis was presented for the first time at a seminar at the *Universidad de Oviedo* in December 2010. In March 2011, we had the opportunity of presenting an early version at the GAPEM Group of Efficiency and Productivity Analysis Workshop. This workshop took place in the Centre for Operational Research and Econometrics (CORE) at the *Université Catholique de Louvain* (la Neuve) in Belgium. In June 2011 the last chapter of the thesis was shown at the V Demo June

Workshop, Economics of Organizations, Corporate Governance and Competitiveness in Barcelona, Spain and at the European Workshop on Efficiency and Productivity Analysis in Verona, Italy.

Final Remarks

Finally, we would like to comment about the general organization of the thesis. Each chapter has its own reference section. All the figures and tables are presented at the end of the chapter. An appendix section has been included for chapters 1 and 2. References are marked in blue fonts in order to facilitate their consultation.

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Business Model Evaluation
Quantifying Walmart's Sources of Advantage

In recent years, the concept of the business model has received substantial attention in strategy literature where a number of qualitative approaches to describe, represent, and evaluate business models have been proposed. We contend that while helpful to understand a firm's overall logic of value creation and capture, qualitative methods must be complemented with quantitative analyses. The development of quantitative methods for the study of business models, however, has trailed that of their qualitative peers. In this paper, we develop an analytical framework based on the theory of index numbers and production theory to provide quantitative insight on the link between a firm's business model choices and its ultimate profit consequences. We apply the method to Walmart. Using evidence from annual reports, research papers, case studies, and books for the period 1972-2008, we build a qualitative representation of Walmart's business model. We then map that representation to an analytical model that quantifies Walmart's sources of competitive advantage over a 36-year period. We find that Walmart's success was due, primarily, to business model choices aimed at increasing sales volume (e.g., building new stores, increasing product variety, setting low prices, and implementing high-powered incentives for store managers) with operational efficiency, rather than to choices driving productivity gains.

1.1 Introduction

In recent years, the strategy field has become increasingly interested in the study of business models.[11] Although the expression was introduced long ago by Peter Drucker,[12] academic work on business models began just a decade ago, in the context of the Internet boom, when entrepreneurs were asked to explain how their ventures would create value (a wedge between willingness to pay and cost) and how value would be captured as profit. Indeed, most management scholars and practitioners refer to a firm's business model as "the firm's logic, the way it creates and captures value for its stakeholders."[13]

Casadesus-Masanell and Ricart (2010) and Casadesus-Masanell and Zhu (2010) operationalize the idea of a business model as the "logic of the firm" by decomposing business models into two fundamental elements: choices, such as policies, assets, and governance of policies and assets, and the consequences of these choices. The causal links between choices and consequences help explain the logic of the firm, how it creates and captures value for its stakeholders. While this decomposition helps to achieve a better understanding of the firm's logic, the methodology proposed by these authors offers little guidance on how the causal links between choices and consequences could be quantified. Without quantification, a detailed study of a firm's business model is incomplete, because there are often far too many degrees of freedom regarding how to interpret the links and relationships between choices and consequences.

In this chapter we provide a novel methodology to quantify the link between a firm's choices and their consequences and, ultimately, to achieve a better understanding of the virtues and weaknesses of a firm's business model. The method builds on business model research by Casadesus-Masanell and Ricart (2010) and on recent advances in production theory by Grifell-Tatje and Lovell (1999, 2008, 2010).

One of the advantages of the method is that it uses widely available accounting data and can therefore be applied broadly. When fine-grained, proprietary data is available, the method delivers more nuanced, less aggregated quantifications, but the method can be applied

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[11] The recent *Long Range Planning* special issue on business models (April 2010) received more than 80 submissions and attracted contributions from scholars such as David Teece and Nobel prizewinning practitioner Muhammad Yunus.

[12] Drucker, Peter, *The Practice of Management*, Harper and Row Publishers, 1954. A Google search for "Business Model" in May 2009 yielded 19.7 million hits.

[13] See *Long Range Planning* call for papers for the Special Issue on "Business Models" by Charles Baden-Fuller, Ian MacMillan, Benoît Demil, and Xavier Lecocq.

to aggregate data to produce significant insights on how well the firm's business model operates.

We are applying the methodology to Walmart, one of the most successful companies of all time. The company began operations in 1962, when Sam Walton and his brother Bud failed to convince Ben Franklin, Sam Walton's employer at the time, to open discount stores in rural America. The unlikely success of this business venture has had profound consequences worldwide. Fishman (2006) points out that Walmart's influence is felt everywhere, even in countries where there are no Walmart stores. Indeed, Walmart alters other retailers' business practices, provokes changes in product features, affects urban space, sets industry standards, changes the market structure, and influences the consumer habits of millions of people worldwide. Walmart's sales in 2008 of more than \$350 billion placed the company as the 27th largest economy in the world, if its sales were likened to a country's GDP. Walmart is an appropriate setting for applying our method and showing its added value because there is little controversy about the nature of its business model over the years, and a wealth of existing information about the company's operations.

We use case evidence to identify the main features of Walmart's business model and relate them to company performance, measured as profits. Our method allows us to develop an explanation as to why Walmart has been so profitable for so long and what accounts for its successful growth. Our model builds on the analysis of Grifell-Tatjé and Lovell (1999, 2008, 2012) and relates business model choices to variations in profit. We find that the main source of its positive profit change is its large sales volume, together with operational efficiency. The evolution of the productivity change at Walmart has been positive but low. The behavior of the components of the profit change has occasionally varied as the company has grown in size.

The rest of the chapter is organized as follows. In Section 2 we review the literature on business models, with an emphasis on the approach proposed by Casadesus-Masanell and Ricart (2010). In Section 3, we describe and discuss Walmart's most important business model choices and consequences and provide a representation of its business model. This allows us to see the usefulness and limits of the non-quantitative method proposed by these authors. In Section 4 we present our method for quantifying the relationships between choices and consequences to ground the business model representation to data. In Section 5 we describe the dataset on Walmart for analysis. In Section 6 we present the results. Section 7 contains the conclusion with a discussion of the advantages and drawbacks of our method.

1.2 The Business Model Concept

The business model concept is recent in scholarly literature. In the 90s, practitioners employed the notion of describing the rise of the e-businesses (Chesbrough and Rosenbloom, 2002; Magretta, 2002). During this period, new ways of doing business emerged that subverted the established logics of value creation and value capture. The term was thus used to describe the wide diversity of new, heterodox e-commerce firms.

While it is helpful to refer to "the logic of the firm," the notion of the business model is not free from controversy. For example, Porter (2001) has described the term as imprecise. This ambiguity has encouraged many attempts to establish its boundaries and define its components. Mäkinen and Seppänen (2007) observe that most of these attempts were carried out in isolation from the literature, which partially explains the current state of fragmentation in definitions. Magretta (2002) considers that the terms "strategy" and "business model" are not clearly separated and that a serious effort should be made to define them.

Despite these objections, we believe that the concept of the business model is useful for integrating different, related elements. For Chesbrough and Rosenbloom (2002), for instance, a business model is a device that establishes a link between technological development and economic innovation. Hedman and Kalling (2003), however, regard it as an integrative concept that connects the resource-based view with the industrial organization perspective. And Amit and Zott (2001) propose a unifying definition "that captures the value creation from multiple sources," (p. 494).

Although there are myriad definitions of business model, most of them are quite similar. Magreta (2002), for example, defines it as a description of how the parts of a business fit together. Hedman and Kalling (2003) characterize the concept as a description of the key components of a business. Casadesus-Masanell and Ricart (2010) provide a practitioner's pragmatic definition: it is a description of the firm's logic, how it operates in order to create and capture value for its stakeholders.

The idea of business models composed of a set collection of elements seems to be implicit in these definitions. Several studies have attempted to provide a definitive list of what a business model should include. Morris et al. (2005) and Hedman and Kalling (2003) examine diverse suggestions for the components of a business model. The range spans between three and eight elements. Morris et al (2005) suggest a business model concept that answers six questions and has three different levels, while Hedman and Kalling (2003)

suggest seven components. The vocabulary employed to describe these components differs considerably from definition to definition, reflecting the lack of consensus among researchers.

In this study, we employ the conceptual framework developed by Casadesus-Masanell and Ricart (2010). A business model is composed of two types of elements: choices made by the management and the consequences of these choices. There are three types of choices: policies, assets and governance of assets and policies. A policy is a decision about a firm's operational realm. Assets are tangible resources used by the firm in its operations. Finally, the governance of assets and policies refers to the establishment of decision rights over these assets and policies. Consequences can be flexible or rigid. The flexibility of a consequence is determined by how fast it changes as the choices that produced the consequence vary.

Casadesus-Masanell and Ricart's framework is simple, flexible and bridges industrial organization and the resource-based view as two alternative perspectives for the study of competitive advantage. According to the resource-based view, what determines a firm's success is the control of valuable, rare, and imperfectly imitable resources (Barney, 1991). The industrial organization perspective, developed by Porter (1980, 1985), essentially portrays the firm as a collection of activities in which competitive advantage resides. The author describes two generic strategies (low cost and differentiation) which translate into two alternative sources of competitive advantage. Casadesus-Masanell and Ricart (2010) and Zott and Amit (2010) recognize the importance of activities (policies) and assets as descriptors of a firm's business model. And, by incorporating the governance of assets and policies, Casadesus-Masanell and Ricart (2010) also consider insights from transaction cost economics, as revealed in the works of the Nobel Laureate Oliver Williamson (1981).

In addition, there are two important elements within the Casadesus-Masanell and Ricart (2010) framework. The idea that consequences can be rigid means that some choices made by the company have a cumulative effect. This provides the "longitudinal dimension" explicitly sought by Hedman and Kalling (2003). The second element is the inclusion of causal relationships in the components of business models. Choices produce consequences. Furthermore, consequences sometimes create other consequences, or enable choices.

A loop diagram is the device used to represent a business model. Choices are represented using bold and underlined fonts; rigid consequences are in boxes and flexible consequences are shown in plain text. The arrows connecting choices and consequences are those provided by theories explaining causal relationships. The authors acknowledge that

sometimes these theories of causality are controversial. If the arrows connecting the elements are based on a false logic the business model will fall apart. Nevertheless, many of the theories behind these arrows are based on "commonly accepted relationships open to little discussion," (Casadesus-Masanell and Ricart 2010, p. 3).

A feedback loop occurs when the consequences of some choices also make these same choices possible. These authors distinguish between two types of feedback loops: virtuous and vicious cycles. Virtuous cycles are "feedback loops that, in every iteration, strengthen some components of the model," (Casadesus-Masanell and Ricart 2008, p. 9).

The level of detail in each business model depends on the objectives of the practitioner or researcher. It is important to bear in mind the trade-off between tractability and realism mentioned by Casadesus-Masanell and Larson (2009) when choosing the degree of specificity. Casadesus-Masanell and Ricart (2008) describe two methods of simplifying a business model. One of these methods is aggregation, which consists of grouping choices and consequences into larger constructs. The other method is decomposability, which refers to the analysis of parts of a business model that are not related to other choices and consequences. In this study we use the aggregation approach.

In the next section we provide a business model representation of Walmart. This representation is created by analyzing what has been written about Walmart, the information disclosed by the company in its annual reports, financial statements for the Security Exchange Commission (SEC) and other sources. After we have scrutinized the information available about Walmart, a business model representation is developed. This representation is the starting point for our empirical work.

1.3 The Walmart Business Model and its Evolution

Walmart becoming the largest retailer in the world was a process that began seventeen years before the first store opened its doors. Anyone who analyzes the history of its founder will observe the amount of experimentation undertaken by Sam Walton in his businesses. This willingness to innovate created many opportunities for improvement. However, there were also many failed experiments. From these successes and failures, Walton built an expanding empire that set trends and adapted easily to the changing environment.

The history of Walmart starts when Sam and Helen Walton bought a franchise of Ben Franklin variety stores in Newport, Missouri. With this venture, Walton traveled to many places, always analyzing competitors and "borrowing" the tactics he considered to be

potentially successful. Although the founder died in 1992, his guidelines still influence the company's daily operations.

Currently, several papers claim to have established the key to Walmart success. We think that more than one business decision is relevant for explaining the firm's performance. After reviewing the literature available on the topic we have identified six choices, or a set of choices, that define the Walmart business model. These choices are setting low prices, investing in technology, having specific human resources policies, establishing strategies for expansion, increasing product variety and developing a Walmart culture.

Nevertheless, as time passes and new CEOs take control of the company, some elements of the successful model evolve. This is also part of Walmart's business model – maybe even the most important part – constant change. Given the size of the company, the executives can test many ideas with very little risk by implementing them in a small number of stores.

The results of the Walmart business model are clear. Figure 1 presents the evolution of Walmart real profits over time. In 2008 the real profits obtained by the company were almost 1.8 billion 1970 dollars, 436 times greater than what the company earned in 1972. The average annual growth rate was 17.82% for the 38-year period. Furthermore, the value added increased from 29.52 million constant dollars in 1971 to 17.14 billion in 2008. Nevertheless, the average productivity growth is only 2%. These results seem incongruent. To resolve this apparent paradox we first need to understand the decisions made by the company and their implications.

[INSERT FIGURE 1 ABOUT HERE]

In this section we describe the six decisions or set of decisions that define the Walmart business model. We try to go beyond mere description by linking these decisions to a set of consequences. In section 5 we measure these predicted consequences.

Walmart Culture:

Sam Walton states in his autobiography that some of his attitudes towards money are the result of growing up during the Great Depression. During this time, most people, including his parents, had to make great efforts to make ends meet. It is no coincidence that the first chapter of his autobiography is entitled "Learning the value of a dollar." Walton made frugality one of the pillars of Walmart's culture.

Frugality means a systematic emphasis on cutting costs by eliminating superfluous expenses. There are many accounts of how tightly expenditure is controlled at Walmart. Bradley and Ghemawat (2002) remark that managers had to share hotel rooms and walk instead of taking taxis. They also highlight the fact that the lack of regional headquarters seems to have saved the company at least 2% of its sales.

The idea behind this obsession with cost-cutting is being operationally efficient. The company seeks to achieve the best possible results at the minimum cost. The progress made by being efficient translates into higher productivity.

The other pillar of the Walmart culture is the creation of a friendly environment focus when serving the customer. Walton (1992) advised that "[t]hese days, the real challenge for managers in a business like ours is to become what we call servant leaders," (p. 135).

The origin of the Walmart culture can be traced back to its beginnings. The first Walmart store opened its doors in Roger, Arkansas. This state belongs to what is called the "Bible belt." This region of America is characterized by the predominance of evangelical churches, representing a singular Christian culture. Walton, who was a Methodist and later joined the Presbyterian Church, emphasized the importance of the church in his life in his memoirs. Dunnett and Arnold (2006) claim that this cultural baggage is found in ideas like "Servant Leadership" which have molded Walmart's distinct nature.

Walmart's efforts to create a friendly, fun environment where customers and associates feel good must translate into increasing the volume of customer visits. Walton (1992) stated that "Satisfied, loyal, repeat customers are at the heart of Walmart's spectacular profit margins, and those customers are loyal because our associates treat them better than salespeople in other stores do," (p. 128). Sales volume is related to a component called activity effect, which will be described in the next section.

Expansion Policy:

Walton (1992) said that when people want to summarize the Walmart story they usually say: "Oh, they went into small towns when nobody else would," (p. 109). Walton used the expression "saturation strategy" to describe Walmart's method of expansion. We will proceed to analyze the most important elements of this growth policy, which was essential for the company's success.

Walmart started in rural areas in the southern region of the United States. Bradley and Ghemawat (2002) explain that, at the beginning, Walmart faced distribution problems because of its geographical position. It was difficult to make vendors stock the stores on time. The solution was a shift in paradigm: instead of each establishment making specific merchandise orders, all orders were centralized and dispatched from one distribution center.

Walton acknowledged that his expansion policy was the result of necessity. It was important that the new stores were close enough so they could easily replenish their stock from the distribution centers. The founder set the standard that stores should be within a day's drive of a warehouse (Walton, 1992, p. 110). The company saturated the market area by placing stores very close to one another.

The main advantage of this expansion policy is the development of a dense distribution network that allowed the firm to spread costs. Walton was aware of this benefit. He also commented on its capacity to shield his stores from competition. Some of the new stores were located in small towns with less than 10,000 inhabitants. Walmart passed unnoticed for many years before it began to face serious competition from companies like Kmart.

Walton (1992) said that he did not plan to go into cities. Instead, Walmart stores were built in the ring around the city, and he waited for demographics to do the rest. Nevertheless, this strategy created many problems for the businesses and authorities in these cities. One of the main problems was "urban sprawl", consisting of uncontrolled urban development creating low-density expansion and the abandonment of the downtown area.

The Walmart expansion policy had several consequences. It had a definite influence on the efficiency of operations. Better logistics and distribution result in higher productivity, as stores are supplied with the items they need faster and cheaper. This expansion also means that more customers are served, affecting activity levels in terms of sales volume. Walmart had 38 stores functioning in 1970 and, by the end of 2008 that number had increased to 7,873. The average annual growth rate was 15%. The number of workers increased from one thousand to two million in the same period. These figures give an idea of the magnitude of the expansion. Finally, expenses such as advertising are spread between stores that are close to each other, thereby reducing costs.

Human Resources Policy:

Walton's view of the importance of having good staff is shown in the following expression: "If you want the people in the stores to take care of the customers, you have to make sure you're taking care of the people in the stores," (Walton, 1992, p. 80).

Walmart has put in place a diverse array of incentives to attract good employees at the managerial level. Initially, Walton lured talented people by offering them a percentage of the profits made by the store. Before Walmart went public, all these partnerships were replaced with stocks. Giving stocks to employees is a remuneration practice that is still used today.

Furthermore, several programs have been implemented to attract people. Volume Produce Item is a contest in which department heads pick an item that they consider has the potential to sell large volumes and develop a promotion plan to sell it. Another program is "store within the store," in which each department manager is given the freedom to act as an independent merchant. "Yes We Can, Sam" is an annual activity in which employees (of all types) are recognized for their innovative ideas. Other initiatives, such as Business Leadership Series and People Asset Review, aim at improving managers' leadership skills.

Nowadays, Walmart is the largest private employer in the United States, and in other countries such as Mexico and Canada, with over 2 million workers worldwide. Surprisingly, despite the emphasis placed by Walton on the importance of treating employees well, one of the most recurrent criticisms made against Walmart is that the company mistreats its non-managerial workers (associates) by paying them low wages with poor benefits. This issue has been analyzed in several studies (Drogin, 2003; Dube & Jacobs, 2004; Hausman & Leibtag, 2007), with contradictory results. What is clear is that Walmart tries hard to keep overhead costs down. Walton (1992) explained in his biography that "payroll is one of the most important parts of overhead, and overhead is one of the most crucial things you have to fight to maintain your profit margin," (p. 128).

Another element of the human resources policy is zero tolerance towards the formation of unions. In the relevant literature, there are two main events relating to union formation within Walmart. The first major threat came from the meat cutters of Jacksonville, Texas. The second attempt at unionization occurred in 2005 in Quebec, Canada. Both episodes provoked swift reaction from Walmart.

Human resources policies have very different implications. Firstly, they encourage operating efficiency and a high activity level by the use of high power incentives for

managerial positions. Furthermore, the company keeps labor expenses as low as possible with respect to non-managerial workers. Walmart not only pays low salaries, but also hinders the formation of unions which could jeopardize its human resources policy. We consider that, initially, the company was relatively unknown and some of its most controversial actions were not subject to scrutiny. However, given the size and the importance of Walmart today, it would be very difficult to avoid making some concessions.

Low Prices:

Sam Walton's trading skills improved as he became more experienced in the field. Walton found that by keeping prices low (in items such as women's underwear), a retail store could increase its sales by much more than merely compensating for the reduction in markup. When he entered the discounting business, Sam applied this principle obsessively, always trying to beat the competition. Several studies confirm that Walmart sets lower prices than its competitors (Basker, 2005; Basker & Noel, 2009; Global Insight 2005). However, it is not clear if these low prices imply low quality merchandise or low quality service.

Whether low prices imply low quality or not, the fact is that the company has been successful in attracting customers whose main concern is price. Certainly low prices have two important effects. Firstly, they lower the markup earned on each item sold. Profit per item sold is therefore reduced. On the other hand, they attract more customers, which means that the sales volume rises, increasing the activity effect. Not every firm could follow this strategy; it requires a strong commitment. Walton (1992) put it simply "[we] keep our prices as low as possible by keeping our costs as low as possible," (p. 119)[14].

Investment in Technology:

Walton was very aware of the importance of investing in technology. He tried hard to surround himself with very talented people who had a good understanding of the impact of computers on retailing. One of the main leaders in Walmart's leap towards sophisticated technology was Ron Mayer. Walton claimed that, after Mayer joined the company, the firm was ahead in investment in equipment and technology.

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[14] To find out more about Walmart's pricing strategy, read Global Insight (2005), Basker (2005), Hausman and Leibtag (2007) and Basker and Noel (2009). The methodologies vary between all these studies as well as the ranges of the price difference. All these studies found that Walmart sets lower prices than its competitors.

The results of all these efforts can be observed on a large scale. In 2004, 75,000 employees were working in the company's Information Systems (IS) department, which had a data warehouse capacity of 570 terabytes[15]. That year, the IS was put to the test by the upcoming threat of Hurricane Ivan. The technicians were prepared; they even knew that the course of Ivan would mean a rise in demand for a specific product: Kellogg's Strawberry Pop-Tarts. The annual report reveals that this merchandise reached the stores in the zone just in time. The following year the IS was put to the test again, this time by the tragedy of Hurricane Katrina. As in the previous year, Walmart flexed its technological muscle and set an example of efficiency, not only to other private companies but also to the government[16].

Walmart was one of the pioneers in the retailing industry in installing a computerized stock tracking system in 1971 (Ghemawat, 1989). It was also one of the first to switch to the Union Product Code (UPC) at the point of sale. The rolling out of the UPC started in 1983 and ended in 1988, two years ahead of Kmart (Bradley and Ghemawat, 2002). The objective was to know the location of every item in stores at all times. A Satellite Network was inaugurated in 1986. It cost 20 million dollars at the time, and was designed to facilitate communication between the different stores and headquarters (Ghemawat, 1989).

What makes Walmart's technology special is that it widens the relationship with its suppliers. For instance, Ghemawat et al. (2004) explain that Walmart developed an application called "Retail Link" that provides point-of-sale data to its suppliers. The authors comment that more recently the company launched "Scan 'N' Pay." In this application, suppliers continue to own items at the store until they are sold. It is only after sale that the accounts payable is incremented. These "choices" fit in well with what has been called "The Logistics Revolution."

Bonacich and Wilson (2006) consider Walmart to form part of this logistics revolution. It constitutes a shift in the paradigm from push to pull production distribution. According to the authors, under the push paradigm suppliers dominate. Production units run at higher levels in order to gain economies of scale, and the surplus is "pushed" out to the retailers, which store it in warehouses. The pull paradigm consists of retailers collecting information about consumer preferences which is then transmitted to suppliers. They then have to meet strict time requirements to produce the merchandise (just-in-time) and cannot

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[15] See Annual Report 2004.
[16] For a good account of Walmart's response to Katrina read: Barbaro, Michael and Justin Gills. "Wal-Mart at the Forefront of Hurricane Relief." The Washington Post. September 6, 2005.

benefit from the economies of scale of mass production. Vendors need to store some of their products in warehouses to deal with retailers' contingencies. Bonacich and Wilson (2006) explain that Walmart uses its technological advantage to coerce suppliers to lower their prices. This pressure is so intense, that some vendors are forced to outsource their production to other countries if they cannot further reduce their costs and markup[17].

Investment in technology affects the performance of the company in several ways. It provides executives with information to measure the performance of managers, stores and product sales. This information is used as an incentive for managers, as well as forcing suppliers to adapt their offers, and identifying potential ways of cutting costs by saving on inputs. This last element is very important: Walmart's technological leadership has pushed out the frontiers of production possibilities. Technology is also a tool to pressurize vendors to reduce their prices or give Walmart preferential treatment. The company can reduce its inventories by demanding just-in-time goods.

Product Variety:

Popcorn and ice cream machines were among the first tricks used by Walton to attract customers to his stores. As an innovator, Walton tried many strategies to increase the volume of customers who came to his businesses. After he died, his successors expanded his vision even further by incorporating a diverse array of services and goods as part of Walmart merchandise. Walmart's strategy is basically to gain an increasing share of customers' wallets by meeting a higher proportion of their needs: medicines, groceries, photos, appliances, furniture, clothing, and even some basic healthcare and financial services.

In addition to expanding the product lines offered, the company has experimented with different retail formats. Walmart was the pioneer of the "supercenter", when the company tried to adapt the hypermarket format from Carrefour (Fishman, 2006). Nowadays the company has four retail formats in United States: discount stores, supercenters, warehouse clubs and neighborhood markets. Outside the United States, the firm has maintained a diversity of formats in some of the countries where it has acquired businesses.

In this chapter, we treat Walmart and the Sam's Club branch separately. The reason for this separate treatment is that, since it began, the warehouse club store has been considered as separate from the other stores. In the words of its founder: "I had a chance to

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[17] See Walton, Sam (1992) "Sam Walton: Made in America" p128

build a company all over again, and I tried to be as hands on as I could […]" (Walton, 1992, p. 201). Walton copied the warehouse club concept from Sol Price's Price Club store. Walmart wants to attract small businesses and customers who want to buy wholesale quantities of goods. In order to buy in a Sam's Club, customers have to pay a membership fee. The store layout is very simple, to keep the costs down. Walmart has historically presented substantial financial data for each branch.

The "one-stop-shopping-effect" and the diversity of store formats are intended to attract more customers by offering them a greater diversity of products. The consequence of these activities is a higher sales volume (implying a higher activity level), because more customers visit the stores and buy more items.

The Walmart business model representation:

Figure 3 is a diagram that represents the Walmart business model[18] based on the above descriptions of the choices made by the company. It is important to note that the decisions or sets of decisions generate consequences. Sometimes these consequences produce other consequences or enable other choices. There are several feedback loops in this diagram produced by these relationships. These feedback loops are virtuous cycles that strengthen some components of the model in every iteration.

[INSERT FIGURE 3 ABOUT HERE]

The arrows connecting causes and consequences are supported by theories. In general, these theories are "commonly accepted relationships open to little discussion" (Casadesus-Masanell and Ricart, 2008). These theories are not part of the business model; they are "suppositions on how choices and consequences are related" (Casadesus-Masanell and Ricart, 2008). In order to make our explanation robust, we provide a description behind each arrow in the business model.

Low prices imply a high volume of sales in accordance with the demand theory. Furthermore, a reputation for having low prices can be expected if a company continuously sets prices low. We claim that this reputation of low prices allows Walmart to spend less on

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[18] Our representation is a modification of a business model created by Casadesus-Masanell for a seminar.

advertising.[19] Low expenditure on advertising contributes to keeping total costs low. A firm with low costs can set prices low as well.

Going abroad, location selection, specific store characteristics and the ownership of distribution centers are all activities that form part of the "expansion policy"[20] symbolized in figure (3) as a consequence. Walmart's expansion policy has been studied by several researchers. It has been described as "a reverse hierarchical strategy with some elements of contagious diffusion" by Graff and Ashton (1994) in order to build an efficient distribution network. Holmes (2008) analyzes the benefits of these economies of density for Walmart and finds them "substantial" despite the cannibalization of its own stores. Jia (2008) emphasizes the scale economies achieved by Walmart during its expansion. Therefore, we support the arrow from expansion policies toward low costs based on the previous literature. We also think that it is a valid assumption to establish a connection between expansion policy and high sales volume (more stores, more opportunities to sell). Furthermore, the fact that the stores are so close to each other means advertising costs can be spread efficiently.

Investment in technology has been used primarily for three purposes: to make good sales forecasts; to increase negotiation power and to measure store performance. Good sales forecast is useful for avoiding stockouts or excessive inventories of certain items. We state that sales forecast is an important factor for the pricing policy of Walmart. The firm is able to anticipate future demand and offer items at lower prices. As we have already mentioned, an investment in technology is key to understanding the "pull paradigm." Now retailers use technology to make precise purchases and pressurize vendors to provide merchandise "just-in-time" and to reduce their prices. Finally, investment in technology provides metrics for measuring store performance. These metrics are used for the implementation of high powered incentives. The importance of incentives in boosting performance has been studied in depth in the economic field. In our opinion the works by Holmström (1979) and Lazear (1986) established the theoretical foundations of the current trends in the economics of organization today. We support the connection between human resources policies and high sales volume based on this theoretical framework. In addition, an investment in technology has been useful in reducing "shrinkage" (losses due to damage, fraud etc.) which also reduces costs.

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[19] See Discount Retailer News (1989) "Reputation, not ads, woos customers." December 19 and Mckee, Steve (2009). "What should you spend on advertising?" Business Week, February 10.

[20] In this case we used "aggregation" defined as "'bunching together' detailed choices and consequences into larger constructs." (Casadesus-Masanell and Ricart, 2010, p. 200).

The one-stop-shopping effect has been studied for the case of retail chains by Basker et al. (2008). They found that for each additional product line added 400 new stores are built. The one-stop-shopping effect can be considered the result of economies of scale on the demand side according to these authors. Consumers save money by buying everything in one place instead of visiting different stores. This issue was studied from a theoretical viewpoint by Bliss (1988).

Frugality implies lower costs by definition. Walmart saved money by controlling expenditures and avoiding superfluous perks. The relationship between economics and culture has been a subject of scrutiny recently. Guiso et al. (2006) offer a good review of current literature seeking to answer the question "Does culture affect economic outcomes?" We claim that Walmart's culture of service boosts sales by providing a friendly environment. Customers will more frequently visit stores where they feel well treated.

In the next section, we will transform this business model in order to gain a better understanding of the effects of these choices on the profit-generation process. Each one of the six choices that we have described in the previous sub-sections has an effect on some components of the change in profits. We map each managerial choice with the corresponding component(s).

1.4 Measuring the Consequences of the Business Model

Profits change for two reasons: either prices or quantities change. A firm's profits could increase for any of the following reasons or a combination of them: a) It sells more goods maintaining a proper margin; b) It sells goods at higher prices; c) It pays for its inputs at lower prices; or d) It uses fewer inputs per unit of goods produced/sold.

In general, a business model aims to increase profits by generating one or more of the causes listed. For instance, a company that has selected a generic strategy of differentiation wants to sell its goods at higher prices. This does not mean that it would not try to trigger the other causes, but selling at higher prices would be the main goal.

In the case of Walmart, we have identified that all its choices aim to increase sales, pay less for inputs and use fewer inputs for the same quantity of sales. The Everyday Low Prices strategy reduces the possibility of selling goods at higher prices. Sometimes a choice is linked with more than one reason. In this section we analyze how each choice made by Walmart affects the bottom line.

We start by analyzing the effect of human resources on profit levels. As we previously mentioned, the company pays low salaries to its non-managerial workers. A serious effort is made to keep labor costs down, which means controlling the prices paid for the labor input. Additionally, "associates" are required to be flexible, and stores are kept understaffed, which could boost operating efficiency. Another cause of efficiency is the high power incentives received by managerial workers. These incentives also entice managers to increase sales volumes by making their salaries contingent on sales performance. Figure 4 shows the Walmart choices and their impact on profits. Figure 4 represents the situation described in which the increase in profits due to increases in sales volumes shapes the company's *activity effect*. Meanwhile, wages and salaries are included in the *evolution of labor and capital prices*, and alterations to efficiency are included in the *operating efficiency effect*.

Investment in technology has two direct effects on profits. The company uses its technology to understand consumer preferences and reduce warehouse stock. This information is used to pressurize vendors into reducing the prices of intermediate inputs. As a result, the value added obtained by the firm increases. The second effect comes from the technical change. Technology has been used to speed up the checkout process, reduce the time spent unpacking merchandise and putting it on sale, gain insight into which are the "hot items" and place them where the customers can see them, among other tasks that improve sales without greatly increasing the quantity of inputs employed. Walmart has been the technological leader in the retail industry for many years. This leadership has helped the company to achieve higher profits by implementing breakthrough technologies, especially in the area of logistics. The situation described is represented in Figure 4 by the links to the *technical change effect* and the *evolution of the value added*.

The expansion policy refers to where stores are located and what the characteristics of these stores are. The way in which Walmart has positioned its stores helps the company to reduce transport costs and spread some costs, such as advertising, widely, making operations generally more efficient. Furthermore, the increase in the number of local and international stores means that more potential customers have access to the stores, thereby increasing sales volumes. In Figure 4 the *activity effect* and *operating efficiency effect* represent the situations described.

The pricing policy affects the volume of sales (the lower the price, the higher the sales, keeping everything else constant) and the value added obtained per item sold. The net effect is not clear – the company sells more units but it receives less per unit sold. It could be that the

reduction in output prices counterbalances the increase in the amount sold. In figure 4 these two effects are represented by the arrows connecting pricing policy to the *evolution of the value added* and *activity effect*.

The Walmart culture makes operations more efficient by eliminating superfluous expenses that do not add much to the value offering. Walmart is a company in which perks, impressive headquarters, and extravagant benefits are considered unnecessary for the business. Culture is also important in attracting consumers. Customers will prefer to buy at a store where they feel appreciated than in a place where they feel mistreated. This aspect of the Walmart culture influences the *activity effect* and *operating efficiency effect* in Figure 4.

The last managerial choice is product variety. The consequence of this choice is also known as the "one-stop-shopping effect". In general, customers will prefer to make all their purchases in one place instead of going from one shop to another. So, as Walmart increases the product lines it offers, more customers will be attracted to its stores, increasing the sales volume and impacting on the *activity effect* in Figure 4.

Figure 4 presents a mapping from managerial choices to the components of change in profit. The connections between the different elements were based on the business model from the previous section.

[INSERT FIGURE 4 ABOUT HERE]

Modeling the Consequences of Walmart:

Traditionally, a financial analysis is used to assess a company's performance. Key financial ratios provide information about the status of a company (see Nassim & Penman, 2001). Analysts usually express a measurement of financial performance (e.g. return on assets) as a product of ratios that commonly take a pyramidal form. The DuPont method applied by Donaldson Brown in the General Motors Corporation in the 20s (Johnson, 1975, 1978) is an example of this analytical framework. This method is still used today (Soliman, 2008).

One of the shortcomings of financial analysis is that it does not take account of economic performance. Gold (1971) reconciles both concepts when he introduces productivity as an explanatory factor for financial performance. However, it is not certain that he manages to accomplish this reconciliation because he defines productivity as the capacity–fixed investment ratio. Gold (1971) breaks down this ratio of capacity over fixed investment,

using partial measures of productivity e.g. labor and raw materials. Eilon *et al*. (1975, 1976) offer applications of this methodology to industrial settings.

Recently, some business literature has studied company performance from a more heterodox and holistic viewpoint. Siggelkow (2001) proposes the use of performance landscapes to analyze company behavior. There are similarities between his framework and that proposed in this study. He maps choices directly to performance, while we map choices to theoretical constructs of production theory and these constructs to performance. In our opinion, the concept of the production frontier is implicit in the Siggelkow (2001) approach. Other studies, such as Siegel and Larson (2009), describe an econometric equation in which a key financial indicator of performance is linked to choices made by the firm, as well as exogenous variables such as macroeconomic indicators. We acknowledge the inherent value of the analytical frameworks described above, although we decided to take an alternative approach. Our approach has the advantage that it requires less data and is theoretically more integrated.

The proposed methodology follows the scheme shown in figure 4. This methodology provides a better assessment of the impact of Walmart's choices on its profits and is better integrated. We rely on the theory of index numbers and production theory to develop our analytical framework. The use of production theory does not mean that this study can be fitted to the neoclassical viewpoint of the firm. Cyert and Hedrick (1972) characterize this issue correctly when they state: "*The unmodified neoclassical approach is characterized by an ideal market with firms for which profit maximization is the single determinant of behavior*" (p. 400) and also "*Many papers are based on…modifications of the neoclassical method. They extend the model to deal with real-world issues not faced by the simple text-book models, but retain the* a priori *character, in that all of the detail added is descriptive of the environment,*" (p. 401).

The hypothesis of profit maximization or its derivations are not used in our analytical framework. Production theory provides the fundamentals required for defining concepts such as productivity, technical change, operating efficiency in the context of economic performance assessment. Once they are defined, these concepts can be incorporated naturally as explanatory variables of profit change, our measure of financial performance.

The methodology employed in measuring the sources of Walmart's advantage had some features that made it attractive from a competitive strategy and management

perspective. There are two levels of analysis and, as we mentioned, the framework combines the theory of index numbers and production theory. The main purpose of the theory of index numbers is the aggregation of the information. This theory is used nowadays by every governmental statistical department. Its roots can be traced back to the 19th century. Fisher (1911) was fundamental in its development and Balk (2008) gives an updated revision of the theory.

The first analytical level only uses the information about Walmart prices and quantities that is publicly available. The change in profits is explained through price and quantity effects. Davis (1955) was a pioneer in proposing this scheme, which was followed by Kendrick and Creamer (1961) and Kendrick (1984). Other researchers such as Genescà and Grifell-Tatjé (1992), Kurosawa (1975, 1991), Miller (1984); and Miller and Rao (1989) follow the same framework, although they do not use Davis's (1955) seminal work as a base.

The proposed framework includes Bennet (1920) type indicators making it possible to obtain a value for each variable. Thus, the price effect is useful to quantify, for example, the impact of the pricing policy on profits. On the other hand, the quantity effect measures the impact of the decisions made on output or input quantities on the bottom line. Choices such as hiring more staff or increasing fixed assets are reflected in this last effect.

At the second level, the quantity effect is decomposed. In order to do this, we need to introduce concepts such as the set of production possibilities and the production frontier. The production theory allows us to explain the quantity effect using well-known economic performance measurement concepts. This level of detail helps us to understand how Walmart's growth policy is contributing to higher profits being obtained. In addition, we can explore the effects of technological progress and efforts to achieve higher efficiency levels. The empirical application of this second layer of analysis requires the construction of a dataset that records information about other firms in the retailing industry. The following paragraphs will provide more details about the proposed methodology.

Bennet indicators:

We define profit π as the difference between revenue and operating cost where revenue is $R = p^{\mathrm{T}}y = \Sigma p_{\mathrm{m}}y_{\mathrm{m}}$ and operating cost $C = w^{\mathrm{T}}x = \Sigma w_{\mathrm{n}}x_{\mathrm{n}}$. Output vectors are represented by $y = (y_1,\ldots,y_M)$ and input vectors by $x = (x_1,\ldots,x_N)$. In addition, output price vectors are denoted $p = (p_1,\ldots,p_M)$ and input price vectors $w = (w_1,\ldots,w_N)$. Profit is expressed

as $\pi = R - C = p^Ty - w^Tx$, and profit change, from period t to period $t+1$, is defined in difference form as

$$\pi^{t+1} - \pi^t = [\bar{p}^T(y^{t+1} - y^t) - \bar{w}^T(x^{t+1} - x^t)] + [\bar{y}^T(p^{t+1} - p^t) - \bar{x}^T(w^{t+1} - w^t)] \; [1]$$

The vectors $\bar{p}$, $\bar{y}$, $\bar{w}$ and $\bar{x}$ are averages of the current and the next period vectors where $\bar{p} = \frac{1}{2}(p^t + p^{t+1})$, $\bar{y} = \frac{1}{2}(y^t + y^{t+1})$ and so on. The first term on the right side of expression [1] is the *quantity effect*, which shows the impact of quantity changes on profit change, and the second term is the *price effect*, which shows the impact of price changes on profit change. Each expression has two components. In the case of the price effect, the first component, $\bar{y}^T(p^{t+1} - p^t)$ quantifies the variations in the prices of the outputs; in our application the change in the value added per unit of output. The second component: $\bar{x}^T(w^{t+1} - w^t)$, measures the impact on profit of the variations in the input prices.

Expression (1) explains profit change using quantity and price indicators. Bennet (1920) advocates using the *arithmetic mean* of price and quantities to evaluate change. We follow this approach because Diewert (2005) has shown that the Bennet indicators have a set of properties that make them superior to the traditional Laspeyres and Paasche indicators.

Grifell-Tatjé and Lovell (1999, 2008) decompose the quantity effect following an output orientation (maximizing output production for a given vector of inputs). We adapt this using Bennet prices and input orientation (minimizing input usage for a given vector of outputs) as this is the previously described behavior of Walmart. De Witte and Saal (2010) also take this orientation in their study of Dutch drinking water utilities. The quantity effect in equation (1) can therefore be further decomposed using production theory.

$$\bar{p}^T(y^{t+1} - y^t) - \bar{w}^T(x^{t+1} - x^t) =$$

$$[\bar{p}^T(y^{t+1} - y^t) - \bar{w}^T(x^C - x^B)] \qquad \text{Activity Effect}$$

$$+[\bar{w}^T(x^t - x^B) - \bar{w}^T(x^{t+1} - x^C)] \qquad \text{Productivity Effect}$$

$$[2]$$

Equation [2] can be clarified with the help of Figure 5 with $M = N = 1$. Production sets in period t and $t+1$ are labeled T^t and T^{t+1}. The set of feasible combinations of output vectors and input vectors over a period of time is the production set or technology T of this period.

Production in period t uses x^t to produce y^t, and this combination is inside T^t. Production in period $t+1$ uses x^{t+1} to produce y^{t+1}, and this combination is inside T^{t+1}.

[INSERT FIGURE 5 ABOUT HERE]

The first term on the right side of expression (2) is the *activity effect*, and the second term is the *productivity effect*. The activity effect can be associated with growth, but growth based on the new technology of period $t+1$ and net of operating inefficiency. It is net of operating inefficiency because it is not possible to produce the same with less input. This idea is shown in Figure 5. The activity effect in Figure 5 is indicated by the arrow connecting operating-efficient vectors (x^B, y^t) and (x^C, y^{t+1}). As both are on the boundary of T^{t+1}, the activity effect contributes to or detracts from the quantity effect as the change in the value of output exceeds or falls short of the change in the efficient quantities of inputs, with the changes being evaluated at Bennet output and input prices. In the case of $M=N=1$ the activity effect is equal to zero when $y^t = y^{t+1}$. But, Grifell-Tatjé and Lovell (1999) have shown that, in a general situation with multiple outputs and inputs, it also collects the changes in the output and input mixes. As we have seen, one of the main characteristics of Walmart is expansion, and the activity effect should largely quantify this in value terms.

The productivity effect is also expressed in value terms, as the difference between weighted input changes. It measures the monetary value of productivity change. The productivity effect contributes positively to the quantity effect, and hence to profit change, if the weighted difference $(x^t - x^B)$ exceeds weighted variation $(x^{t+1} - x^C)$. Grifell-Tatjé and Lovell (2012) have shown that this measure of total factor productivity change can be related to a Malmquist productivity index.

Malmquist productivity index:

Malmquist (1953) published a quantity index for use in consumption analysis. The index uses gauge functions to compare two or more consumption bundles, and uses an indifferent curve from one of the consumers as a reference set. Caves *et al*. (1982) (CCD) rediscovered Malmquist's lost work and adapted his idea to production analysis. These authors presented a Malmquist index as a measure of productivity change and defined it in a context given by a technology characterized by variable returns to scale. Grifell-Tatjé and Lovell (1995) showed that in contrast to the consumer context, in a producer context the notion of economies of scale is relevant. When a Malmquist productivity index is defined relative to a technology characterized by variable returns to scale, it does not collect the effect

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of scale economies. Färe *et al.,* (1995) demonstrated that a Malmquist index can be defined as a ratio of distance functions (Shepard, 1970). An input distance function is defined as $D^t(y^t, x^t)$ = max{θ: $(y^t, x^t/θ \in T^t$} where $D^t(y^t, x^t) \geq 1$ because $x^t \in T^t$; $D^t(y^t, x^t) = 1$ when x^t is producing maximum feasible output with technology prevailing in period *t*. $D^{t+1}(y^{t+1}, x^{t+1})$ has the same characteristics of $D^t(y^t, x^t)$ with T^{t+1}. The adjacent-period input distance function $D^{t+1}(y^t, x^t)$ is also obtained by replacing T^t with T^{t+1}. However, as quantity data from one period may not be feasible with technology prevailing in another period, it follows that $D^{t+1}(y^t, x^t) \gtreqless 1$.

An input-oriented CCD Malmquist productivity index can be written as

$$M_{CCD}^{t+1}(x^t, y^t, x^{t+1}, y^{t+1}) = \frac{D^{t+1}(y^t, x^t)}{D^{t+1}(y^{t+1}, x^{t+1})}$$

$$= \frac{D^{t+1}(y^t, x^t)}{D^t(y^t, x^t)} \frac{D^t(y^t, x^t)}{D^{t+1}(y^{t+1}, x^{t+1})} \qquad [3]$$

The first line of equation [3] defines a CCD Malmquist productivity index as the ratio of two input distance functions. It compares period *t* data to period *t+1* data, using input distance functions characterizing the structure of technology prevailing in period *t+1* as a reference, and attains a value greater than, equal to, or less than unity depending on whether the producer has experienced productivity growth, stagnation, or productivity decline, net of the contribution of scale economies, between periods *t* and *t+1*. Figure 2 plotted the CCD Malmquist productivity index of Walmart from 1977 to 2007. The second line of equation [3] shows that the CCD Malmquist productivity index decomposes into the product of two indexes. The first index provides a measure of the contribution to productivity change of whatever technical change occurs between periods *t* and *t+1*, a long a ray through period *t* data. It measures the shift of the production frontier. Figure 5 gives the intuition of the index, because it can be expressed as the ratio x^A/x^B. It attains a value greater than, equal to, or less than unity depending on whether technical progress, stagnation or technical regress has occurred. The second index provides a measure of the contribution to productivity change of a variation in operating efficiency between periods *t* and *t+1*. This index is greater than, equal to, or less than unity depending on whether the relative operating efficiency of Walmart has increased, remained the same, or decreased between the two periods.

[INSERT FIGURE 2 ABOUT HERE]

Profit change and Malmquist productivity index:

Recently, Grifell-Tatjé and Lovell (2012) have shown that their measure of productivity change in equation (2) can be related with the CCD Malmquist productivity index. They propose to decompose the productivity effect in equation (2) in terms of (3) as

$$\overline{w}^{\mathrm{T}}(x^t - x^B) - \overline{w}^{\mathrm{T}}(x^{t+1} - x^C) =$$

$$\overline{w}^{\mathrm{T}}x^B \left(\frac{D^{t+1}(y^t,x^t)}{D^t(y^t,x^t)} - 1 \right)$$

$$+ \overline{w}^{T}x^t \left(1 - \frac{1}{D^t(y^t,x^t)} \right) - \overline{w}^{T}x^{t+1} \left(1 - \frac{1}{D^{t+1}(y^{t+1},x^{t+1})} \right).$$

[4]

The first term on the right side is the *technical change effect* and will be greater than, equal to or less than zero depending on the Malmquist technical change index $D^{t+1}(y^t,x^t)/D^t(y^t,x^t) \gtreqless 1$, and the rate of technical change $[D^{t+1}(y^t,x^t)/D^t(y^t,x^t) - 1]$ is converted into monetary units through scaling by $\overline{w}^{\mathrm{T}}x^B$. We can also express the technical change effect as $\overline{w}^{\mathrm{T}}(x^A - x^B)$. The second term of [4] quantifies the *operating efficiency effect* in value terms. It constitutes the translation into value of the Malmquist operating efficiency index in [3]. The rate of operating efficiency $[1 - 1/D(y,x)]$ is multiplied by the Bennet cost of the period. The product constitutes a cost valuation per period of the operating inefficiency of the firm. The operating efficiency effect contributes to or detracts from the profit change as $\overline{w}^{\mathrm{T}}x^t[1 - 1/D^t(y^t,x^t)] > < \overline{w}^{\mathrm{T}}x^{t+1}[1 - 1/D^{t+1}(y^{t+1},x^{t+1})]$. When the producer is operating efficiency in both periods: $D^t(y^t,x^t) = D^{t+1}(y^{t+1},x^{t+1}) = 1$, the operating efficiency effect takes a value of zero. The operating efficiency effect can be rewritten as $\overline{w}^{\mathrm{T}}(x^t - x^A) - \overline{w}^{\mathrm{T}}(x^{t+1} - x^C)$.

Grifell-Tatjé and Lovell (2012) prove that when the producer is operating efficiency in period *t+1*, the equation [4] can be rewritten as $\overline{w}^{\mathrm{T}}x^t[1 - (M_{CCD}^{t+1})^{-1}]$. Walmart operated efficiently and uninterruptedly from 1984 to 2008, the last year of our data set. These authors justify the productivity effect as it "*is consistent with the notion that efficiency and technology are under the control of management, whereas size is less likely to be endogenous*".

Estimating the technology:

The calculation of the activity effect and the two economic drivers of the productivity effect (i.e. operating efficiency change and technical change) require an estimate of the unobserved input quantity vectors, x^A, x^B, x^C. As Figure 5 shows, these unobserved quantity

vectors are located on the production frontiers of period t and $t+1$. All are radial expansions of observed quantity vectors (x^t,y^t) and (x^{t+1},y^{t+1}). Thus, the technically efficient period t input vector is $x^A = x^t/D^t(y^t,x^t)$, and the technically efficient period $t+1$ input vector is $x^C = x^{t+1}/D^{t+1}(y^{t+1},x^{t+1})$; x^B is also a radial scaling of y^t, but to the boundary of T^{t+1}, and so $x^B = x^t/D^{t+1}(y^t,x^t)$.

In this chapter we use the technique known as Data Enveloped Analysis (DEA), which was introduced by Charnes *et al.* (1978) to evaluate producer performance and extended to production theory by Färe *et al.* (1985). DEA constructs best practice frontiers which provide empirical approximations to the boundaries of T^t and T^{t+1}, and it measures the performance of a producer relative to best practice observed in the sample. In this study, we adopt a *sequential* technology. This means the feasible set T^t includes all the observations from period *1* to period t. Hence, the technology in year t is constructed from data from all producers in all years prior to and including year t, so best practices in previous years are "remembered," and remain available for use in the current year. This definition of the technology does not allow technical regression. This implies that $x^A \geqq x^B$ always as in Figure 5.

The unobserved input distance function $D^t(y^t,x^t)$ of retailer 'o', in our case Walmart, is calculated by

$$[D^t(y^{ot}, x^{ot})]^{-1} = \min_{\phi^A, \lambda^s} \phi^A$$

$$\text{s.t } X^s\lambda^s \leq \phi^A x^{ot}, y^{ot} \leq Y^s\lambda^s, \lambda^s \geq 0, \sum_i \lambda_i = 1 \qquad [5]$$

We have t time periods, and in time period s we have I_s retailers, $s = 1,...,t$; $Y^s = [y^{1s},...,y^{os},...,y^{Is}]$ is an $M{\times}\Sigma_{s=1}^{t}I_s$ matrix of M outputs produced by all I_s retailers in each of periods $s = 1,...,t$, and $X^s = [x^{1s},...,x^{os},...,x^{Is}]$ is an $N{\times}\Sigma_{s=1}^{t}I_s$ matrix of N inputs used by all I_s retailers in each of periods $s = 1,...,t$. Thus the data matrices Y^s and X^s are "sequential," as they include output and input quantity data for all producers from the beginning of the sample through period t; λ^s is a $\Sigma_{s=1}^{t}I_s{\times}1$ activity vector and, finally, the convexity constraint $\sum_i \lambda_i = 1$ allows the approximating technology T^t to satisfy variable returns to scale, and to envelop the data tightly. This program is solved $\Sigma_{s=1}^{t}I_s$ times, once for each retailer in each year, although we report only Walmart's results. The results derived from these calculations are reported from 1977 because the performance of these calculations required sufficient data.

The outcome of the linear program [5] is ϕ^A, which enables the calculation of the unobserved input quantity vector x^{oA} as $x^{oA} = \phi^A x^{ot}$. The value of the input distance function $D^t(y^{ot}, x^{ot}) = 1/\phi^{oA}$. The estimation of $D^{t+1}(y^{t+1}, x^{t+1})$ is similar to $D^t(y^t, x^t)$. We need to replace (x^{ot}, y^{ot}) with (x^{ot+1}, y^{ot+1}) and s = $1,...,t$ with s = $1,...,t+1$ in [5]. Thus the solution of this new linear program is ϕ^{oC} which, as before, permits the valuation of x^{oC} as $x^{oC} = \phi^{oC} x^{t+1}$. In the case of $D^{t+1}(y^t, x^t)$ we replace s = $1,...,t$ with s = $1,...,t+1$ in [5] and the outcome of this linear program is ϕ^{oB} and $x^{oB} = \phi^{oB} x^t$. As before, the value of the input distance function $D^{t+1}(y^{ot}, x^{ot})$ = $1/\phi^{oB}$. We can calculate the activity effect, the productivity effect and the economic drivers of the productivity effect by replacing x^A, x^B, x^C in [2] and [4], or the input distance functions of their respective values.

1.5 Dataset Description

This section contains the definition of the variables, a description of the sample and some descriptive statistics from our empirical investigation of the sources of profit change in Walmart during the period 1971-2008. Walmart became a public company in October, 1970. We are therefore analyzing the period of time in which the company has been on the stock market.

The calculation of the activity effect, productivity effect and its economic drivers, expressions [2] and [4], is only possible if we can estimate the best-practice frontiers of the retailing industry. In order to build the feasible production sets we incorporate data from six companies other than Walmart. These companies are Kmart, Target, Sears, May, Costco and Bradlees. The information from these companies was used only to construct the production sets. The main sources of this dataset are the annual reports and financial statements published by each company. Other sources employed in this study are the Osiris database and the reports of consulting firms provided by Thompson-Financial. These alternative resources were mainly employed in building a long series of numbers of employees for some companies and completing information about Sam's Club. In this long period of time, 28 years, some of these firms underwent bankruptcy, take-overs or mergers. We treat the firm after the merger or acquisition as a new company[21]. Table 1 provides a description of the dataset.

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[21] In the case of Costco, the company merged with Price in 1993. We therefore treat Costco as two separate firms, one prior to the merger and the other after the merger. Kmart filed for bankruptcy in 2002. The successor company survived for two years before merging with Sears. Each circumstance was treated as a separate case (three firms). May Department Stores was treated as two separate companies, one before the acquisition of

[INSERT TABLE 1 ABOUT HERE]

Annual profits consist of operating profits, or profits that contain the revenues generated from the firm's retail activity. This means the accounting record called "other income" is not included in our definition, which represents an average amount of 1% of total sales. The cost of sales, operating, general and administrative expenses and capital cost are subtracted from the sales figure. In this study, operating profits, revenues and costs are deflated to 1970 values, using the consumer price index.

We follow a value added (VA) approach, which is defined as sales minus cost of intermediate goods. The value added approach has a long tradition in business literature, especially in the retail sector. Some authors such as Gilchrist (1971) define it as a firm's main performance indicator. As we have seen, the value added created by Walmart went from 18.61 million in 1971 to 17.14 billion constant dollars in 2008. The advantage of this VA approach is that it simplifies and homogenizes the outputs in a sector characterized by great heterogeneity in disclosing policies among retailers.

In the case of Walmart, we define two outputs and two inputs, labor and capital. The real value added associated with each of the two outputs is decomposed into quantity and price components[22]. The output quantity is defined as the amount of sales measured in 1970 dollars. Given the fact that we wanted to make a distinction between Walmart Stores and Sam's Clubs, two types of outputs were outlined; y_1 = average of beginning-of-year and end-of-year real sales of all the discount stores plus the stores built outside the United States; y_2 = average of beginning-of-year and end-of-year real sales under the warehouse club format. Sam's Club started in 1983, so before then Walmart only had one type of output. The price components (p) are defined as the ratio of real value added to the average output quantity.

Caldor and the other after the acquisition. We include information about May only until 2003. Kmart, Target and May had multiple retail formats during the period of study. The financial information on these businesses is not separated from the discount retailing activities. We do not consider this a problem, as all these activities are in the same line of business. The same is not true for Sears which had a very broad spectrum of businesses besides retailing (e.g. Dean Witter, Allstate Insurance Company, Coldwell Banker among others). For this reason, it was essential to analyze the merchandise part only. Fortunately, Sears discloses information on each division separately. We therefore include only the retail part of Sears.

[22] We do not have information about the value added amount for each type of retail format, discount and warehouse club at Walmart. However, we know the total sales and the operating profit obtained by each branch for every year in the sample. We assume that the value added is distributed in the same way as the income variable is distributed each year.

As a labor quantity input (x_1) we used the average of beginning-of-year and end-of-year number of employees[23]. The cost of labor would be the ideal price for this input variable. Unfortunately, this is one of the best kept secrets in the industry. Although Drogin (2003) has data about Walmart's labor costs, and some authors have used this data to project total labor costs, this is not enough for our study which starts in 1971. We therefore chose to use real operating, general and administrative expenses as a substitute for labor costs. The price component (w_1) is the ratio of real operating, general and administrative expenses to the average number of employees.

The second, and final input, is capital. We follow a traditional approach whereby the capital from one period is equal to the capital of the previous period minus the amortization expenses plus the investment from the period. The information about capital is taken from the annual reports in which data about net property and equipment from the two periods can be found. The amortization expense is calculated as the difference between the accumulated amortization and depreciation expenses of period $t+1$ and t. The quantity component of input capital (x_2) is evaluated at the average of the beginning-of-year and end-of-year value of constant 1970 prices, by applying the deflator 's', cumulative from 1971 to year 's', to the flow of investments until period 2008. The capital cost consists of the sum of current depreciation and amortization expenses plus the net interest paid expressed in 1970 prices. We follow an accounting approach and the operating profit is that reported by the firm. The price component is the ratio of the cost to the average quantity of input capital for the period.

[INSERT TABLE 2 ABOUT HERE]

Table 2 provides some descriptive statistics about Walmart extracted from the dataset used in our calculations. It presents the average for each of the variables studied as well as their growth rates. In general terms, we can see a moderation in growth rates as the company became bigger. The results are presented distinguishing the three CEO terms analyzed. In February 2009 Mike Duke was appointed as the company's new Chief Executive Officer. He is therefore not included in this study. We have information on Walmart since it became a public company. Walton's tenure therefore covers seventeen years (1971-1987).

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[23] In the case of Walmart, the number of employees is provided in the Annual Reports. This information is not always provided by other retail companies. Sometimes, we have to rely on information collected by third parties or make our own estimate based on the average number of employees per store.

Walton's years are the most dynamic ones for the company. The expansion policy is appreciable in the double-digit growth in output, capital and labor. Capital prices increase moderately, while output and labor prices fall. Glass's term shares the same pattern of the previous period, but less intensely. In this period, capital costs decreased and labor costs increased by less than 1%. Finally, under Lee's mandate, Walmart's discount stores' sales grew an average of 8.6%, less than the double-digit growth rates of the previous periods. Output prices (value added) grew, on average, a minimal 0.4%. Capital and labor prices showed similar behavior to the previous CEO's tenure. The increase in Sam's Club sales was less than that experienced by Walmart's discount stores. Average capital input growth is higher than labor input growth for all three periods. There is a tendency to substitute using labor with capital.

1.6 Results

The results of the empirical part of the study are shown in tables 3, 4 and 5. Table 3 contains the decomposition of the change in profits. This decomposition is carried out in steps. First the change in profits is expressed as the sum of price and quantity effects as expressed in equation [1]. The quantity effect is decomposed into activity and productivity effects (equation 2). Finally, the productivity effect can be calculated as the sum of technical change and operating efficiency change as in equation [4]. Table 3 is the main conclusion of the study. Tables 4 and 5 provide additional insight on how the price and the quantity effect are calculated respectively. Table 4 reports the price effect expressed as the sum of output and input price effects. Meanwhile, table 5 presents the quantity effect separated into output and input quantity effects.

Given the scheme in figure 4, we need to make a small detour and define our expectations before introducing the results. "Everyday low prices", frugal culture, high power incentives, investment in technology, geographical expansion and variety of products are the elements for formulating our expectation. Behind the "low price" promise there is the "low mark-up" consequence. Technology applied to handling inventories is useful for pressurizing suppliers to reduce the cost of their products. We do not therefore know which of these two forces is greater and we cannot make a prediction for the behavior of output prices. Low prices, geographical expansion and product diversity boost the volume of sales, and this is observed in a positive and increasing activity effect. Frugality, good human resources policies and the presence of network economies produce operational efficiency as well as low input price effects. Investment in technology implies technical change.

In general terms we observe an increase in the values of the components of profit change, although the series is steady. The price effect is in general negative, and the quantity effect is positive, as we expected (see the aggregate information at the end of table 3). The quantity effect more than compensates for the price effect, so the change in profit is positive. A closer look at the quantity effect in table 5 reveals that the output quantity effect grows faster than the input quantity effect. On the other hand, table 4 shows that the output price effect was generally negative during Walton's and Glass's tenure, but, when Lee's period is added it becomes positive. Capital input prices have a tendency to reduce, while labor prices tend to increase (with the exception of Walton's years). In summary (last row of table 4), the change in capital prices reduced costs by $341.24 million constant dollars while labor prices increased costs by $1,134.84 million constant dollars for the 1972-2008 period. Both the productivity and activity effects are mainly positive. These findings fit our perception about the company. Walmart is a successful retailer because it boosts its sales by having low prices and its business decisions allow efficient expansion. Although the administration asserts that it is doing everything possible to keep overheads low, market pressure can be seen in the behavior of the labor input prices.

Sam Walton 1972-1988:

Walmart registered increasing real profits during Sam Walton's tenure[24]. The price effect was insignificantly negative, while the quantity effect was notably positive. Table 4 reveals that the output price effect was in general negative, which means a reduction in the value added per item sold. The input price effect was also negative. Therefore, for some years Walmart enjoyed positive price effects because it did not pass on all the savings obtained by controlling costs. Negative output price effects are related to applying "everyday low prices" policies as well as investing in technology. It was precisely during this period when Walmart computerized the management of inventories, deployed the UPC system and created the satellite network.

The year 1981 was a special year for Walmart, as reflected in tables 3, 4 and 5 (1980-1981). This was the year when Walmart made its first major acquisition: Kuhn's Big K stores. Sam Walton made the following statement referring to the Big K acquisition: "But we'd never

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[24] The only exception was the period 1973-1974 (see table 4). The explanation for this fall in profits was the adoption of the LIFO method of costing inventory. The accounting change resulted in a reduction in earnings of 1.8 million 1970 dollars in real terms, although the company profits grew if measured in current dollars.

bitten off anything close to this size before, and we didn't know what it would be like trying to digest it," (Walton, 1992, p. 197). The purchase mainly affected the output price and the price of capital. 1986 was also an exceptional year due to a 41% increase in sales (in nominal terms) compared to the previous year. This sales record is the second largest of the complete series (the largest increase in sales occurred in 1972-1973 period).

The activity effect was in general positive, with the exception of the years 1983 to 1985. A negative activity effect in this context signifies that the cost of the variation in inputs is greater than the positive value added change. This negative activity effect was compensated by a positive productivity change in those years. The productivity effect was initially negative due to operational inefficiencies that were later corrected. The company enjoyed positive technical change during Walton's last four years. In aggregate terms, improvements in productivity were more important than increments in activity levels in explaining the quantity effect.

David Glass 1988-2000:

Glass's period is characterized by the importance of the activity effect. Walmart experienced few technological shocks and no changes in efficiency levels. The productivity effect was very small (note the David Glass subtotal row, table 3). Glass did not alter the core of the firm much and his approach was to expand the model in the United States and abroad. When Glass left, Walmart's sales were 12 times greater than when Walton resigned. The numbers reveal that Glass's secret of success was growing at high speed and was always operationally efficient. Table 5 reveals that output and input quantities were all positive during Glass's years. Output quantities grew faster than input quantities. In table 4 it can be observed that the output price effect was mainly negative, while the input prices of capital and labor followed different trends. The labor input price effect was positive in aggregate terms, contrary to what happened in the previous period. Labor prices therefore increased under Glass's administration. On the other hand, the capital input price effect was negative for the whole Glass period.

In 1991, the price effect decreased substantially, while the activity effect more than compensated for it. First, Walmart completed the acquisition of McLane in December 1990. McLane was a company that provided and distributed goods to different retail stores, including Walmart. Furthermore, the corporation was fully deploying its Sam's Club nationwide. When Walton left the CEO position in 1988, there were 105 Sam's Club stores;

by 1991 that number was 205. (See the development of the output quantity effect for Sam's Club in table 5). According to company records, both Sam's Club and McLane were firms with lower markdowns than Walmart. This explains why the value added of the company decreased substantially in 1991. The strong positive activity effect is explained by the fact that Sam's Club and McLane had higher sales volumes with respect to the amount of inputs used. Sam's Club is a no-frills store where items are sold in bulk. 1991 was also the year when Walmart started deploying its Retail Link technology, connecting the company's headquarters directly with its suppliers.

1995 was a bad year for Walmart. The company's sales were growing at rates greater than 20% but in that particular year the growth rate was 13%. The company was trying to diversify by investing outside the United States and some of the results were not satisfactory. Sam's Club was not performing as expected. In 1993 the warehouse franchise registered 14.7 billion in sales (current dollars); one year later that figure was 19 billion. Finally, in 1995, Sam's Club reported 19.068 billion in sales. The growth was below the inflation rate. The company's authorities acknowledge that they were refocusing their strategy for Sam's Club. However, table 5 reveals that the output quantity effect for Sam's Club never recovered the levels of growth of prior to 1995.

The price effect after 1997 becomes positive. Table 4 reveals that the output price effect which used to be negative is now positive. Walmart states that several systems that improved inventory management and a change in the merchandise mix were implemented during those 25 years and that these improvements reduced the cost of sales. Despite Walmart obtaining higher value added per dollar sold, the activity effect remains strong although lower than previous years.

David Glass did not modify the Business Model developed under Sam Walton; on the contrary, he intensified its application. Glass discontinued the "Buy American" campaign, opening the doors to overseas suppliers. Glass invested heavily in technology, spurred the expansion of the company by deploying new retail formats and building new stores in the United States and abroad, and continued the frugality culture. The comparison between Glass and Walton reveals that, taken together, the different effects were very similar. The main difference between Walton and Glass is in the decomposition of the quantity effect. Walton's years are characterized by the importance of the productivity effect, while in Glass's years the main component was the activity effect. Another difference comes from the fact that, in

Glass's last years, the value added per item sold increased instead of following its previous behavior (the only exception being the very last year of Glass's tenure 1999-2000).

Scott Lee 2000-2008:

Walmart's sales were only twice those of Glass's time when Lee left the CEO position. The main characteristic of Lee's term is moderation in the growth rate. Under Lee, Walmart's profit increased, not only because of the changes in activity levels, but also with the help of productivity improvements (see subtotal table 3). The company enjoyed substantial technical progress and the price effect had a similar negative impact to that of the previous period. Nevertheless, the output price effect (table 4) changes its trend, becoming positive on average. The labor input price effect was the component that showed the most striking shift. The labor prices (measured as operating, general and administrative expenses divided by the number of workers) increased significantly in this period. Company records relate these increases to insurance and payroll-related costs. Walmart applied a new pay structure for workers in the United States in 2004. The price effect was, on average, negative because of the influence of labor prices, contrary to what happened during Walton's years, when the output price effect was the main cause. Table 5 reveals that the importance of Sam's Club is diminishing. Under Glass's administration, Sam's Club contributed to the increase in profits with 820 million dollars. With Lee, that amount reached only 392.9 million.

2003 is the first record in the series that requires analysis. In that year McLane was sold for $1.5 billion dollars and the company recorded an extraordinary income of $151 million after taxes. McLane sales in 2002 were $14.9 billion, so its influence on the company was substantial. Walmart decided to sell McLane because it did not fit with its core business. This decision affected the firm's accounting records. However, the components of the productivity change were affected in different ways, with output quantities and prices undergoing most distortion.

In 2004, the number of workers was 1.6 million, a 10% increase on the previous year. This is the result of several acquisitions made by the company (e.g. Bompreço in Brazil) as well as the continuous construction of new stores.

The last year of the series reported a negative change in profits. In current dollars, Walmart registered an increase in profits; however the picture is different when values are expressed in real terms. Profit grew below the inflation rate. The explanation for this poor

performance was a disappointing year for Sam's Club and the negative impact of the exchange rate for international units.

Lee followed the lead of Walton and Glass. He did not change the core principles of the business model at all. Walmart was the industry leader; it continued competing on costs, used technology as leverage against suppliers, applied high power incentives, diversified its offering and remained committed to Walmart's southern culture. However, Walmart is no longer invisible. It is a giant company that has been blamed for underpaying workers. Walmart has gone abroad and found competitors that were copying its strategies in their own markets. Scott Lee managed a company in a much more hostile environment than his predecessors. When Walton was leading, Kmart was the rival to beat. Nowadays, Walmart has become the target.

1.7 Conclusions

The Walmart business model has been the subject of many case studies. Books, journal articles and TV documentary programs have devoted time to attempting to understand how Sam Walton built his empire from its humble beginnings. We have constructed a business model representation based on these sources, as well as information provided by the company in its annual reports and filings to the SEC. We have tried to capture the way the choices made by the company affect the bottom line and we have found several interesting results.

Walmart is a company in which the price effect is mainly negative and the quantity effect is positive. This means the company grew basically by selling more goods at very low prices. Increases in levels of activity were the main component of Walmart's growth. The firm created a vast network of discount stores, supercenters and neighborhood markets in the United States and abroad to reach the largest possible number of consumers. It expanded its selection of goods by including groceries in its stores and, with this, increased its share of its customers' wallets. Technical change and improvements in efficiency had a limited role in explaining Walmart development. However, in our database there was no firm more efficient than Walmart so there was very little room for efficiency improvement.

The empirical analysis reveals three important facts about Walmart today. The first is that labor costs are increasing. As we mentioned, the firm blames health cost expenses as the main reason for this phenomenon. We do not know if the exposure of Walmart's austere labor policies had any influence on this increase in costs. The second fact is the stagnation of Sam's

Club. The firm has tried many measures to revitalize the warehouse club, but so far these efforts have not delivered the expected results. The third fact is the symptom of stagnation at Walmart as well. The business model is successful; it provides a good share of revenues, but the firm's growth rate is waning. The firm has gone abroad in search of fresh sources of revenue, but the outcomes of these endeavors have been mixed.

There are many lessons practitioners can extract from the Walmart business model. This business model is an example of internal fit, where choices and consequences feed one another creating feedback loops. The firm remains committed to its strategy of selling at low prices. Walmart did not try to expand its market share by differentiation or by including other target audiences. The results show that this commitment paid off. However, the company tried to repeat its success by applying the same logic to the warehouse club format and failed to achieve the same results. Similar attempts did not work when Walmart invested in countries like Germany or South Korea. The success of business models depends greatly on environmental conditions.

Walmart's future is uncertain, but there are some signs of upcoming trends. Recently, one of Walmart's competitors in the electronic sector closed down. Circuit City, the second electronic retailer in the United States, filed for bankruptcy on November 18, 2008. The company announced on January 16, 2009 that it would close all its stores. According to several newspapers, Walmart is very interested in filling the space left by the electronic retailer. The firm is also moving in other very different front lines. It has moved into the healthcare business, installing walk-in clinics inside its stores. Another sector that has always attracted Walmart's attention is the financial services sector. However, the company has faced strong opposition that has hindered its attempts to enter the banking industry.

The main challenge faced by Walmart's administration is to decide whether to be faithful to Walton's view of the retail business or to change, given the firm's current situation. In this scenario, with small growth rates, Walmart could thrive by improving its productivity, just as it did when Walton was in charge, instead of focusing exclusively on choices that boost the firm's activity levels. Careful consideration should be given before it decides whether to undertake certain business projects. The failures in Germany and South Korea show that the company is not immune to defeat.

Our future research will focus on the relationship between Walmart and its former major rival Kmart. Walton acknowledges in his memoirs that he always perceived Kmart as

the retailer to imitate. Kmart and Walmart may have followed similar business models. The failure of Kmart is a conundrum. Kmart was, from its beginning, bigger than Walmart. It is necessary to analyze the causes of Kmart's collapse and which Walmart choices enabled the company to overcome its main rival. We are also interested in analyzing firms such as Target and Costco that have been able to compete successfully against the giant of Bentonville. We consider that important lessons could be obtained by studying the relationship between Walmart and its main competitors.

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1.9 Figures & Tables

Figure 1

Walmart Real Profits from 1972 to 2008
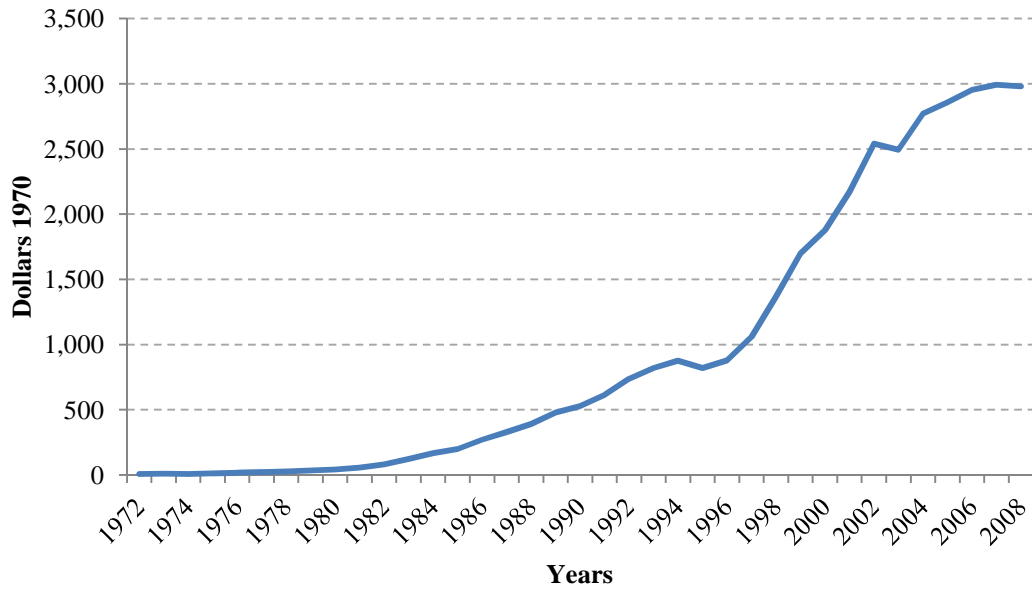
Figure 2

Productivity Index for Walmart (1978- 2007)
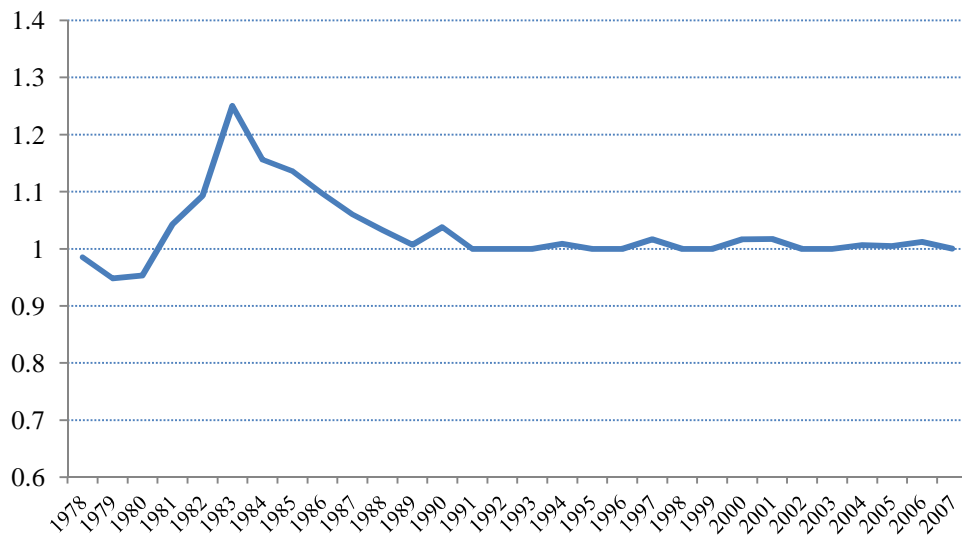
Figure 3

Walmart Business Model Representation
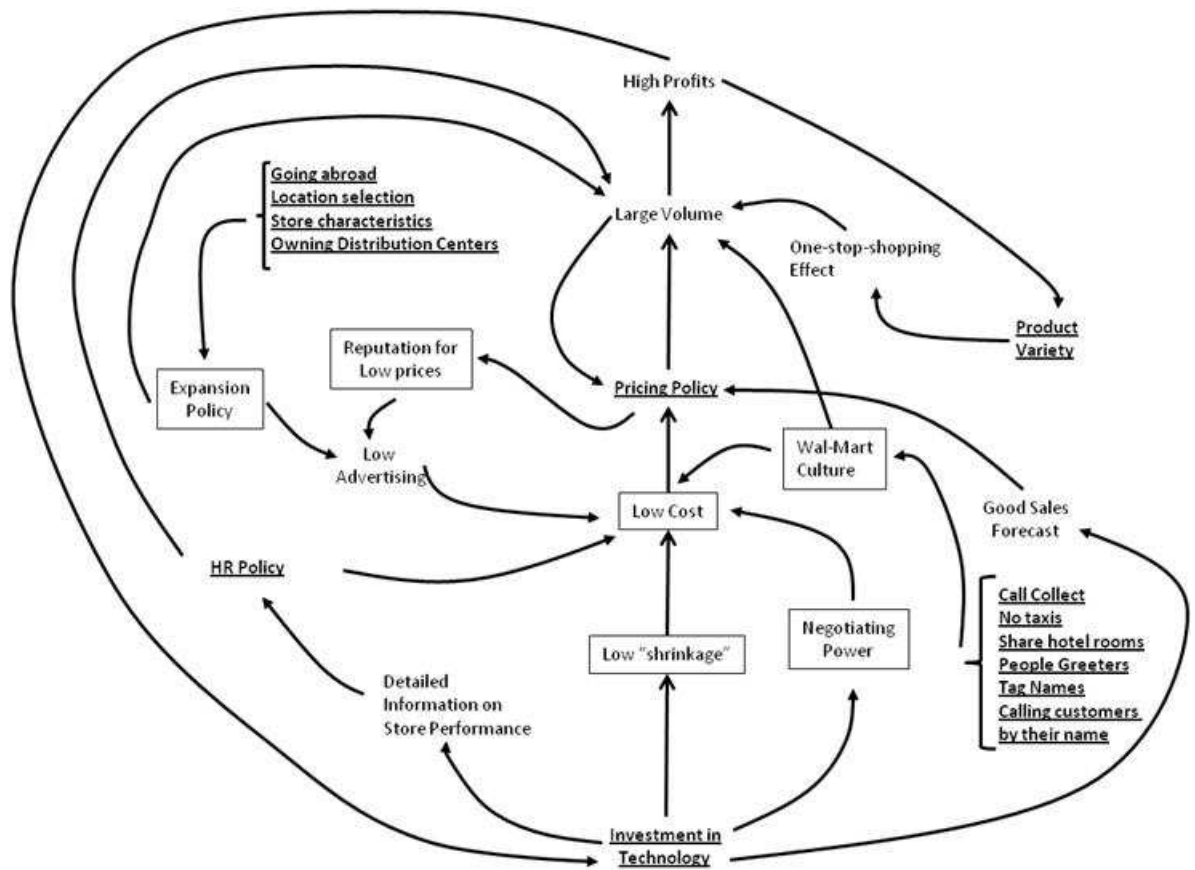
Figure 4

Scheme that links Walmart Choices with the Change in Profits
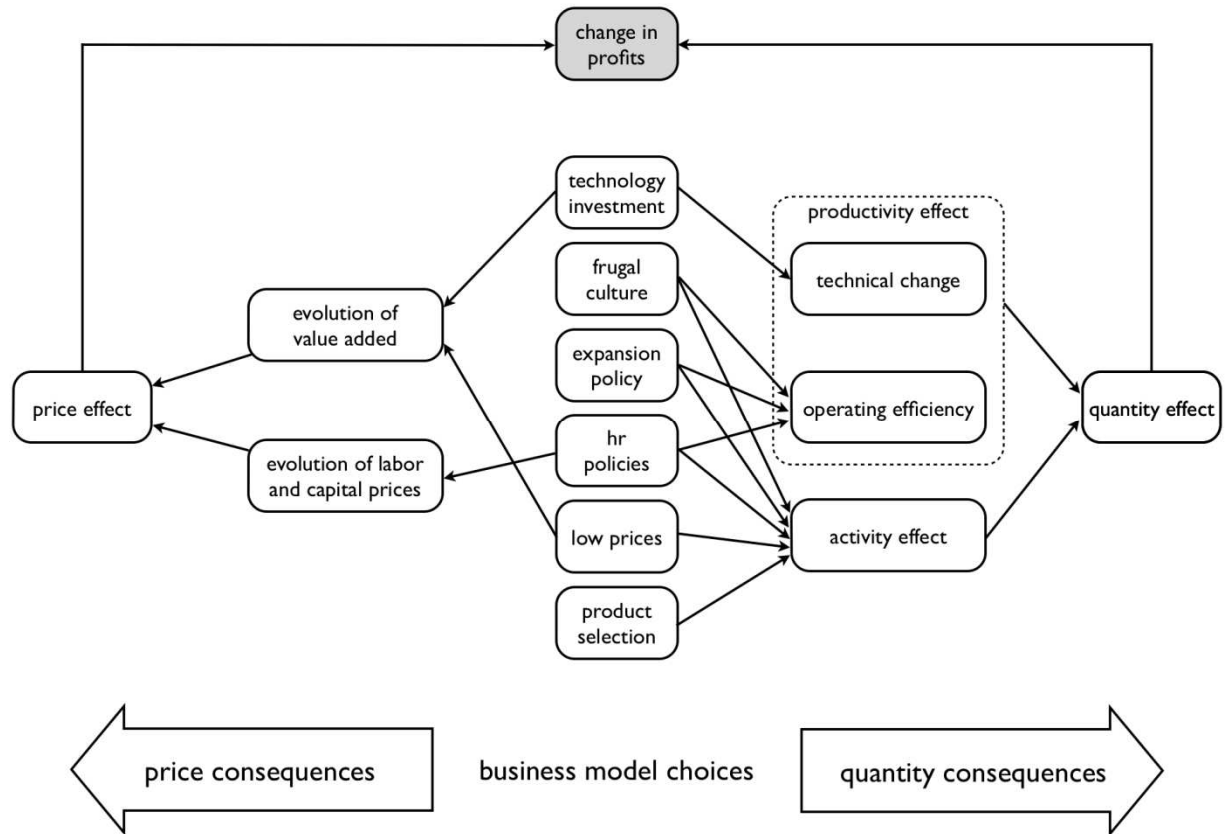
Figure 5

Productivity Effect Decomposition
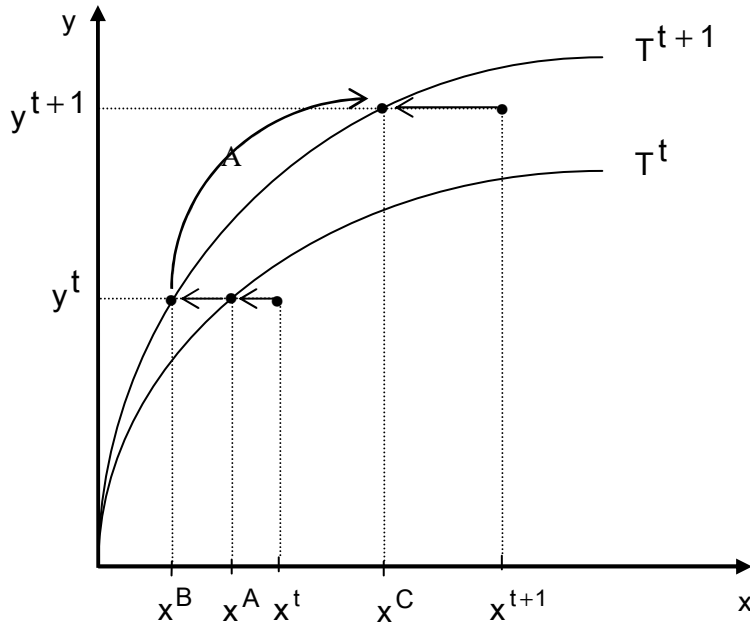
Activity Effect is represented by the arrow that goes from (x^B, y^t) to (x^C, y^{t+1})

Operating efficiency change is the difference between the arrow that goes from (x^t, y^t) to (x^A, y^t) and the arrow that goes from (x^{t+1}, y^{t+1}) to (x^C, y^{t+1})

Technical change is portrayed as the arrow that goes from (x^A, y^t) to (x^B, y^t)

Table 1

Description of the Companies Analyzed

Company	Number	Period	Description
Walmart	1	1971-2008	Walmart Stores Division, Walmart International and Others
Sam's Club	1	1983-2008	
Target	2	1971-2008	
Kmart	3	1971-2002	Filed for bankruptcy in 2002
Kmart post-bankruptcy	4	2003-2004	Merged with Sears in 2005
Sears	5	1994-2004	Merged with Kmart in 2005
Sears / Kmart	6	2005-2008	
Costco	7	1984-1992	Ancestor company
Costco	8	1993-2008	Successor company
Bradlees	9	1971-1986	The company went bankrupt in 1995 and again in 2000
May	10	1971-1985	Acquired Caldor in 1985
May post-acquisition	11	1986-2003	Only until 2003

Table 2

Averages and Average Growth for Selected Variables in Each of the CEO Tenures

		y1	p1	y2	p2	xk	wk	xl	wl
Walmart	Average	17,389.44	0.2649	4,410.70	0.1820	5,169.54	0.1235	589.22	5.91
1971-2008	A. Growth	19.76%	-0.42%	24.03%	-3.00%	24.01%	-1.58%	20.47%	-0.76%
Target	Average	4,944.42	0.2989			2,148.15	0.0861	174.99	5.18
1971-2008	A. Growth	6.59%	0.07%			9.00%	-2.17%	5.62%	0.90%
Kmart	Average	7,482.90	0.2641			1,694.55	0.1254	272.33	5.99
1971-2002	A. Growth	2.72%	-1.55%			7.28%	-0.94%	1.46%	0.56%
Kmart post Brkcy	Average	3,823.27	0.2740			48.83	0.7445	145.50	5.87
2003-2004	A. Growth								
Sears	Average	8,353.19	0.2865			1,789.63	0.2913	302.92	7.56
1994-2004	A. Growth	-0.54%	-1.42%			3.04%	-1.18%	-1.20%	-1.39%
Sears/Kmart	Average	9,588.11	0.2718			1,792.66	0.1261	333.58	34.09
2005-2008	A. Growth	-5.16%	-6.90%			-4.98%	1.08%	0.73%	-2.95%
Costco pre-merge	Average			887.40	0.1116	103.38	0.0818	9.04	9.54
1984-1992	A. Growth			42.74%	-2.25%	52.98%	10.43%	28.54%	2.84%
Costco post-merge	Average			7,447.44	0.1155	1,278.19	0.0579	81.91	8.68
1993-2008	A. Growth			8.15%	1.39%	9.96%	-5.19%	7.66%	1.42%
Bradlees	Average	1,022.20	0.2355			164.85	0.0975	28.47	7.17
1971-1986	A. Growth	2.71%	2.11%			5.15%	1.04%	5.42%	-0.90%
May pre-acquisition	Average	1,064.62	0.2850			622.14	0.2894	65.16	4.41
1971-1985	A. Growth	2.08%	0.76%			5.68%	1.23%	3.39%	-0.49%
May post-acquisition	Average	2,171.80	0.2816			1,215.71	0.2887	124.29	4.97
1986-2003	A. Growth	-2.10%	0.70%			3.16%	0.29%	-2.15%	0.60%
Total general	Average	7,581.01	0.2754	4,798.77	0.1510	2,113.90	0.1565	248.44	6.63
	A. Growth	6.16%	-0.24%	23.60%	-1.97%	11.22%	0.00%	7.10%	0.18%

Variable	Measurement
y1	Discount store sales expressed in millions of 1970 dollars.
y2	Warehouse club sales expressed in millions of 1970 dollars.
p1	Value added per dollar sold in 1970 dollars.
p2	Value added per dollar sold in 1970 dollars.
x capital	Capital valued at prices of 1970 (millions).
w capital	Cost of capital per dollar invested in capital in 1970 dollars.
x labor	Number of workers (thousands).
w labor	Operating, General and Administrative expenses per thousand employees. (Millions of 1970 dollars).

Table 3

Decomposition of the Change in Profits (Millions of 1970 Dollars)

	Period	$\Pi^1-\Pi^0$	Price Effect	Quantity Effect	Activity Effect	Productivity Effect	Technical Change	Operational Efficiency
Sam Walton	1972 – 1973	1.63	-0.41	2.05	N/A	N/A	N/A	N/A
	1973 – 1974	-1.34	0.30	-1.64	N/A	N/A	N/A	N/A
	1974 – 1975	6.04	6.26	-0.23	N/A	N/A	N/A	N/A
	1975 – 1976	4.21	-2.04	6.25	N/A	N/A	N/A	N/A
	1976 – 1977	3.81	1.53	2.28	N/A	N/A	N/A	N/A
	1977 – 1978	6.88	4.49	2.39	15.96	-13.56	-	-13.56
	1978 – 1979	6.22	-1.04	7.26	14.62	-7.36	-	-7.36
	1979 – 1980	6.80	8.29	-1.49	13.44	-14.93	-	-14.93
	1980 – 1981	14.92	23.47	-8.55	16.22	-24.77	-	-24.77
	1981 – 1982	25.22	-2.22	27.44	37.47	-10.04	-	-10.04
	1982 – 1983	40.83	-4.75	45.58	40.11	5.47	-	5.47
	1983 – 1984	45.78	1.63	44.15	-26.82	70.97	-	70.97
	1984 – 1985	30.13	-17.20	47.33	-12.47	59.80	59.80	-
	1985 – 1986	71.83	-0.66	72.49	5.75	66.74	66.74	-
	1986 – 1987	59.36	-30.20	89.56	25.76	63.80	63.80	-
	1987 – 1988	60.59	-29.09	89.67	37.99	51.68	51.68	-
Total 1977-1988		**368.56**	**-47.28**	**415.84**	**168.03**	**247.80**	**242.03**	**5.78**
Total 1972-1988		**382.91**	**-41.65**	**424.55**	**N.A.**	**N.A.**	**N.A.**	**N.A.**
David Glass	1988 – 1989	90.15	12.13	78.02	43.11	34.90	34.90	-
	1989 – 1990	48.80	-8.94	57.74	48.27	9.47	9.47	-
	1990 - 1991	83.97	-134.72	218.68	159.06	59.62	59.62	-
	1991 - 1992	125.05	-164.76	289.81	289.81	-	-	-
	1992 - 1993	81.36	-30.86	112.21	112.21	-	-	-
	1993 - 1994	56.76	-48.17	104.94	104.94	-	-	-
	1994 - 1995	-57.01	-224.17	167.16	135.74	31.42	31.42	-
	1995 - 1996	61.33	-92.07	153.41	153.41	-	-	-
	1996 - 1997	178.05	114.28	63.78	63.78	-	-	-
	1997 - 1998	310.81	99.11	211.70	132.10	79.60	79.60	-
	1998 - 1999	328.85	183.66	145.19	145.19	-	-	-
	1999 - 2000	179.69	36.04	143.65	143.65	-	-	-
Total 1988-2000		**1,487.82**	**-258.47**	**1,746.29**	**1,531.27**	**215.02**	**215.02**	**-**
Scott Lee	2000 – 2001	293.09	-27.79	320.88	203.12	117.76	117.76	-
	2001 – 2002	369.71	-210.09	579.80	444.73	135.07	135.07	-
	2002 – 2003	-44.74	-317.76	273.01	273.01	-	-	-
	2003 – 2004	275.44	703.23	-427.78	-427.78	-	-	-
	2004 – 2005	87.89	209.36	-121.47	-187.66	66.19	66.19	-
	2005 – 2006	95.85	-233.39	329.24	272.79	56.45	56.45	-
	2006 – 2007	39.26	-303.61	342.88	192.78	150.10	150.10	-
	2007 – 2008	-14.23	-83.59	69.36	66.66	2.70	2.70	-
Total 2000-2008		**1,102.27**	**-263.64**	**1,365.91**	**837.65**	**528.27**	**528.27**	**-**
Total 1977-2008		**2,958.64**	**-569.39**	**3,528.04**	**2,536.95**	**991.09**	**985.31**	**5.78**
Total 1972-2008		**2,972.99**	**-563.76**	**3,536.75**	**N.A.**	**N.A.**	**N.A.**	**N.A.**

Table 4

Decomposition of the Price Effect (Millions of 1970 Dollars)

	Period	Output Price 1	Output Price 2	Output Price Effect	Input Price K	Input Price L	Input Price Effect	Price Effect
Sam Walton	1972 – 1973	-1.70	-	-1.70	1.10	-2.39	-1.28	-0.41
	1973 - 1974	-1.81	-	-1.81	0.72	-2.83	-2.11	0.30
	1974 - 1975	2.81	-	2.81	-0.62	-2.83	-3.46	6.26
	1975 - 1976	0.93	-	0.93	0.08	2.88	2.97	-2.04
	1976 - 1977	-2.30	-	-2.30	-3.10	-0.73	-3.83	1.53
	1977 - 1978	-0.17	-	-0.17	-0.86	-3.81	-4.66	4.49
	1978 - 1979	-0.71	-	-0.71	-0.88	1.22	0.34	-1.04
	1979 - 1980	-5.02	-	-5.02	-1.29	-12.03	-13.31	8.29
	1980 - 1981	19.79	-	19.79	4.10	-7.77	-3.67	23.47
	1981 – 1982	-1.58	-	-1.58	-0.62	1.25	0.63	-2.22
	1982 – 1983	-2.09	-	-2.09	-5.43	8.09	2.66	-4.75
	1983 – 1984	-14.74	-	-14.74	-0.14	-16.23	-16.37	1.63
	1984 – 1985	-47.54	-5.65	-53.19	-4.57	-31.42	-35.99	-17.20
	1985 – 1986	18.63	-14.04	4.59	4.76	0.49	5.25	-0.66
	1986 – 1987	-50.88	-20.95	-71.83	3.07	-44.70	-41.62	-30.20
	1987 – 1988	-48.20	-18.42	-66.62	-1.80	-35.73	-37.53	-29.09
Total 1972-1988		**-134.58**	**-59.06**	**-193.64**	**-5.46**	**-146.53**	**-151.99**	**-41.65**
David Glass	1988 – 1989	-10.51	-15.72	-26.23	-11.29	-27.07	-38.36	12.13
	1989 – 1990	-35.59	4.21	-31.38	-8.50	-13.94	-22.44	-8.94
	1990 – 1991	-20.69	-6.89	-27.58	10.56	96.57	107.14	-134.72
	1991 – 1992	-85.45	-20.13	-105.59	-19.86	79.04	59.17	-164.76
	1992 – 1993	2.39	-21.22	-18.83	1.65	10.38	12.03	-30.86
	1993 – 1994	-25.56	27.72	2.16	11.95	38.39	50.34	-48.17
	1994 – 1995	-101.19	-99.45	-200.63	12.65	10.89	23.54	-224.17
	1995 – 1996	-90.75	1.47	-89.28	-46.42	49.21	2.79	-92.07
	1996 – 1997	109.95	6.38	116.33	-42.21	44.27	2.05	114.28
	1997 – 1998	169.32	3.05	172.37	-12.80	86.06	73.26	99.11
	1998 – 1999	144.05	41.71	185.75	19.50	-17.41	2.09	183.66
	1999 – 2000	-188.06	-14.97	-203.03	-36.77	-202.30	-239.07	36.04
Total 1988-2000		**-132.09**	**-93.85**	**-225.94**	**-121.55**	**154.08**	**32.54**	**-258.47**
Scott Lee	2000 – 2001	-185.09	-10.93	-196.03	-45.71	-122.52	-168.23	-27.79
	2001 – 2002	140.70	-7.73	132.97	-132.89	475.94	343.05	-210.08
	2002 – 2003	17.98	40.41	58.40	-42.97	419.12	376.15	-317.76
	2003 – 2004	559.41	-6.53	552.88	-48.93	-101.41	-150.35	703.23
	2004 – 2005	-5.02	6.09	1.07	-34.25	-174.03	-208.28	209.36
	2005 – 2006	317.84	3.93	321.77	53.86	501.30	555.16	-233.39
	2006 – 2007	-162.34	-2.42	-164.76	45.57	93.29	138.86	-303.61
	2007 – 2008	-12.29	-44.61	-56.90	-8.91	35.60	26.69	-83.59
Total 2000 – 2008		**671.20**	**-21.79**	**649.41**	**-214.24**	**1,127.29**	**913.05**	**-263.64**
Total 1972 – 2008		**404.54**	**-174.70**	**229.84**	**-341.24**	**1,134.84**	**793.60**	**-563.76**

Table 5

Decomposition of the Quantity Effect (Millions of 1970 Dollars)

	Period	Output Quantity 1	Output Quantity 2	Output Qty. Effect	Input Capital	Input Labor	Input Qty Effect	Quantity Effect
Sam Walton	1972 – 1973	10.83	-	10.83	0.62	8.16	8.78	2.05
	1973 – 1974	10.09	-	10.09	0.58	11.15	11.73	-1.64
	1974 – 1975	14.35	-	14.35	0.85	13.73	14.57	-0.23
	1975 – 1976	21.02	-	21.02	1.15	13.61	14.76	6.25
	1976 – 1977	28.09	-	28.09	4.95	20.86	25.81	2.28
	1977 – 1978	30.73	-	30.73	4.61	23.73	28.34	2.39
	1978 – 1979	34.07	-	34.07	3.44	23.37	26.81	7.26
	1979 – 1980	34.32	-	34.32	3.65	32.16	35.81	-1.49
	1980 – 1981	55.87	-	55.87	4.25	60.18	64.42	-8.55
	1981 – 1982	89.94	-	89.94	6.46	56.05	62.50	27.44
	1982 – 1983	116.50	-	116.50	7.94	62.99	70.93	45.58
	1983 – 1984	158.10	-	158.10	9.78	104.17	113.95	44.15
	1984 – 1985	138.08	42.19	180.27	14.68	118.26	132.94	47.33
	1985 – 1986	183.54	69.22	252.76	17.00	163.27	180.27	72.49
	1986 – 1987	242.15	74.43	316.57	18.15	208.86	227.01	89.56
	1987 – 1988	249.46	67.13	316.60	20.59	206.33	226.92	89.67
Total 1972-1988		**1,417.14**	**252.98**	**1,670.12**	**118.71**	**1,126.85**	**1,245.56**	**424.55**
David Glass	1988 – 1989	261.77	54.94	316.70	24.21	214.48	238.69	78.02
	1989 – 1990	279.81	63.34	343.14	33.99	251.41	285.40	57.74
	1990 – 1991	405.81	106.22	512.03	47.74	245.61	293.35	218.68
	1991 – 1992	512.66	128.32	640.98	77.37	273.80	351.17	289.81
	1992 – 1993	515.72	107.60	623.32	96.40	414.70	511.11	112.21
	1993 – 1994	559.95	132.14	692.09	86.04	501.11	587.15	104.94
	1994 – 1995	570.42	72.44	642.86	80.55	395.15	475.70	167.16
	1995 – 1996	506.16	-6.19	499.97	59.22	287.34	346.56	153.41
	1996 – 1997	520.63	10.80	531.44	56.06	411.60	467.66	63.78
	1997 – 1998	739.63	42.45	782.09	63.49	506.89	570.38	211.70
	1998 – 1999	1,104.43	61.37	1,165.81	136.51	884.11	1,020.62	145.19
	1999 – 2000	1,178.11	47.33	1,225.44	161.12	920.66	1,081.78	143.65
Total 1988-2000		**7,155.10**	**820.75**	**7,975.85**	**922.70**	**5,306.86**	**6,229.56**	**1,746.29**
Scott Lee	2000 – 2001	1,017.84	52.39	1,070.23	96.557	652.7952	749.35	320.88
	2001 – 2002	1,038.64	62.46	1,101.10	92.3124	428.9883	521.30	579.80
	2002 – 2003	651.43	66.85	718.28	104.6042	340.663	445.27	273.01
	2003 – 2004	522.25	63.40	585.66	122.8067	890.6325	1,013.44	-427.78
	2004 – 2005	834.89	50.25	885.14	128.7538	877.8525	1,006.61	-121.47
	2005 – 2006	1,027.89	30.62	1,058.51	135.3116	593.965	729.28	329.24
	2006 – 2007	1,048.97	31.88	1,080.84	127.6236	610.345	737.97	342.88
	2007 – 2008	695.23	35.04	730.26	47.2176	613.69	660.91	69.36
Total 2000-2008		**6,837.13**	**392.90**	**7,230.03**	**855.19**	**5,008.93**	**5,864.12**	**1,365.91**
Total 1972-2008		**15,409.37**	**1,466.63**	**16,876.00**	**1,896.60**	**11,442.64**	**13,339.24**	**3,536.75**

1.10 Appendix: Review of the Literature about Walmart

Books, research articles and even documentaries have been made about Walmart. The aspects analyzed in these sources vary considerably, as do the standpoints of the authors. This section does not intend to be an exhaustive literature review on the subject of Walmart; we merely concentrate on the most relevant works for our research.

One of the most important sources about Walmart's business model consists of the books written by insiders like Sam Walton (the founder) and Don Soderquist (former COO). In his memoirs, Walton offers his viewpoint on how he built his empire. Walton dwelt on the history of the company and gave an insight into his decision-making process. Obviously, both Soderquist and Walton portrayed the company in a good light, and gave advice for future entrepreneurs.

Some of the works available are compilations of research articles written by authors from distinct fields of study. "Wal-Mart World" by Stanley Brunn (2006) and "Wal-Mart, The face of twenty-first century capitalism" by Nelson Lichtenstein (2006) are examples of this literature. Several issues are covered in these books ranging from human resources policies to zoning. In this chapter we used some of the research articles published in these sources.

Other authors try to explain Walmart's success by recognizing some strategies employed by the giant of Bentonville. "The Walmart Effect" by Charles Fisher and "Walmart Triumph" by Robert Slater correspond to this type of publication. Academically, the Harvard Business School has published several business case studies of Walmart (Ghemawat, 1989 and 2007; Bradley & Ghemawat, 2002; Ghemawat, Mark & Bradley, 2004 and Oberholzer-Gee, 2006). In this literature, the authors provide facts about the company; describe strategies pursued by the firm, and list challenges and opportunities for future years. These documents constitute a great starting point for getting a broad picture of the company.

One of the best known facts about Walmart is its obsession with prices. "Always low prices, always" was the company's slogan for many years. The idea of this slogan was to convey the message of Walmart's "Every Day Low Prices" policy. EDLP is defined "as fixing low prices so the customers could be sure that these prices won't change erratically by frequent promotional activities.[25,26]" Several studies have been carried out in an attempt to

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[25] Wal-Mart. "Annual Report 2006." 2006., p21.

[26] Nevertheless, sometimes the company carries out promotional activities, such as Rollback prices. This activity consists of cutting prices even further for prolonged periods of time, sometimes indefinitely.

demonstrate that Walmart in fact does charge low prices. Basker (2005) finds that Walmart's presence lowers prices by between 1.5-3% in the short run and 7-13% in the long run. Walmart itself appointed the company Global Insight to conduct a study of the economic impact of Walmart's operations. The results, presented in 2005, showed that Walmart contributed to lowering the prices of food-at-home (9.1%) and commodities (4.2%) and to the decline of overall consumer prices (3.1%) between 1985 and 2004. Moreover, Basker & Noel (2009) analyze how prices change in a community when Walmart opens a supercenter (discount store plus groceries). Walmart's prices were 10% lower than its competitors, according to the results of the study. In addition, competing stores reduce their prices by between 1% and 1.2%.

Nevertheless, a reputation for low prices could mean a reputation for low quality products as well. According to Hausman and Leibtag (2007), the Bureau of Labor Statistics (BLS) in the United States considers that customers do not receive the same quality service when shopping at Walmart as in other retail stores. The BLS justifies the price gap by this alleged difference in service quality. Following this reasoning, Basker (2005b) conducted a study to determine whether Walmart sells inferior goods in the strictly economic sense. She finds that, *ceteris paribus*, a 1% reduction in personal disposable income increases Walmart's revenue by 0.5%[27]. The researcher offers two explanations for these results. On the one hand, it could be that the majority of households view shopping at Walmart as an inferior activity. On the other hand, it may be that the subset of households that hold this view has greater elasticity of demand.

Another topic discussed is the relationship between Walmart and its employees. We have to make a distinction between supervisory and managerial ranks and non-managerial workers, who are called associates. Bradley & Ghemawat (2002) explain that store managers' remuneration is based on store sales and profits. In the case of non-managerial workers, besides their salaries, they benefit from a profit-sharing plan to which managers also have access.

One of the issues usually analyzed is whether Walmart creates jobs or destroys them. Two studies, Basker (2005b) and Global Insight (2005), find that Walmart's presence increased the number of jobs available in the communities where the company places its stores. However, several authors have raised concerns about the quality of these new jobs.

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[27] This is an upper boundary. The author claims that a more realistic figure is 0.7%.

Greenhouse[28] (2003) reported that the average pay of a sales clerk at Walmart in 2003 was $8.50 per hour, or about $14,000 a year. This amount is $1,000 below the poverty line for a family of three. Furthermore, in a 2005 presentation given by Arindrajit Dube and Steve Wertheim (University of California at Berkeley, Labor Center), it was reported that Walmart's workers' wages were 12.4% lower than those earned by other workers in the retail industry and 14.5% less than the wages paid to employees working in large retail in general.

The secrecy of Walmart's labor costs was partially broken as a by-product of proceedings in a court case. In June 2001, six workers filed a lawsuit against Walmart, in what has become the largest class-action lawsuit in the United States. As part of the collection of evidence for the case, Professor Richard Drogin was appointed to answer questions raised by the plaintiffs. Walmart submitted valuable information about workers' remuneration. In February 2003, Drogin presented his conclusions.

Drogin (2003) found that although women made up more than two-thirds of the total workforce from 1996 to 2001, they were disproportionately employed in low-earning positions. Furthermore, women working in similar positions to men earned 5% to 15% less than men, with controlling factors like seniority, status and store. Drogin stated that the disparity increases if the measurement of performance is included in the study. The company defended itself against this accusation by claiming that women were less likely to apply for managerial positions because these positions required constant moving between cities (as reported in Oberholzer-Gee, 2006). Nevertheless, a highly feminized workforce was coherent with what was explained by Fishman (2006). The author suggests that the management conceived the Walmart workforce as mainly housewives trying to earn a supplementary income for their families. From this perspective, workers clearly needed their spouses' income and the healthcare benefits to survive. Dube and Jacobs (2004) made the claim that when workers cannot cover their basic needs with their spouses' income and healthcare benefits, they have to rely on public assistance. These authors tried to measure the Walmart effect on the public accounts of the state of California[29]. However, Hausman and Leibtag (2007)

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[28] Quoted from Oberholzer-Gee (2006).

[29] Dube and Jacobs (2004) used Drogin's data plus other sources to calculate the effect of Walmart's presence on the public accounts of California. The researchers concluded that Walmart finances its operations with public money. Walmart's annual cost to California tax-payers was $86 million dollars, distributed into 32 million for health-related benefits and 54 million in other assistance during the year the study was conducted. They estimate that Walmart's employees use 40% more public healthcare money than the average families of all retail employees. The author claims that Walmart's effect on public finances may have been underestimated. For instance, not all the people who are eligible for public assistance apply for it. Dube and Jacobs (2004) comment,

suggest that, when measuring the welfare effects of Walmart, its influence on prices should be included in order to gain full understanding. They state that the company's low prices more than compensate for its low wages, making the net effect positive.

Besides prices and wages, some papers analyze the expansion patterns followed by Walmart. The idea behind these studies is that Walmart's expansion patterns helped the company to reduce costs and compete effectively against its rivals. However, Walmart's presence in some communities implied problems such as urban sprawl.

Basker (2005) estimates that each new Walmart store accounts for the failure of 4 small stores and 0.7 medium size stores after 5 years of entry. Although this appears to be a general trend in the retail sector between 1977 to 2002, the number of "mom-and-pop" stores fell by nearly 40% and the number of small chains by 75% (Basker et al., 2008). A study carried out by Jia (2008) reported that Walmart's expansion accounts for approximately 40-50% of the variation in the net number of small stores and 30-40% for all other discount stores.

According to Graff and Ashton (1994), Walmart followed neighborhood expansion diffusion and reverse hierarchical diffusion. This means that the company expanded to locations that were a short distance from its current facilities, in almost the same way as an outbreak. Reverse hierarchical diffusion means that the company went first to small towns and the periphery and then moved to larger cities and metropolitan areas.

The main advantage of this expansion policy is the development of a dense distribution network. Graff (1998) claims that this density enabled Walmart to spread the advertisement costs and to reduce distribution costs. This idea is explored by Holmes (2008). Both authors, Holmes and Graff, affirm that the introduction of the "supercenter format" in the late 80s followed the same path of expansion as the initial discount stores. Holmes (2008) said that "Walmart never jumped to some far off location to later fill in the area in the inside out" (p. 1). The downside of the "economies of density" in the retail industry is the cannibalization of the sales by the older stores. Walmart estimates that this effect represents 1% of the sales of the stores in 2006 and 1.5% in 2007 and 2008[30,31].

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that in a program broadcasted by PBS, it was reported that Walmart gave their employees a 1-800 number to determine their eligibility. So, if Walmart instructs its employees on how to obtain public assistance, the total effect would be greater than that reported in the study.

[30] Wal-Mart. "Annual Report 2006." 2006, p22.

[31] Wal-Mart. "Annual Report 2008." 2008, p13.

The internationalization of Walmart is a new topic that has been explored recently. According to Burt and Spark (2006), three phases can be distinguished in the international expansion of the firm. Firstly, the company opened stores in adjacent markets such as Mexico and Canada. Then it started the "flag-planting phase", during which the firm started new businesses in a wide range of countries. Some of the new ventures were successful, as in the case of China, and others did not go well (e.g. Indonesia, Hong Kong and South Korea). There was also stagnation in Germany, Argentina and Brazil due to regulatory pressure or other barriers. Finally, in the third phase, the company decided to invest carefully, purchasing already successful chains like ASDA in the United Kingdom and Seiyu in Japan.

Another benefit of internationalization is its impact on the supply chain. China has played a major role in Walmart's expansion as a supplier of cheap goods for sale. Basker and Hoang Vang (2008) explore this issue and emphasize that Walmart's imports from China accounted for 15% of total US imports of goods from that country. These authors conclude that the combination of low trade barriers and high investment in technology are the main causes of Walmart's growth. According to their calculations, 60% of Walmart's growth is explained by technological innovation and the other 40% is explained by the reduction of input costs due primarily to tariff reductions and changes in sourcing.

The one-stop-shopping effect is an additional element that has been analyzed in the literature about Walmart. Basker, Klimek and Hoang Van (2008) try to demonstrate that there is a complementary relationship between the economies of scale and scope that benefit Walmart and other big box retailers. The hypothesis is that, as the companies increase the number of stores, they gain economies of scale. In addition, these companies offer a broader assortment of products generating economies of scope. The larger diversity of products attracts customers who want to avoid the transport costs inherent in buying at several stores. This last situation is known as the "one-stop-shopping effect" or economies of scale on the demand side due to savings in transport costs (Basker et al., 2008). The authors find that, for every store opened, a retail company adds an additional product line to an existing store. Furthermore, when the company incorporates a new line into its current stores, this action entails the opening of 400 new stores competing in more than 8,000 new markets.

The interest in Walmart has not ceased. Newspaper articles and media reports frequently provide the latest news about this company. Walmart's relevance is a consequence of its leadership role in the industry. Managers observe Walmart's actions to anticipate upcoming trends in the retailing sector. Researchers will continue to pay attention to

Walmart's behavior looking for best-practices and weaknesses in the business model. This literature review showed the diversity of perspectives in the analysis of Walmart's evolution and its adaptation to market environment.

Kmart: Exploring the Reasons for its Giant Downfall

The purpose of this study is to understand how a big retailer such as Kmart lost its dominance in the American retail industry. At the beginning of the 70s, Kmart's sales were almost 40 times larger than Walmart's; thirty years later, Kmart's sales were one-fifth of Walmart's. By observing the changes in Kmart's business model, we provide an explanation as to why this firm lost its market share and went bankrupt. Our empirical model reveals two important elements in the explanation of Kmart's collapse. Firstly, output prices have a negative influence on profits. This situation seems to be a direct consequence of the competition with Walmart and other retailers. The firm lowered its prices to be competitive but could not generate sales or lower costs enough to compensate losses for low margins. The other reason is the lack of consistency in the adjustments in the business models. Kmart altered some parts of its business model, but these modifications failed in achieving Kmart's objectives.

2.1 Introduction:

In our opinion, there are two different alternatives that management science researchers could use to extract knowledge from events of reality. Researchers could focus on positive cases, in which the object of study (e.g. a firm) succeeded in achieving its goals. Identifying the causes of the outstanding results helps in the elaboration of a best practices list that will provide recommendations for practitioners who face similar situations. The other approach is to concentrate on failure cases. In this context, researchers make an effort to determine what caused the failure and suggest policies to avoid similar outcomes. Kmart is a failure case. It was a pioneer in the discount retailing business and became the largest discount retail chain in the United States for a considerable period of time. Although Kmart apparently had an insurmountable advantage, its market share shrank until it declared bankruptcy in 2002. The goal of this study is to contribute towards understanding Kmart's collapse. Surprisingly, despite the size and importance of Kmart in its heyday, there are very few studies on Kmart's downfall[1].

Our analysis is divided into two parts. In the first part we describe Kmart's business model and its adjustments from 1972 to 2002. The second part is an empirical analysis using nonparametric methods that reveal how the changes in the business model configuration affected the components of profit variation. In addition, we use Walmart as a counterpoint in our assessment of Kmart's performance. Our results show that as managers modified some of the business choices, the components that affect profit change fluctuated consistently and revealed whether or not these alterations were successful in achieving the expected results. We extract useful lessons through understanding what specifically Kmart changed and how these changes influenced profits.

The business model concept is a central element in our explanation of Kmart's failure. Casadesus-Masanell and Ricart (2010) define the business model as "the logic of a firm." Conceptually, a business model is a set of business choices and consequences that are interrelated. Sometimes, these consequences reinforce the business choices that caused them,

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[1] A recent search of the word Kmart (July 18th, 2011) brought zero results in the research database "Econlit" contrary to what occurs with the word "Wal-Mart" that retrieves 93 results. In the database "Web of Knowledge" from Thompson Reuters, the keyword Kmart only generates 15 hits two of which are in Academic Journals. These two articles were written by Thomas Graff from the University of Arkansas in the Professional Geographer (1998 and 2006). Graff (1998) compares the location of the Walmart and Kmart supercenters (a discount retailing format). Graff(2006) studied the supercenter format location of the three major chains (Walmart, Target and Kmart).

forming virtuous cycles. The interdependence of the business model components can be associated with the concept of fit in strategic management literature. Fit, as Porter (1996) suggests, can be defined as how well-connected these choices are.

Kmart was a pioneer in developing the discount retailing business model. The firm applied policies towards controlling overheads as well as offering products at very low prices. It expanded its presence in the main urban markets across the United States, becoming a household name and a strong competitor for traditional department stores like Sears. In addition, Kmart was the inspiration for other firms in the discount retailing industry such as Walmart. However, as the company grew, returns started to decline. Therefore, the firm hired new CEOs who introduced some changes to the business model, expecting to reestablish the path of growing profits.

It is precisely in the nature of these changes that the key to understanding Kmart's failure lies. We believe that Kmart's executives changed some elements of the business model instead of revamping the firm's configuration. These actions may have destroyed virtuous cycles and weakened the firm's positioning in the industry. Our results reveal that, in fact, the components of profit variation moved in the direction of the introduced changes; however they failed to deliver the expected stream of profits.

Our findings are coherent with results and theories in current management literature. For instance, Siggelkow (2001) makes the distinction between internal and external fit. Internal fit is defined as coherence among activities, while external fit consists of the congruence of these configurations with the environment. Sometimes external fit is destroyed while internal fit remains intact. In this case, the author explains that firms can react in three different manners: by doing nothing, by playing a partial game (adjusting some parts of the firm's internal logic) or by playing a new game (changing the firm completely). According to Siggelkow (2001) the first two options can be easily rationalized by the managers but their effects have a negative effect on the firm's performance. Within this context, we believe that Kmart played a partial game, in the sense that it only altered some of its business choices.

The manager's rationalization may have come from what Chesbrough and Rosenbloom (2002) call "dominant logic". A business model constitutes a "dominant logic" that filters possible changes of the configuration. Sometimes firms require new business models, but the dominant logic of the firm precludes the executives from recognizing the necessary steps to transform the company. Furthermore, customers may have contributed to

this distorted view of reality. For instance, Christensen and Bower (1996) explain how incumbents usually introduce technological changes that appeal more to mainstream consumers. Therefore, the internal "dominant logic" of a firm may have been reinforced by the feedback received from its customers.

Kmart's proximity to metropolitan consumers made the company particularly sensitive to the changeable urban setting. The firm altered its business choices to better serve its target consumers. This adaptive behavior exposed the retail chain to apparent trends that failed to materialize. Furthermore, Kmart did not pay attention to how other retailers such as Walmart better fulfilled their patrons' demands.

Kmart's partial adjustment tried to keep the loyalty of all its customers and at the same time appeal to a newer, more affluent class. Porter (1996) stated that "companies that try to be all things to all customers in contrast, risk confusion in the trenches as employees attempt to make day-to-day operation decisions without a clear framework" (p. 69). Nevertheless in the mid-80s Kmart attempted to recover its earlier focus on cost leadership and offer low prices. However, the company remained committed to some of the past CEO's policies, and these partial adjustments deteriorated its positioning even more. In 1994, the firm divested other retail business in order to save the discount retailing chain. After this decision, Kmart experienced a period of stability. Unfortunately, a new CEO assumed control of the company in 2002 and waged a price war against Walmart that pushed Kmart to bankruptcy.

The empirical analysis takes into account the business model adjustments made by the managers. Profits can be decomposed in a revenue approach or a cost approach. The selection of an approach implies a detailed dissection of the components of profit variation assuming that the firm focuses mainly on the chosen variable. Cost-oriented decomposition was used in 4 out of 5 of the CEO tenures studied. This means that managers concentrated on reducing costs and selling cheap goods. Certainly, a cost leadership strategy can be the result of different business models; that is why although 4 out of 5 CEOs focused on costs, they achieved very different results. One of the CEO's tenures was analyzed using a revenue approach. This means that the manager tried to increase Kmart's profits by charging higher prices instead of emphasizing increasing sales volume.

As we mentioned earlier, this study contains two types of analysis. The description of Kmart's earlier business model and how it was modified is found in Section 2.2 and it is extended in the appendix section. Sections 2.3 to 2.6 correspond to the empirical analysis.

The third section contains a description of the methodology. The fourth section details the dataset used in our analysis. The results are discussed in the fifth section of the chapter. Our conclusions are presented in the sixth section.

2.2 Kmart's Business Model

Brief History of Kmart

Sebastian Spering Kresge was a traveling salesman who started two five-and-dime stores together with John McCrory in 1897. After two years, Kresge bought McCrory's interests and became the company's sole owner (Britannica, 2010). The company was established in 1912 as S. S. Kresge with 85 stores and $10 million sales (Layton Turner, 2003). He was the president of his company until 1925. After that year he became the Chairman of the Board and kept that position until a few months before his death in 1966. Kresge was one of the greatest philanthropists of the United States. He founded the Kresge Foundation in 1924 and contributed extensively to charitable works through this institution. Today this foundation is the thirteenth largest in the US with assets valued at $3.1 billion dollars[2].

As time passed, the Kresges' stockholdings became diluted. Herman (1981) pointed out that by the year 1964 the family owned 37% of the company's stocks. Eleven years later, the family's total holding was 0.7% of the share volume although the Kresges' control reached 9.7% if the stakes of the Foundation were included. Besides contribution to the philanthropic foundation, Herman (1981) mentioned the firm's capital expansion as the reason for the reduction of the Kresges' holdings. The family lost grip on the company and in 1977 they lost a very symbolic battle to keep the name of the founder as part of the firm's name. After that vote, the company became known as Kmart Corporation.

Managers became the effective controllers of Kmart's corporation and they tailored the company according to their perceptions. The mastermind of Kmart's discount retailing model was Harry Cunningham. In his obituary in the New York Times, it was explained that he was a successful sales director in 1951 when he applied the brilliant idea of having the same checkout lanes as in supermarkets inside Kresges' five-and-dime stores. The company ordered him to dedicate his time and effort to developing new business strategies.

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[2] Ranking made by the Foundation Center. http://foundationcenter.org/findfunders/topfunders/top100assets.html accessed on November 18th 2010.

Cunningham considered the discount retail format to be the future of the business after spending two years observing several formats including the discount store E. J. Korvette. (NYT, November 12th, 1992).

Cunningham became president of Kmart in 1959. The first Kmart discount store opened in a Detroit suburb in 1962. In just ten years 486 new stores were built. Cunningham retired as Chairman of the Board and CEO of the company in March 1972. Walton, Walmart's founder, wrote about the departure of Cunningham in his memoirs: "This was a big break for us. Harry was really the guy who in just ten years, had legitimized the discount industry and made Kmart into the model for all of us [...]." (Walton, 1992, p.191). The retirement started earlier, in 1970, when Cunningham renounced the presidency of Kmart and the position was occupied by its later successor Robert E. Dewar.

Kmart inspired Walton. He copied many of the tactics and policies implemented by Cunningham and Dewar. Walton used to visit Kmart stores to observe what new tactic the company was implementing (Walton, 1992, p.48). However, Walmart was a rural retailer and remained unnoticed for many years. Cunningham explained in Walton's memoirs that "From the time anybody first noticed Sam, it was obvious he had adopted almost all of the original Kmart ideas. I always had great admiration from the way he implemented – and later enlarged on – those ideas. Much later on, when I was retired but still a Kmart board member, I tried to advise the company's management of just what a serious threat I thought he was. But it wasn't until fairly recently that they took him seriously." (Walton, 1992, p. 191).

The starting point of the analysis is 1971. Dewar was in charge of the company since this year, given the fact that Cunningham had relinquished the president position the previous year and in 1972, retired completely from the company[3]. Dewar further developed the discount retailing concept. Kmart changed the history of the American retail industry and for many years it was the giant to defeat. The company became the second largest department store after Sears and the first discount store by the end of Dewar's period. The next subsection describes Kmart's business model under Dewar's direction. This business model inherited the early configuration established by Cunningham.

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[3] Harry Cunningham was given an honorary chairmanship of Kmart, although the effective Chairman of the Board was Dewar.

Robert E. Dewar (1972-1979) Kmart's original business model

When Dewar assumed control, the company was operating in a very difficult economic environment. The firm was threatened by the weak economic conditions faced by the United States. During the decade of the 70s, the United States suffered an oil embargo and continuous price raises from the OPEC countries. The oil embargo caused a reduction in the aggregate demand as well as inflation. This situation is known as stagflation. To improve the economic conditions, the United States government imposed several price controls in order to stop the continual spiral of high prices. These price controls consequently affected the business operations of the retail chains.

Kmart had to impose price controls on its merchandise. These price controls limited the customary markup obtained by the company as well as the pre-tax margin. At the beginning, these price controls were placed on individual items. The controls were partially relaxed in 1973 when the Cost of Living Council lifted individual item price controls and instead replaced them with category or department classification price controls. Despite all these difficulties, the company thrived vigorously in the 70s. When Robert E. Dewar left the CEO position in 1980, the company was more than three times bigger than when he had started.

This is an account of the six main business categories of choices made by Kmart during Dewar's eight years. Kmart's business model under Dewar is represented in figure 1. In this figure, choices are represented in bold and underlined fonts, and consequences in boxes or plain text depending on whether these consequences are rigid or flexible. Casadesus-Masanell and Ricart's (2010) framework classifies consequences as flexible if they disappear as soon as the choice(s) that generate(s) them are modified. Conversely, rigid consequences remain even after the consequences that caused them vanish.

Low Prices

In the early 70s, Kmart characterized its costumers as "value-conscious consumers of all income groups.[4]" It was a priority for the company to become the chain that had the lowest prices. According to Kmart's records, low prices were achieved by speeding up the inventory turnover, eliminating certain items, controlling overheads and occupancy costs and by using self-service, central checkout operations. Additionally, the firm undertook promotional

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[4] Kmart (1971), Annual Report 1970, p. 3.

activities to offset the impact of the economic crisis on the sales volume. These promotional activities reduced markups, having a negative effect on the bottom line.

Kmart was not the only firm to follow a low price approach. During this time, there were other discount retailers that competed regionally and nationally. Among these other rivals, Walmart later became the main company to challenge Kmart's supremacy. Walmart applied the "Everyday low prices" policy which consisted of uniform low prices that were not periodically adjusted. Walmart's strategy sought to offer a "stable" pricing structure, so that customers would be confident they were getting the lowest price possible.

Licensing and Product Variety

Kmart had licensed several departments inside its stores. The company changed this policy and started acquiring these licensees. For example, most of the automotive departments were licensed before the shift in this policy. In the 70s, the company created Kmart Enterprise Inc. (KEI) and these automotive departments were placed under its control. Other departments such as home improvement had the same fate.

The only licensed department business that was kept outside the control of the company was the footwear department in the US stores. Kmart signed an agreement with Melville Shoe Corporation for 25 years. Kmart had 25% of the equity at Melville, but in 1975 raised its stakes to 49%.

Besides acquiring licensees, Kmart developed its own set of new departments. The company was aware of the one-stop-shopping effect and consistently increased the variety of the assortment available in the stores to attract more people. Kmart incorporated pharmaceutical, optical and do-it-yourself departments.

Regarding product variety, Walmart had similar policies. Almost all the shoe, pharmaceutical and jewelry departments were handled by licensees in 1975, but the company mostly eliminated them ten years later (Ghemawat, 1989). For Kmart and Walmart, the one-stop-shopping effect was very important; therefore they tried to increase product variety in order to attract more customers and capture a higher percentage of the customers' wallet.

Expansion Policy

The company invested heavily in building new discount stores. The number of stores went from 411 reported in the Annual Report of 1970 to 1,688 in 1979. Other variety stores such as Kresge and Jupiter were phased out. Most of this expansion was financed with

internal funds. Kmart's objective was to be present in most of the Standard Metropolitan Statistical Areas[5] (SMSA) in the United States. In the Annual Report of 1972, it was reported that 40% of the population had access to a Kmart store. The goal was to double that number the next decade. Kmart precluded itself from developing a strong distribution network by placing its stores in the main urban areas instead of placing them close to each other in a specific region as Walmart did. Nevertheless, inside the metropolitan areas, Kmart placed its stores close to each other, slashing its former prejudice of building new stores at distances of less than 8 miles.

According to company records, Kmart built its stores in sites with sufficient population concentrations within 3 and 5 miles. The retail chain considered income levels, accessibility, presence of other competitors, and location of other Kmarts in the decision-making process regarding the construction of a future store. Kmart assembled a real estate team that was responsible for evaluating potential sites for future stores and securing those that had been identified. The firm had a policy of respecting the physical appearance requirements suggested by local communities.

Kmart leased property whenever it was possible. The majority of Kmart's leases were taken out under the clause that the lessor would pay property taxes, insurance and specified building and parking lot maintenance and repair costs. The retail chain informed that on average it took eight weeks from when a crew arrived at a new store and transformed its interior, to the opening. Kmart preferred freestanding stores than having an establishment inside a shopping center.

Kmart developed four store formats. The standard store had an area of 84,000 square feet, the medium sized store 68,000 sq. ft., stores for suburban and non-metropolitan areas 55,000 sq. ft. and stores for small towns and rural areas 40,000 sq. ft. The last format was a prototype developed during the 70s. Kmart had the strategy of experimenting with different store sizes and layouts in order to find a better adjustment. In addition, Kmart also built several distribution centers to supply its stores.

Kmart and Walmart adopted different ways of store expansion. Walmart had several difficulties in keeping their stores stocked. Walton (1992) stated in his memoirs: "We had no established distributors. No credit" (p.51). The company adopted the strategy of building

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[5] SMSA is a concept employed by the Office of Management and Budget of United States to describe a metropolitan area with a large population that is economically and socially integrated.

distribution centers to solve its logistic problems. Moreover, stores were built close to each other in order to replenish them quickly. If technology is defined as "the process by which an organization transforms labor, capital, materials and information into product or services" (Christensen and Bower, 1996, p. 198); we could characterize Walmart as a technological innovator in the discount retail business in the area of logistics.

As we previously illustrated, Kmart arranged its stores differently. Graff (1998) described Kmart's store location as a hierarchical diffusion strategy. Under this approach, stores are placed following a hierarchy, from the most populated to the least populated areas. This policy has the advantage of reaching the highest number of consumers, but the stores could be very far away from each other, which increases the transportation costs and negatively affects logistics.

Acquisitions and Discontinued Businesses:

Kmart have commonly experimented with different retail formats. Kmart itself was an experiment. The original variety store, Kresge, and the small discount store, Jupiter, were phased down during Dewar's tenure. The policy was to close those Kresge and Jupiter stores that did not satisfy the return on investment requirements.

Kmart acquired several companies during the 70s. Schiller Millinery Stores Inc. was acquired in 1971. This company operated most of Kmart's millineries. Planned Marketing Associates (PMA) Inc., an insurance company, was purchased in January 1974. Kmart also bought the Canadian footwear company SCOA in the fourth quarter of 1979. Of the 186 SCOA units operating in 1979, 109 were leased departments in Kmart Canada stores and the remaining units were operating in leased spaces in conventional department stores and separate retail locations. Kmart owned the Canadian subsidiary and 51% of the Australian subsidiary. In 1979, Kmart restructured its Australian participation by transferring 51% of its shares in exchange for 20% of the equity of Coles, the largest retailer in Australia and co-owner of Kmart Australia.

With the exception of the acquisition of PMA Inc., Kmart's acquisition policy focuses primarily on strengthening its core business: discount retailing. In the years to come, this policy would change dramatically and the firm would try very hard to diversify its investments. A signal of this shift was the approval of the acquisition of Furr's Cafeterias by the board of directors in the first quarter of 1980.

Walmart was very small compared to Kmart. The company was focusing only on its discount retailing business. Walmart acquired sixteen Mohrs Value stores and transformed them into Walmart stores in 1978, and it de-emphasized Ben Franklin's variety stores and Sav-Co Home Improvement Center. There were no other major acquisitions.

Private brands and technology

Kmart offered its own private brand for some items sold in the stores. The company reported that in some cases Kmart's items outperformed some national brands. The company created a team of expert buyers and quality control labs to inspect the quality of potential merchandise.

Kmart considered that the construction of a communication network using computers and hardware was a necessary step for the success of its expansion program. Nevertheless, the company did not invest intensively in this kind of technology until the mid-80s.

Walmart invested very seriously in technology. It was one of the first retailers in the United States to have an in-store computer terminal[6] in 1977. The goal of the firm was to speed up communication between stores and to systematize payroll in order to have better control over costs. Walmart had an "orient program" of purchasing merchandise in Asia. The corporate documents of 1978 reveal that 8% of all Walmart merchandise came from this region of the world.

Labor Policy

The company put a lot of emphasis on training its employees. The retail chain provided a large management training and recruitment program. The firm mainly wanted to attract college students. Another source for managerial positions at Kmart came from successful managers at Kresge and Jupiter. Another interesting aspect of Kmart's labor policy was its condition of equal opportunities employer. The company published the percentage of female and minority workers occupying managerial positions for several years.

Walmart had a very special relationship with its employees during its early years. Firstly, Walmart called them associates instead of employees. Early on, the firm implemented a profit sharing benefit plan for its workers. In corporate documents the company emphasized its goal of attracting personnel with entrepreneurial qualities. The personnel department

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[6] Walmart, *Annual Report*, 1978 page 9.

visited colleges and universities[7] recruiting people for their Management Training Program. The managerial team deemed it very important to identify promotable workers in order to sustain Walmart's expansion.

In summary, the main goal of Kmart was to attract price-conscious consumers with great deals. The company wanted to gain better control of the departments by eliminating licensees, and made a great effort to reach the highest amount of consumers as possible. Walmart assumed the follower role, by implementing some policies undertaken by Kmart. However, Walmart was not an important rival for Kmart. Walton (1992) states that Walmart built stores in small communities and this strategy shielded competition from Kmart for some time. Kmart was basically "alone" with no major competitors in the discount retailing business. Figure 1 shows Kmart's business model under Dewar's tenure.

[INSERT FIGURE 1]

This figure contains several arrows connecting choices and consequences. Different theories lie behind these arrows. As Casadesus-Masanell and Ricart (2010) pointed out: "In many cases theories are commonly accepted relationships open to little discussion" (pg. 3). For instance, the demand theory describes how low prices cause high volume. Additionally, we can justify using the same theory for the relationship between private brands and high volume. Private brands are the results of retailers buying merchandise at a low cost and selling these items with their own brand at lower prices. We can also easily justify the connection between "location in high density populations" and large volume since high density implies lower transportation costs for customers and possibly large numbers of potential clients. Labs for testing products diminish the probability of selling a defective item which increases the perceived quality of that item. Consumers tend to buy higher quality goods more than lower quality goods with all other factors remaining constant.

Promotional activities are undertaken precisely to boost sales volume. It is our assumption that during Dewar's and Cunningham's respective periods this was the consequence. Increasing product variety produces "the one-stop-shopping-effect" which is economies of scale on the demand side (according to Basker et al. 2008). This means that consumers reduce the total purchase cost by buying all the items they need in one place. Therefore, adding additional lines of products increases the sales volume. Finally, new store

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[7] Walmart, *Annual Report*, 1978 page 7.

formats can be considered as a sort of market segmentation. Kmart had segmented according to the size of the metropolitan area. The idea was to reach the maximum amount of people. Therefore, we consider that different store formats are related with high sales volume.

Training managers, reducing the amount of licensees, leasing property and eliminating limited appeal or fringe items were activities that reduced costs. Low costs are a requisite for having low prices without incurring losses. Having a high sales volume involves a rapid turnover which decreases inventory costs. By increasing the number of stores, the probabilities of having more customers also increases. The connection between high sales volume and high profits depends on low costs if prices are low too. The intricate relationship can be explained with the existence of virtuous cycles.

Figure (1) contains two virtuous cycles that are interrelated. The first virtuous cycle starts with the investment in building new stores. New stores, in principle, entail an increment in sales volume. Higher profits are a direct consequence of the sales volume increase. The company invests a portion of the additional profit in building new stores and the cycle starts again. This feedback loop represents the idea of growth as a source of increasing profits. Nevertheless, growth itself does not guarantee higher profits as we have previously mentioned. The arrows connecting each element depend on the ability of the firm to make these new stores successful without increasing the costs too much. This is where the second virtuous cycle becomes relevant. Lower prices imply a higher sales volume, which increases inventory turnover and lowers costs. Low costs enable low prices to be charged, which brings us back to the beginning of the loop. This is the key of a discount retailing business; pricing low to increase sales volume and expanding the number of stores to augment the total amount of profits. An analysis of Walmart's business model would reveal that this was essentially the main strategy. Walmart copied those business choices of Kmart that aimed to strengthen or to mimic these two interrelated business cycles represented in figure 2.

[INSERT FIGURE 2]

Bernard Fauber (1980-1986)

Dewar adapted Kmart's business model to the stringent economic situation of the United States of the 70s. This was the period of the oil shock, high inflation and high unemployment rates that lasted until the early-80s. The company tailored its strategy to reach low income urban consumers, by selling at low prices.

Nevertheless, in the last years of Dewar's administration, the company shifted its strategy. If, at the beginning of the 70s, the company's target audience was "value-conscious consumers," during the last years the firm's focus was on middle-class Americans. Kmart introduced some upgraded items at higher price points in some merchandise lines. The biggest transformation came after Bernard M. Fauber assumed the management of Kmart on January 31st, 1980.

In the Annual Report of 1980 it was stated that the company replaced the aroma of popcorn with the shine of real gold at the jewelry department. This was not an understatement. Fauber changed Kmart's pricing policy to reach its target audience. The company introduced high price assortment and emphasized national brands instead of its own private brand. Moreover, the retail chain discontinued the sale of products that did not have exceptional value or that did not meet a certain level of sales.

Kmart was very proud of the change and emphasized this pride in the company's communications. For example, in the Annual Report of 1984, it was stated that: "According to a national ongoing survey by Simmons, a leading consumer research firm, 23.3% of Kmart's customers in 1980 lived in households with incomes between $25,000 and $39,999. By the end of 1984, 28.1% of our customers have attained this income level. In fact, the proportion of our customers in this income group was higher than that represented in the total U.S. population. Even more important, in 1980 only 8.3% of Kmart's customers came from households with annual incomes of $40,000 or more. Today 18.9% of our customers are from households with incomes at this level." (Kmart, Annual Report, 1984, p. 3.)

During Cunningham and Dewar's years, the main focus of the corporation was the expansion of Kmart's discount stores. Fauber shifted the corporation's policy and focused on creating new businesses opportunities that could yield quick profits and whose expected rate of return exceeded that prevailing in the discount retailing business. Kmart became a conglomerate that had food-away-from-home businesses, insurance companies, bookstores, home improvement, drugstores and high-quality apparel. Internationally, Kmart invested in Canada, Australia and Mexico. The company also had a joint-venture with a Japanese retailing company.

The results of Kmart's investments were disappointing. Many ventures failed and the rate of return of some businesses did not meet the expectations. The company closed or sold many of the businesses that it created during Fauber's years. In the last year of Fauber's

tenure, the specialty retail group (the division that congregated all the acquisitions and new ventures), only included four of twelve businesses: Walden Books Company, Inc. (bookstores), Pay Less Drugstores Northwest, Inc. (drugstores), Builders Square Inc. (home improvement) and Bargain Harold's (discount stores). Kmart continued its participation in Australia and the control of its units in Canada.

Contrary to what happened under Dewar's administration, Fauber decided to diminish the rate of construction and concentrated on refurbishing stores and giving them a modern look. The idea was to change the layout and appearance of the stores in a way that emphasized the high quality merchandise inside. The program of modernization was called "Fashion 80s".

All the changes introduced by Fauber negatively affected the components of the virtuous cycles depicted in figure 2. In summary, Fauber increased prices, reduced the construction of new stores and could not control costs. The structure of the virtuous cycle was damaged by these modifications and, in addition, the firm's executives were busy trying to make the new business included in the company's portfolio profitable. Strategically, this change meant abandoning the traditional cost leadership perspective of the company. The company adopted a revenue oriented approach; it tried to increase profit by selling at higher prices instead of increasing the sales volume.

Meanwhile, Walmart was growing dramatically during these years. Walmart had 330 stores in 1980 (Kmart, 2,146) and in six years the company more than tripled that number: 1,029 (Kmart 3,644). Walmart was present in 11 states in 1980 and had increased that number to 23. The firm had also heavily invested in technology. The retail chain had made a serious effort to automate processes and go paperless. The uniform product code (UPC) was being deployed and several laser scanners were tested. In terms of sales, Walmart's sales were 10% of Kmart's in 1979, and in 1986 that number had increased to 50%. Walmart was quickly catching up at that time. Kmart started to feel the competitive pressure. In the last letter addressed to Kmart's shareholders, Bernard Fauber stated the following: "We believe that the competitive retail environment of the late 1980s and beyond provides little opportunity to improve gross margin on the products we sell simply by raising prices. Just the opposite is true. With better buying and better distribution methods, Kmart will continue to keep a tight lid on inflation." This statement clearly signals Kmart's shift towards lower prices.

Joseph Antonini (1987-1994)

Antonini's period can be characterized as a timid attempt to increase the level of competitiveness of the company. Kmart reorganized its structure and completed the elimination of many underperforming businesses. The firm's managerial team was aware of the competitive pressure exerted by rivals such as Walmart or Target. Richard S. Miller, an executive vice president, predicted in 1991 that many retail chains would disappear at the end of the 90s because of the intense competition. Antonini tried to fix the shortcomings of Fauber's strategy and reincorporate some elements of Dewar's business model.

Antonini refocused the company on low- and middle-income customers. Kmart wanted to become a price leader by selling everyday low prices merchandise. Basically, Antonini shifted Kmart's strategy back to cost leadership instead of being a leader in differentiation. The first element of this new strategy was the change to one-week ad circulars with a seven-day-duration instead of twice-a-week circulars lasting for three to four days. In 1987, Kmart lowered the prices of 2,500 items to become price leaders of those items in every market. In 1988, 500 prices were lowered and in early 1989 the prices of 3,000 items were lowered. The company's management acknowledged that its efforts to transform Kmart into a price leader had hit the bottom line. This shift constituted a partial reinstatement of Dewar's pricing policies.

Antonini continued to neglect the discount retail business and to focus on the Special Retail units. Nevertheless, the company changed its expansion methods. Rather than initiating new business from scratch, the company shifted to purchasing already viable businesses. The firm invested in the groceries business, office supplies, sportswear and bookstores. Kmart also started its own version of a supercenter format and invested internationally. The corporation not only acquired new businesses, but also invested heavily in building new stores (for instance, it opened 192 new special unit stores in 1992[8]), improved their operations, and trained and hired new personnel. Some stores had to be transformed in order to be merged with other acquisitions. According to the company documents, the plan was to "… acquire and create retailing businesses with growth rates above the general retailing over the next seven to 10 years." (AR 1989, p. 2.)

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[8] See Kmart Annual Report 1992, page 22.

Despite the fact that discount retailing was no longer the centerpiece of the corporation, Kmart undertook a new store modernization program. The cost of the program was set to 2.3 billion dollars in 1989. The modernization program would make stores more inviting to customers by providing more space to walk, better lighting and a good selection of merchandise. In 1992, 50% of the stores had applied the new look.

Selling private brands was an additional source of revenue under Dewar's administration. Antonini tried to reestablish this source with an emphasis on lifestyle merchandising. Although the concept began with Fauber, it was further developed under Antonini's tenure. Kmart introduced private label brands backed by celebrities such as Martha Stewart. The idea was that customers would come to Kmart stores seeking exclusive brands that had been endorsed by celebrities, and once in the store they would satisfy other purchasing needs. Launching private lines and using celebrities as spokespeople usually took two years' preparation.

Cost reduction was a priority in Kmart just as it was under Dewar. Antonini applied a cost reduction program to make the company more competitive. Some of the actions that included this cost reduction program are: modification of labor scheduling, change in vacation policies, among others. It also helped to reduce costs with respect to sales from the acquisition of some businesses such as PACE, since employees who worked for this division had lower salaries.

Antonini tried to recover Dewar's cost approach but he failed to reconstruct the previous business model. In fact Antonini did not relinquish keeping the "special retailing units" as part of Kmart's corporation. This policy diverted capital resources that would have been useful in expanding Kmart's discount store chain. Although the decision to include celebrity sponsored items was successful in capturing public interest about Kmart, in our opinion this business choice was incongruent with the objective to reestablish the low price reputation. This lack of commitment toward a real cost leadership strategy was an opportunity for Walmart to fill this niche in the retailing industry. Nevertheless, we categorize Antonini's tenure under the cost leadership approach.

Walmart surpassed Kmart in sales volume in 1990. By 1995, Walmart sold almost three times more than Kmart, despite having fewer stores. Nevertheless, Walmart had more square feet available for sale than Kmart (approximately 300 million vs. 197 million). The reason behind this apparent paradox is that during this time Walmart developed the

supercenter concept. A supercenter is a discount store that also sells groceries. It was a smaller version of Carrefour's Hypermart. Walton (1992) acknowledges having observed these hypermarts in Brazil and in Europe (p. 199). In 1988, Walmart opened two experimental supercenters in Dallas-Fort Worth (they were hypermarts); seven years later there were 255 of them.

We can safely conclude that Walmart was more focused on the discount retailing business than Kmart. Walmart applied a cost-leadership strategy and tried to attract price-conscious consumers. The average markup per dollar for Walmart was 21 cents while for Kmart it was 27 cents in the 1986-1995 period; (See markup evolution in figure 3). Antonini's efforts to compete against Walmart fell short. We deem that the biggest mistake was keeping the special retail units which wasted economic and managerial resources.

[INSERT FIGURE 3]

Floyd Hall (1995-1999)

Floyd Hall's period started when Antonini resigned from his CEO position in March, 1995. The company presented poor results in the last two years of Antonini's tenure and lost much of its market value according to some media reports[9]. The Board of Directors led by Donald S. Perkins conducted a nationwide search for a new CEO to replace Antonini. In the meantime, the company executives undertook several major changes to boost Kmart's competitiveness.

The change began before Antonini's resignation when, in a summer review of Kmart's performance, many important transformations were decided upon. Firstly, Kmart would recruit people from other companies to bring fresh ideas to the firm. Kmart decided to divest from its specialty retail stores. Many PACE assets were sold to Walmart in 1994. PayLess was sold to an entity called Thrifty PayLess Holding Inc. although Kmart acquired a significant participation in this holding. Kmart sold its participation in Coles Myer Ltd, reduced its stakes in The Sports Authority and Office Max and planned an IPO over the Borders Group. The company's aircraft was sold. In addition, many changes were introduced in the workers' compensation scheme. A profit sharing plan was designed to link the pension plan with the company's performance. Bonuses were offered for the accomplishment of three specific objectives on pre-tax profit, measurements of in-stock position and customer traffic.

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[9] "Kmart's Antonini Steps Down", Chicago Sunday Times, March 21st, 1995.

Hall continued with this divestiture policy. Under Hall's mandate, Kmart completed the elimination of the Specialty Retail Store business group. The firm finished its ties with OfficeMax, The Sports Authority, Borders Group[10], PayLess Drugstores, PACE Warehouse Club and Builder Square by selling them or closing the stores. Kmart international joint ventures in Mexico and Singapore were discontinued. The Czech and Slovak stores and 87.5% of the shares of Kmart Canada were sold as well.

As a result of all these actions, Kmart was a lean organization with only one business line, discount retail. Certainly, the divestiture procedure consumed a lot of effort and resources and sometimes the company reported losses from these operations. However, we consider that the main losses came from the lost opportunities that Kmart failed to grab as a result of this "experimental conglomerate."

Kmart's executives gave a precise definition of the company's customer target: "She is a middle income homemaker who often must balance both job and family. She shops at Kmart not only for the convenient price but also for the opportunity to "stock-up" on needed items. Kmart can be the store where this customer goes to buy basic consumables." (Kmart's Annual Report 1994, p.2) As a result, the merchandise mix was reoriented toward frequently purchased items. In addition, a new prototype was developed with the purpose of providing more space to frequently purchased goods. The new prototype was called Big Kmart and by 1999, there were 1,869 of them. The goal was to transform all the stores into Big Kmart. The transformation of Kmart Stores into Big Kmart as well as the expansion of the Super Kmart Center cost $1.1 billion dollars in the three years that it lasted.

After the deployment of the POS technology in the 80s, Kmart continued investing in technology. For example, in 1999, Kmart installed computers inside the stores offering customers a broader range of products than those available in store. The online service kmart.com was launched in May 1998. One year later, bluelight.com was created from a joint venture with Softbank Venture Capital. Bluelight.com was an internet service provider and an e-commerce website. The company documents assert that it was a total success; within 90 days one million people had subscribed to the service. Technological investment also improved workers' skills by offering computer-based training, long-distance learning and

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[10] The divesture of Builder Square created financial problems for Kmart. The buyers declared bankruptcy in 1999, forcing the retail chain to record a non-cash charge of $230 million after taxes to cover the leases of 117 former Builders Square locations.

satellite broadcast. Investment was also made to reduce running out of stock. The company tested several ways to distribute merchandise and to better predict customer demands.

Hall continued Antonini's policy of promoting private brands. Martha Stewart's Everyday Bed and Bath were introduced in 1996. KGro (horticulture) and American Fare (consumables) brands were also available at that time. Other brands such as Sesame Street, White-Westinghouse and Penske Automotive were later introduced. The Martha Stewart line was the most successful of all the brands introduced. Kmart reported one billion worth of sales of Martha Stewart items in 1999.

On the other hand, Kmart's executives claimed that the company did not neglect the national brands. For instance, in 1996 the company celebrated a conference with 280 producers in order to layout the foundations of a new "partnership" with its vendors. Recognized national brands were placed alongside with exclusive private brands.

Kmart changed its relationship with its workers during Hall's administration. The company made a great effort to keep the labor expenditures as low as possible. This was part of the effort to reduce the selling, general and administrative expenses. The other main change was the variation in the compensation plans to link salary payment with achievement of some company goals. As we mentioned, Kmart also changed its hiring policy for managers by attracting employees from other organizations who would bring fresh ideas to the business.

Although Kmart improved its performance during Hall's administration, Walmart did not stop growing. When Hall relinquished the CEO position, Walmart's sales were five times higher than Kmart's and was present throughout the USA and in nine other countries. Kmart's answer to Walmart's rise was to dismantle its conglomerate and to focus merchandising on frequently-sold items. Kmart started to grow again but not as fast as Walmart.

Floyd Hall's period symbolizes the return of Kmart to its core. The elimination of the specialty retail units, the changes in the merchandise mix, and the serious efforts to reduce costs gave Kmart a small opportunity to offset the downward trend in which it found itself. However, Hall's successor failed to continue with these good practices and the company followed an accelerated path to bankruptcy.

Charles (Chuck) Conaway: The end of Kmart

Floyd Hall retired from the CEO position in 2000. Charles (Chuck) Conaway, a former CEO of the pharmacy chain CVS, replaced him. The new CEO promised a complete turnaround of the company by August 2002. Two years later, on January 22nd, 2002 Kmart filed a voluntary petition for reorganization under chapter 11. Kmart was financially stable when Hall left his position in 2000. A chain of bad decisions led to the failure of the company. All the details on how Kmart went down are not clear. As recently as February 10th, 2010, a federal judge ordered the ex-CEO of Kmart to pay a fine of $10 million dollars for misleading investors about the financial situation of the company.[11] In particular, Conaway was accused of not disclosing the liquidity shortage problems and the fact that the company was delaying payments to its vendors in a conference call with investors two months before the bankruptcy filing.

Conaway decided to engage in a price war against Walmart when he assumed the CEO position. Bluelight special, an old trick used by Kmart to attract customers to the stores, was the center piece of his strategy for gaining a market share. According to Layton-Turner (2003) a bluelight special consisted of announcing promotions inside the stores at specific intervals of time. The idea was that customers would visit stores more frequently attracted by the great discount prices offered during the promotion. Bloomberg[12] reported that Kmart spent $850 million dollars in the summer of 2001 on stocking its inventories. Kmart lowered the prices of 30,000 items and at the same time reduced its marketing expenses. This was a recipe for disaster. The Christmas season of 2001 was regarded as "disappointing" in the Annual Report of 2001. This event worsened the liquidity problem that the firm was facing and eroded the vendors' and creditors' confidence even more. In January of 2002 the company had to declare bankruptcy.

When Conaway assumed the CEO position, Kmart had some chronic problems with its supply chain. The former executive explained in the company documents that the firm did not have minimal metrics for measuring performance and the company's culture was not adapted for competition. In order to change that, Conaway planned a major overhaul of the supply chain by investing $1.7 billion in equipment, software design and implementation of

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[11] Fisk, Margaret C. & Raphael Steve. (2010) "Kmart's Former CEO Must Pay More Than $10 Million (Update2)." Bloomberg http://www.bloomberg.com/apps/news?pid=newsarchive&sid=abQpeMmCe47s Published on February 25th, 2010; accessed May 10th, 2010.

[12] ibid

several projects under the "play-for-win" initiative. Some of the projects under the play-for-win initiative were already finished by 2001, such as the Electronic Merchandise Operations ELMO to reduce soft-inventory lead times and the Blue Dot Program in order to improve the in-stock position of the company. In addition, the out-of-stock definition was changed to "missing from shelf" in order to represent what customers really experienced.

Despite all of these efforts, the decision to engage in a price war with Walmart was ill-fated. Kmart tried to recover its former niche when it was too late. One of the reasons that we consider to be an explanation for such a poor judgment of reality is the fact that the managerial team had very little experience of discount retail. In 2000, 31 of the 40 corporate officers were new to the company. 16 of them had only spent six months at Kmart. The original idea of bringing new ideas to the company was carried to the extreme. In a letter addressed to Kmart shareholders, the interim CEO of Kmart during the restructuration period, James B. Adamson, stated that "We have installed a new management team consisting of seasoned executives with considerable turnaround and retail experience."[13]

On the other hand, there were many accusations about mismanagement of the resources of the company. Creditors of Kmart filed a lawsuit against six former employees including the CEO and the COO accusing them of using the resources of the company to their own personal benefit.[14] In addition, creditors also accused Conaway of having poor managerial skills and replacing senior managers at Kmart with people without experience in the field.

As we have previously mentioned, James B. Adamson assumed the position of CEO of the company after Conaway left in March 2002. His contract stipulated that he would receive a "success payment" of 4 million dollars if Kmart was able to emerge from bankruptcy before July 31st, 2003. Mr. Adamson had the difficult task of reorganizing the company, closing stores, terminating many employees' contracts, and facing the anger and frustration of creditors and shareholders. Although in this study we concentrate on the history of the company from 1971 to 2002, we briefly comment on the fate of the company after the bankruptcy. The new company that emerged was called Kmart Holding Corporation. The bluelight website was scrapped and Kmart continued its efforts to improve the supply chain. Two years later, the company executives decided to merge Kmart with Sears (Kmart was the

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[13] Adamson, B. James (2001) Kmart's Annual Report 2001, page 2.
[14] Cosgrove-Mather, Bootie (2003) "Too Many Perks at Kmart." Website: CBS, http://www.cbsnews.com/stories/2003/05/06/national/main552617.shtml Accessed: May 15th, 2010.

acquirer) and form the Sears Holding Corporation. The purpose of the merger was to compete against the other retail chains like Walmart and Target.

Table 1 summarizes all the differences found among the CEOs who managed the company from 1972 to 2002. In the appendix section, we have included a more detailed description of the modifications that Kmart's business model suffered in this time period.

2.3 Methodology

The methodology that we are going to use in this chapter is based on that presented by Grifell-Tatjé & Lovell (2012). The authors decompose the cost function using a Konüs Index. We adapt their method to express profits in two alternative ways. Profit change can be represented as the sum of the change in revenues minus cost change decomposition. Alternatively, the change in profit can be broken down as a decomposition of revenue change minus the variation in costs. The selection of one of these two choices depends on the nature of the business model of the firm and the analytical objectives of the researcher. A cost decomposition approach is better suited for business models oriented toward cost leadership; on the other hand, if the firm aims to be a leader in differentiation, revenue decomposition is more appropriate. The objective of these methodologies is to measure the performance of a business model in a period of time. The components measure the influence of prices, efficiency levels, and technological and size changes.

The description of the methodology starts by outlining the working variables. A decision-making unit (DMU) is the starting point of the analysis. In this study, a DMU is defined as a retail chain such as Walmart or Kmart. We assume that DMU produces M outputs and uses N inputs. The vector $x_i = (x_{i,1},...,x_{i,N})$ represents the amount of inputs consumed in the production of $y_i = (y_{i,1},...,y_{i,M})$ units of output by DMU i. The input price vector $w_i = (w_{i,1},...,w_{i,N})$ stands for the amount paid for each one of these N inputs. Finally, the output price vector $p_i = (p_{i,1},...,p_{i,M})$ corresponds to the prices of the M goods produced by the firm i. These vectors could have exponents that symbolize a time period. Therefore $w_i^{0,T}x_i^0$ means the total costs incurred by the producer i at period 0.

An input set $L^s(y^s)=\{x^s: (x^s \ can \ produce \ y^s)\}$ is a set that defines the technology available at period s by including all the input vectors that can be used to produce y^s. $L^s(y^s)$ is assumed to be convex and to satisfy the strong disposability property. $c^s(y_i^r, w_i^q)$ is the solution of the cost minimization problem $\min_x\{(w_i^{q,T}x) : x \in L^s(y^r)\}$. Therefore, $c^s(y_i^r, w_i^q)$ is the minimum cost incurred to produce y_i^r paying the following input prices w_i^q using technology

available at period *s*. Both the input price vector and the output have exponents, meaning that this procedure can be used for assessing hypothetical situations. For instance, we can assess what the minimum cost would be using technology available at period 1, with input prices at period zero to produce output obtained in period 1 by DMU *i*: $c^1(y_i^1, w_i^0)$.

Alternately, an output set is defined as $P^s(x^s) = \{y^s: (y^s$ is produced by $x^s)$ and also represents the technology available at period *s* by including all the output vectors that can be produced by using input vector x^s. The set is also assumed to be convex and to satisfy the strong disposability property. $r^s(x_i^r, p_i^q)$ is the solution of the revenue maximization problem $\max_y \{(p_i^{q,T} y) : y \in P^s(x^r)\}$ which represents the maximum revenue obtained by using x_i^r and technology *s* and charging output prices p_i^q. As occurs with the minimum costs, the maximum revenue can be evaluated in hypothetical situations. By way of example, the maximum revenue obtained using technology and inputs of period 0 and input prices of period one for DMU *i* is equal to $r^0(x_i^0, p_i^1)$

Now that we have established the framework, we will proceed to break down the change in profits using the technology $t + 1$ as a reference.

$$\pi^{t+1} - \pi^t = (p^{t+1,T}y^{t+1} - w^{t+1,T}x^{t+1}) - (p^{t,T}y^t - w^{t,T}x^t)$$

$$= (p^{t+1,T}y^{t+1} - p^{t,T}y^t) - (w^{t+1,T}x^{t+1} - w^{t,T}x^t) \qquad [1]$$

Equation [1] states that profit change can be expressed as the difference in revenues minus the difference in costs. The next step is to present the cost approach. Therefore, we start by decomposing the second term in equation [1]:

$$(w^{t+1,T}x^{t+1} - w^{t,T}x^t) = [c^{t+1}(y^{t+1}, w^{t+1}) - c^{t+1}(y^{t+1}, w^t)] \qquad \text{Input Price Effect}$$

$$+ [w^{t+1,T}x^{t+1} - c^{t+1}(y^{t+1}, w^{t+1})] - [w^{t,T}x^t - c^{t+1}(y^{t+1}, w^t)]$$

Input Quantity Effect

$$[2]$$

Expression [2] shows that the cost change can be written as the sum of price and quantity effects. The first term in equation one can be decomposed as follows:

$$(p^{t+1,T}y^{t+1} - p^{t,T}y^t) = (p^{t+1} - p^t)^T y^t + (y^{t+1} - y^t)^T p^{t+1} \qquad [3]$$

The first term (Output Price Effect) measures the influence of the variation in output prices on revenues while the second term (Output Quantity Effect) captures the effect of

output quantity variation. Equation [2] and [3] are two different ways of decomposition. Equation [2] uses information of the industry in the calculation of the cost functions and can be further decomposed. Meanwhile equation [3] uses Index Number Theory to separate price and quantity effect; it cannot successively be decomposed without introducing additional methodologies.

Quantity effect in equation [2] can be separated into two main components:

$$[w^{t+1,\mathrm{T}}x^{t+1} - c^{t+1}(y^{t+1}, w^{t+1})] - [w^{t,\mathrm{T}}x^t - c^{t+1}(y^{t+1}, w^t)] =$$

$$[w^{t+1,\mathrm{T}}x^{t+1} - c^{t+1}(y^{t+1}, w^{t+1})] - [w^{t,\mathrm{T}}x^t - c^{t+1}(y^t, w^t)] \text{ Cost Productivity Effect}$$

$$+[c^{t+1}(y^{t+1}, w^t) - c^{t+1}(y^t, w^t)] \hspace{4em} \text{Size Effect}$$

$$[4]$$

The size effect measures how much cost varies as a result of increasing the output net of the effects related with improvements in productivity. In equation [3] the output quantity effect represents the variation in profits due to increments in output. Therefore these two elements can be combined into one expression:

$$(y^{t+1} - y^t)^{\mathrm{T}}p^{t+1} - [c^{t+1}(y^{t+1}, w^t) - c^{t+1}(y^t, w^t)] \hspace{3em} [5]$$

Expression [5] is called net growth effect and measures how much profit changes as output quantity (in our application sales volume) increases. This term is related with the virtuous cycles depicted in figure (2). We expect that as the virtuous cycles are undermined this term will diminish or even become negative.

The cost productivity effect is the combination of two different components, technological change effect and cost efficiency effect:

$$[w^{t+1,\mathrm{T}}x^{t+1} - c^{t+1}(y^{t+1}, w^{t+1})] - [w^{t,\mathrm{T}}x^t - c^{t+1}(y^t, w^t)] =$$

$$[w^{t+1,\mathrm{T}}x^{t+1} - c^{t+1}(y^{t+1}, w^{t+1})] - [w^{t,\mathrm{T}}x^t - c^t(y^t, w^t)] \text{ Cost Efficiency Effect}$$

$$+[c^{t+1}(y^t, w^t) - c^t(y^t, w^t)] \hspace{3em} \text{Technological Change}$$

$$[6]$$

Combining expressions [1] to [6], we obtain the following:

$$\pi^{t+1,1} - \pi^t =$$

$$(p^{t+1} - p^t)^\mathrm{T} y^t \qquad\qquad\qquad\qquad\qquad\text{Output Price Effect}$$

$$-[c^{t+1}(y^{t+1}, w^{t+1}) - c^{t+1}(y^{t+1}, w^t)] \qquad\qquad\text{Input Price Effect}$$

$$-[w^{t+1,\mathrm{T}} x^{t+1} - c^{t+1}(y^{t+1}, w^{t+1})] - [w^{t,\mathrm{T}} x^t - c^t(y^t, w^t)] \quad \text{Cost Efficiency Effect}$$

$$-[c^{t+1}(y^t, w^t) - c^t(y^t, w^t)] \qquad\qquad\qquad\text{Technological Change}$$

$$+(y^{t+1} - y^t)^\mathrm{T} p^{t+1} - [c^{t+1}(y^{t+1}, w^t) - c^{t+1}(y^t, w^t)] \qquad\text{Net Growth Effect}$$

$$[7]$$

The price and quantity effect measure how much profit varies as a result of changes in input prices and quantities respectively. The productivity effect represents the variation in profits due to changes in productivity levels. Technological change effect quantifies the effect of technology in the change in profits. Cost efficiency effect assesses how much profit is modified due to variations in efficiency of the firm. The net growth effect exposes the influence of growth policies in generating profits.

The cost approach is explained graphically in figure (4). Here we represent the same firm in two time periods. The curves define the minimum cost attainable given the input prices and technology. The cost efficiency effect is represented as the subtraction of the two red vectors with the number (1) attached to them. The technological change corresponds to the blue vector with the number (2); it is the distance of two minimum cost functions given output quantities and input prices. The size effect is shown as the distance portrayed by the green arrow (3). Finally the input price effect is shown as the orange vector (4).

[INSERT FIGURE 4]

The same decomposition process can be applied to the revenue approach:

$$(p^{t+1,\mathrm{T}} y^{t+1} - p^{t,\mathrm{T}} y^t) = [r^{t+1}(x^{t+1}, p^{t+1}) - r^{t+1}(x^{t+1}, p^t)] \qquad\text{Output Price Effect}$$

$$+[p^{t+1,\mathrm{T}} y^{t+1} - r^{t+1}(x^{t+1}, p^{t+1})] - [p^{t,\mathrm{T}} y^t - r^{t+1}(x^{t+1}, p^t)] \quad \text{Output Quantity Effect}$$

$$[8]$$

$$(w^{t+1\mathrm{T}} x^{t+1} - w^{t,\mathrm{T}} x^t) = (w^{t+1} - w^t)^\mathrm{T} x^t + (x^{t+1} - x^t)^\mathrm{T} w^t \qquad\qquad[9]$$

Equations [8] and [9] are the corresponding revenue approach versions of equation [3] and [4]. Equation [9] decomposes cost variation into input price effect (first term) and input

quantity effect (second term). Revenue is further decomposed while costs are only expressed in terms of price and output effects. Output quantity effect is a breakdown in revenue productivity effect and size effect:

$$[p^{t+1,\mathrm{T}}y^{t+1} - r^{t+1}(x^{t+1}, p^{t+1})] - [p^{t,\mathrm{T}}y^t - r^{t+1}(x^{t+1}, p^t)] =$$

$$[p^{t+1,\mathrm{T}}y^{t+1} - r^{t+1}(x^{t+1}, p^{t+1})] - [p^{t,\mathrm{T}}y^t - r^{t+1}(x^t, p^t)] \quad \text{Revenue Productivity E.}$$

$$+[r^{t+1}(x^{t+1}, p^t) - r^{t+1}(x^t, p^t)] \qquad\qquad\qquad\qquad \text{Size Effect}$$

[10]

The net growth effect can be constructed similarly as in equation [5]

$$[r^{t+1}(x^{t+1}, p^t) - r^{t+1}(x^t, p^t)] - (x^{t+1} - x^t)^T w^{t+1} \qquad\qquad [11]$$

The revenue productivity effect can be broken down into technical change effect and revenue efficiency effect:

$$[p^{t+1,\mathrm{T}}y^{t+1} - r^{t+1}(x^{t+1}, p^{t+1})] - [p^{t,\mathrm{T}}y^t - r^{t+1}(x^t, p^t)] =$$

$$[p^{t+1,\mathrm{T}}y^{t+1} - \mathrm{r}^{t+1}(x^{t+1}, p^{t+1})] - [p^{t,\mathrm{T}}y^t - r^t(x^t, p^t)]$$
$$\text{Revenue Efficiency E.}$$

$$+[r^{t+1}(x^t, p^t) - r^t(x^t, p^t)] \quad \text{Technological Change E.}$$

[12]

Hence, the profit change can be decomposed alternatively as follows:

$$\pi^{t+1} - \pi^t =$$

$$[r^{t+1}(x^{t+1}, p^{t+1}) - r^{t+1}(x^{t+1}, p^t)] \qquad\qquad \text{Output Price Effect}$$

$$-(w^{t+1} - w^t)^{\mathrm{T}}x^t \qquad\qquad\qquad\qquad \text{Input Price Effect}$$

$$+[p^{t+1,\mathrm{T}}y^{t+1} - r^{t+1}(x^{t+1}, p^{t+1})] - [p^{t,\mathrm{T}}y^t - r^t(x^t, p^t)] \quad \text{Revenue Efficiency E.}$$

$$+[r^{t+1}(x^t, p^t) - r^t(x^t, p^t)] \qquad\qquad\qquad \text{Technological Change E.}$$

$$[r^{t+1}(x^{t+1}, p^t) - r^{t+1}(x^t, p^t)] - (x^{t+1} - x^t)^T w^{t+1} \qquad \text{Net Growth Effect}$$

[13]

The definition of these components is equivalent to that presented for the cost approach. Figure (5) portrays the components of the revenue decomposition. The difference between the red vectors (1) is the revenue efficiency effect. The blue vector is the technology effect (2). The green arrow is the size effect (3) and the orange vector is the output price effect (4).

[INSERT FIGURE 5]

We have use the technology available in period t + 1 (future period) as our reference point. The same dissection can be done using the technology available at period t (present period) as a reference and the results are similar. In this study we report the average of the two ways of carrying out the decomposition.

The technological set is defined sequentially; this means that the input, output combinations available in the previous periods remain feasible in the current period. We consider that this is an appropriate assumption for the retailing sector.

Cost minimization problem

The cost minimization problem can be formulated as the following linear programming problem outlined for DMU *j*.

$$c^s\left(y_j^q, w_j^r\right) = \min_{x, \lambda_i^s} w_j^{r,\mathrm{T}} x_j$$

Subject to $\quad x_{j,n} \geq \sum_{k=1}^s \sum_{i=1}^I \lambda_i^k x_{i,n}^k \quad n = 1, \ldots, N \;;\; \sum_{k=1}^s \sum_{i=1}^I \lambda_i^k y_{i,m}^k \geq y_{j,m}^q \quad m = 1, \ldots, M$

$$\lambda_i^k \geq 0 \;\forall i, k \;;\; \sum_{i=1}^I \lambda_i^k = 1 \;\forall k \quad i = 1, \ldots, I \tag{14}$$

Where *s, q, r ,k* represent time periods; and *j*∈ *[1,...,I]* is for firms

The solution of the linear programming problem [14] is the answer of the cost minimization problem. The exponents *s*, *q* and *r* can assume different period values according to what cost minimization we want to calculate. For example, the calculation of $c^t(y_i^t, w_i^t)$ using procedure [14]:

$$c^t\left(y_j^t, w_j^t\right) = \min_{x, \lambda_i^t} w_j^{t,\mathrm{T}} x_j$$

Subject to $\quad x_{j,n} \geq \sum_{k=1}^t \sum_{i=1}^I \lambda_i^k x_{i,n}^k \quad n = 1, \ldots, N \;;\; \sum_{k=1}^t \sum_{i=1}^I \lambda_i^k y_{i,m}^k \geq y_{j,m}^t \quad m = 1, \ldots, M$

$$\lambda_i^k \geq 0 \;\forall i, k \;;\; \sum_{i=1}^I \lambda_i^k = 1 \;\forall k \quad i = 1, \ldots, I \tag{15}$$

$$c^{t+1}(y_i^{t+1}, w_i^{t+1}), \, c^{t+1}(y_i^{t+1}, w_i^{t}), \, c^{t+1}(y_i^{t}, w_i^{t}), \, c^{t}(y_i^{t}, w_i^{t+1}), \, c^{t}(y_i^{t+1}, w_i^{t+1}), \text{ can be}$$

similarly calculated.

Revenue Maximization Problem

The revenue maximization problem can be formulated similarly to the cost minimization problem:

$$r^s(x_j^q, p_j^r) = \max_{y, \lambda_i^s} p_j^{r,\mathrm{T}} y$$

Subject to $\quad y_{j,m} \leq \sum_{k=1}^{s} \sum_{i=1}^{I} \lambda_i^k y_{i,m}^k \quad m = 1, \dots, M \; ; \; \sum_{k=1}^{s} \sum_{i=1}^{I} \lambda_i^k x_{i,n}^k \leq x_{j,n}^q \; n = 1, \dots, N$

$$\lambda_i^k \geq 0 \; \forall i,k \; ; \; \sum_{i=1}^{I} \lambda_i^k = 1 \; \forall k \quad i = 1, \dots, I \tag{16}$$

In the same way as in the previous minimization problem, the exponents *s*, *q* and *r* can assume different period values to solve the following revenue maximization problems $r^{t+1}(x_j^{t+1}, p_j^{t+1}), \, r^{t+1}(x_j^{t+1}, p_j^{t}), \, r^{t+1}(x_j^{t}, p_j^{t}), \, r^{t}(x_j^{t}, p_j^{t+1})$ and $r^{t}(x_j^{t+1}, p_j^{t+1})$.

Order-m

In our assessment of the retailing industry we found that some firms are "outliers" that perform differently from the rest of the companies. Order-m approach takes into consideration the influence of extreme observations in order to render more robust results within the non-parametric setting. Cazals et al. (2002) proposed this technique for providing statistical inference in a setting that was not sensitive to the presence of outliers. This methodology was applied first to FDH and DEA estimates but can also be applied to other types of frontiers such as cost frontier estimation or revenue frontiers. We applied order-m techniques in our calculations of cost and revenue functions as stated in Cazals et al. (2008). Order-m comes from the fact that a full frontier is not estimated; instead a random set of m observations is the foundation of the partial frontier.

Equations [17] and [18] represent the mathematical expressions for the order-m calculations of the cost and revenue frontier based on Cazals et al. (2008). We did not use a montecarlo approximation to calculate the integrals; we calculated them directly. We chose m=200 for all our estimations although the number of superefficient units stabilized in m= 55.

The estimator for the cost function

$$\widehat{\varphi}_{m,i} = \mathrm{E}[\min(C_1, C_2, \dots C_m)|Y \geq y] = \int_0^{\infty} \left[\widehat{S}_{c,i}(c|y) \right]^m dc \tag{17}$$

In this situation m stands for the number of randomly chosen total costs C_j. For the revenue function we have the following expression:

$$\hat{\delta}_{m,i} = E[\max(R_1, R_2, \dots R_m) | X \leq x] = \int_0^\infty [\hat{S}_{c,i}(r|x)]^m dr \qquad [18]$$

Where R_j, represents a randomly chosen total revenue.

2.4 Description of the Dataset

The dataset used in this chapter has been built by consulting a large amount of financial documentation from the period 1971 to 2008. In addition to consulting the SEC filings and annual reports of several companies, other sources of information were included to complement the information available in the financial reports of the company. These sources are the Osiris Dataset and reports provided by Thompsom-Financial. The companies included in our dataset are Walmart, Target, Kmart, Sears, Bradlees, May and Costco. We consider that these companies cover a large percentage of the total retail market[15]. Kmart filed for bankruptcy in 2002; therefore the dataset comprises information until that year. This dataset was particularly useful for defining the input and output sets required for calculating $c^s(y_i^r, w_i^q)$ and $r^s(x_i^r, p_i^q)$.

Output is defined as sales in real terms. The base year for the study was 1970. Retail chains sell a large diversity of products. Some of these stores have thousands of different items on display. Therefore, this approach not only uses available information, but also simplifies the calculations. Output quantities were expressed as the average of beginning-of-the-year and end-of-the-year values. Output prices are defined as the ratio or value added (sales minus intermediate goods) over output quantities.

We identify two inputs: labor and capital. The input quantities were expressed as averages of the beginning-of-the-year and end-of-the year corresponding values, just like the output quantities. Labor was defined as the number of workers (in thousands) per year. The

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[15] The U.S. Census Bureau has published an online document called "Estimated Annual Sales of U.S. Retail and Food Services Firms by Kind of Business: 1992 Through 2009" (http://www.census.gov/retail/index.html#arts accessed on June 1st 2011). This information was used to calculate the total market share of the three largest discount retail chains in this specific sector. These calculations included the total sales of supercenters and warehouse clubs that were presented separately in the U.S. Census Bureau accounts. The results reveal that Walmart, Target and Kmart had an average market share of 76.32% from the period 1992 to 2002 and that its market share was increasing with time.

cost of labor was approximated by using the Selling General and Administrative Expenses expressed in real terms. The price of labor is the ratio of SGAE divided by the total number of employees.

Capital is defined as the capital of the previous period plus investment minus amortization expenses. The source of this variable was the accounting record "Net Property and Equipment." Amortization expenses were defined as the difference between the accumulated amortization and depreciation of two periods. Every component was expressed in 1970 prices. Capital prices are calculated as the ratio of the sum of current depreciation and amortization plus interests over the total capital.

The dataset was modified for the order-m computations. Each firm in the dataset was "merged" with Kmart. This was done to avoid the result of "non-convergence" in the integral calculations. Table 2 contains descriptive statistics prior to the transformation of the variables used in the empirical analysis.

2.5 Results:

Before discussing the results, we need to provide a detailed explanation of how these results are presented. Tables 3 and 4 show the main results of this study. In these tables we make a distinction between the different CEOs that the company had from 1972 to 2002. The revenue approach has been chosen for the Bernard Fauber period while the cost approach was selected for Robert Dewar, Joseph Antonini, Floyd Hall and Charles Conaway. We choose these approaches because we consider that they reflect the nature of Kmart's business models under these administrations better. Our conclusions are based on the information presented in section 2, in which we explain how Fauber broke with Kmart's business model and reoriented the company toward upper- and middle-class consumers.

In addition, we make a comparison between Walmart and Kmart in figure (6). This figure represents the contribution of each of the analyzed components to profit variation. The information is divided into the corresponding Kmart CEOs' tenures. We contrast Kmart with the performance of Walmart in each period. Cost approach was assumed for Walmart. The estimates for Walmart were calculated using the order-m approach as well. These tables and figures will help us to validate some of the premises that can be extracted from the analysis of Kmart's business model in section 2.2. These premises can be summarized as follows: (1) Early Kmart business model was an inspiration for the former Walmart business model; (2) Original Kmart business model had a "growth virtuous cycle" that strengthened the net

growth effect; (3) Fauber transformed Kmart's business model and oriented the firm toward differentiation leadership. Although this transformation generated additional revenue by increasing the output price effect, the performance measured in terms of profit variation was unsatisfactory; (4) Antonini tried unsuccessfully to recover the old business model by competing in prices; (5) Hall managed to rebuild some of the features of the old Kmart business model; (6) Conaway bankrupted the firm by waging a price war against Walmart.

[INSERT FIGURE 6]

Table 3 and 4 validate our hypothesis expressed in the second section regarding the "growth virtuous cycle" illustrated in figure 2. Kmart's engine of good performance was the net growth effect during Dewar's years. It had a net contribution of 272.43 million 1970 dollars[16]. The net growth effect was mainly positive, although the last three years had a decreasing influence. Dewar's administration succeeded in achieving an overall positive profit change although it continuously declined from 1974 to 1979 (see table 2). The company benefited from technological progress (cost reduction increased profits in $241.12) and the cost inefficiency was relatively modest (only -$107.96). Output prices contributed minimally to profit increase ($32.50). The main source of costs was the input prices (-$326.30). These findings are coherent with our depiction of Kmart's business model under Dewar. Nevertheless, the business bet failed to deliver an upward stream of benefits. Graphically this failure is represented in figure (7) which shows the revenue-cost ratio for the whole analyzed period. It is important to note the negative trend during the last years of Dewar's tenure. It seems plausible that a discussion about Kmart's business model followed after these disappointing results (especially in the last year of Dewar's tenure).

[INSERT FIGURE 7]

In figure (6) we make a comparison between Walmart and Kmart. It is important to note that both have a positive influence of the technological progress effect. The main difference between them is that Walmart had a negative growth effect while Kmart had a positive growth effect. A negative net growth effect is puzzling for Walmart, especially during a time when the retail chain was growing dramatically. In the case of Walmart, the negative net growth comes from the input side. The costs of expansion were greater than its benefits. We consider this an early stage of the development of Walmart's business model.

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[16] In this section all the dollar amounts are expressed in millions of 1970 dollars.

Dewar's composition of profit variation is very similar to Walmart's distribution in the following periods (compare Kmart under Dewar's administration with Walmart in later periods). One major difference between Kmart's original business model and Walmart's is the control over input prices. It might have been better for Kmart managers to focus on controlling capital and labor costs instead of reorienting the company towards leadership in differentiation.

Fauber's business choices described in section 2 can be summarized as breaking the virtuous cycle depicted in figure 2. In summary, these choices increase output prices, decrease sales volume and decrease or stop the construction of new stores. Fauber reoriented the company toward high-end merchandise in order to attract middle- and upper-class Americans as we remarked in section 2. Furthermore, Fauber explored new sources of revenue by buying businesses unrelated with discount retailing. Table 4 shows that this strategy failed to shift the course of the company. Higher output prices increased profits ($192.63) but the net growth effect became very negative (-$430.31). Technological progress did not contribute to improving the company's performance (-$10.65[17]). Revenue efficiency improved moderately ($88.23). The main shortcoming was that costs grew faster than revenues. Observe figure 3, how the revenue/cost ratio was growing until it became downward in Fauber's last years. The overall results show that Fauber did not deliver the expected U-turn, since the period of recuperation was very brief. In terms of sales, Fauber's last period was 19% higher than Dewar's last period; if the comparison is made with respect to profits, the difference is just 2.42%. Fauber invested heavily in new businesses that did not achieve the expected rate of returns and were later sold.

The contrast between Walmart and Kmart in the 1982-1986 period is clearly shown in figure (6). As we have already mentioned, Walmart's profit variation decomposition is similar to Kmart's in the previous period with the exception that it had input prices controlled and a negative output price effect. Fauber's decomposition seems to be the inversion of Dewar's. Fauber controlled input prices, but the firm reported a significantly negative net growth effect. In this period of time, the company was testing other retail formats besides discount retailing.

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[17] In theory, technological effect cannot yield a negative result. The reason is that we used a sequential technology in our analysis. This means that previous technology is available in the current period, thus technological regression is impossible. However, we used order-m approach to render our findings more robust. A collateral consequence of the use of order-m approach to calculate the cost and revenue function is that negative results using sequential technology are possible. We no longer have a deterministic frontier as would have been the case if we did not use order-m approach.

The cost of expanding into these other types of businesses was clearly higher than the benefits obtained from these ventures.

Antonini was a hybrid of Fauber and Dewar. Celebrity sponsored brands such as Martha Stewart were highlighted but the firm began to feel the pressure of competitors such as Walmart and it started to compete in prices as well. Table 3 reveals the excessive toll that had output prices on profits (-$662.99). Costs were under control in Antonini's administration. The input price change contributed to increasing profits ($102.49) as well as the improvements in cost efficiency ($329.83). The net growth effect remained negative (-$181.17) and technology progress was small ($6). Kmart's performance plunged in the last three years of Antonini's tenure. The board of directors removed Antonini while Donald Perkins assumed temporary control of the firm. The corporate documents disclose that the authorities deemed the specialty retail units to be a distraction, and decided to divest. Furthermore, they identified the supply chain as an important problem for Kmart.

Figure (6) depicts this "hybrid nature" of Antonini's business model clearly. It was operative efficient but had a negative output price effect. The net growth effect was negative but significantly smaller than the previous period. This figure implicitly presents an intense competition that is portrayed as the blue bars corresponding to the output price effect. Both companies lowered prices to attract more customers (more than in any other period). However, the impact of this measure was worse in Kmart than in Walmart. Walmart managed to offset low prices through improvements in technology and its expansion policies. On the other hand, Kmart's improvements in efficiency and input price effect did not compensate for the loss in revenues due to low prices. Figure (8) presents the Kmart-Walmart sales ratio as a decreasing curve. During Antonini's period Walmart surpassed Kmart in sales volume. It is important to note that not in any of the thirty three years did the trend reverse.

[INSERT FIGURE 8]

Floyd Hall assumed the CEO position after the brief Perkins' period. Hall completed the process of divestiture started by Perkins although the net growth effect of his tenure was positive ($155.57). Under Hall's management Kmart's efficiency levels worsened (-$28.48) and it did not experience technological progress (-$4.55). However, profits increased due to input and output prices ($155.57 and $6.8 respectively). Kmart had good results because of its efforts to control costs, and not because of its efforts to generate revenues. Nevertheless,

figure (7) shows that the policies implemented by Hall achieved the objective of changing the curse of Kmart toward good performance.

We observe similarities between Walmart and Kmart between 1995 and 2000. Both companies had positive net growth, input and output price effects and problems with the operative efficiency. It is important to remember that we are comparing two companies of different sizes. As we mentioned, by the time Floyd Hall retired from Kmart, Walmart's sales had increased five-fold. Therefore, Kmart was the follower and Walmart the leader in the industry. Hall's strategy was to recover Kmart's former niche when Walmart was the biggest retailer in the industry.

The last period was the ill-fated administration of Charles Conaway (Chuck). Kmart was making progress towards recuperation until Hall relinquished his position and Conaway assumed control of the firm. The operative efficiency and technological change increased profits by ($79.37) and ($127.68) as we expected after Kmart's investment in boosting its supply chain. The input price effect decreased profits by (-$201.50) and net growth was practically inexistent (-$0.5). The main problem was the output price effect. The decision to engage in a price war against Walmart came about as a result of the bankruptcy of the firm (-$715.85). Conaway's lack of understanding regarding the discount retail sector is probably an important factor in explaining the chain of decisions that led to Kmart's bankruptcy.

Figure (6) shows the severe consequences for Kmart of the price war against Walmart. The apparent lack of reaction from Walmart against Kmart's move is notable. This is also corroborated in figure (3). Walmart did not lower its markup; on the contrary the discount retailer chain increased it. However, Walmart did respond aggressively to Kmart's provocation[18]. Walmart's prices fell as a result of boosting its cost efficiency by pressurizing vendors to reduce their prices, minimally affecting the markup. Furthermore, Conaway reduced advertising expenditure at the same time prices were lowered. This decision might have limited the damage caused by the price war against Walmart.

In general, Kmart's lack of consistency and the negative influence of the output price effect can be categorized as two important factors in explaining the collapse. As we mentioned in the introduction, two different phenomena can cause problems in the adjustment of the business model. Firstly, the idiosyncratic organizational culture could preclude the firm

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[18] See The Economist (2002) "Blue Light Blues." January 17th; Los Angeles Times(2001) "Kmart Posts a Loss as Price War Takes Its Toll." August 24th.

from undertaking the precise adjustments to the business model. Secondly, the modification of Kmart's business model disrupted the virtuous cycles and this negatively affected the firm's performance.

In summary, our results show a firm the main shortcoming of which was the output price effect. This result can be a direct consequence of the intense competition with Walmart, especially after 1986. Moreover, the CEOs' partial adjustments failed to deliver the expected results. Before 1999, it was not predictable that Kmart was heading towards bankruptcy. The firm was losing market share but its performance was not bad enough to foresee its downfall. It is impossible to know what would have happened if the events of 2000 to 2002 had not occurred. Nevertheless, Kmart was already weak when Conaway was appointed CEO.

2.6 Conclusion

Kmart's executives noticed that the company was having difficulties in generating profits since 1979 and tried many different policies to overcome its shortcomings. The CEOs did not stand idle while the performance of the firm was eroding. Many policies were implemented to avoid the downfall. The firm tried to attract middle and upper classes, launched celebrity sponsored items, diversified its investments, modified its expansion policy, located its stores in metropolitan areas, reduced output prices, controlled costs, divested from the special retail units and in the end engaged in a price war against Walmart. Kmart implemented high power incentives and hired highly qualified personnel from outside the company. According to our results, Kmart was not a technological leader in the retail industry and this seems to be a relevant factor when compared to Walmart. Walmart was a technological innovator in the way in which it placed its stores geographically and introduced many new procedures and gadgets that improved the supply chain. Kmart trailed behind in the technological field as our results corroborate.

Kmart was not consistent in its efforts to achieve excellent performance. Every CEO switched abruptly from the policies implemented by his predecessor. Kmart changed its business model with Fauber, breaking its virtuous cycles. The company was struggling to keep a continuously increasing revenue stream and the United States was undergoing an important socio-demographical change that enticed the firm to adjust its offering. Kmart failed to achieve the expected results and timidly tried to rebuild its original business model under Antonini's administration. Hall reoriented the firm once more toward low costs and

divested from all the special retail units. In each situation, Kmart's executives chose to alter the existing business model in order to adapt the firm to current market characteristics instead of strengthening its virtuous cycles and focusing on long-term goals.

Kmart's analysis demonstrates what occurs when too much of a good practice becomes bad policy. During the reorganization of the business offering in 1994, Kmart decided to hire personnel from outside the discount retailing sector in order to bring fresh ideas to the business. After the collapse, the firm implicitly acknowledged that it hired many executives without proper retail experience. The price war against Walmart was a naïve decision that can only be rationalized by the executives' lack of understanding of the discount retailing business. Old and new employees might have distorted expectations of the future as a consequence of working for a former incumbent of the industry. As a future topic, it would be interesting to determine in terms of organizational behavior how employees view the fact that the firm where they work is no longer the market leader.

In terms of methodology, this study presents an analytical framework to assess business model performance in terms of prices, efficiency levels, technological changes and net growth effects. Managers could use this framework to evaluate the company's performance and analyze rival firms. Accounting data were collected to build our dataset; therefore it would be realistic for managers to produce a similar study for their industry. Practitioners could learn how their companies are doing in terms of efficiency, search for solutions earlier and measure how the changes in the business model are influencing the composition of profit variation.

The analytical framework would be more powerful if the company first created a business model representation of the firm. Knowing a priori what the components of the business model are provides the managers with more insight into the consequences of the decisions they have made. For example, if a firm sets the goal of being cost leader and the profit decomposition shows that the implemented policies are having a very negative effect on the revenue stream, then the executives of the firm should reconsider their initial objectives.

There are some important lessons to be learned from Kmart's case. Fauber's decision to change Kmart's business model is a misstep. After observing our empirical results, we would have recommended continuing with the original model and only focusing on lowering labor and capital costs. Walmart copied Kmart's business model but Walton emphasized the control of the overhead costs, unlike Kmart. Sometimes, when large firms face stagnation, the

corporate managers try to transform the firm's business model seeking newer sources of revenue. This requires strong commitment and sometimes painful changes. Fauber's decision could have had better results if the firm had completely reoriented its strategy and made the necessary adjustments, although Walmart proved that Dewar's strategy was far from exhausted. We think that managers should first consider intensifying the current business instead of choosing a new one. Antonini's period can be described as a clear example of "stuck-in-the-middle" status (Porter, 1980). Kmart broke a basic law in retailing: you cannot satisfy all types of customers. Kmart's last period shows the importance of picking battles wisely. We believe that Kmart was not in a position to wage a price war against Walmart in 2001. The composition of the managerial team is proven once more to be very relevant in the survival of an organization.

Our answer to the question "what made Kmart go bankrupt?" is a chain of decisions that started many years before the bankruptcy. It began with the change in the business model during Fauber's tenure; then the incomplete adjustment of Antonini made things worse and these problems were partially solved during Hall's administration. However, Hall's successor derailed the recovery process by waging a price war against Walmart. Kmart's case is an example of the failure of a conglomerate idea; it emphasizes the relevance of strategic positioning and the importance of not underestimating newcomers regardless of their size.

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2.8 Figures & Tables

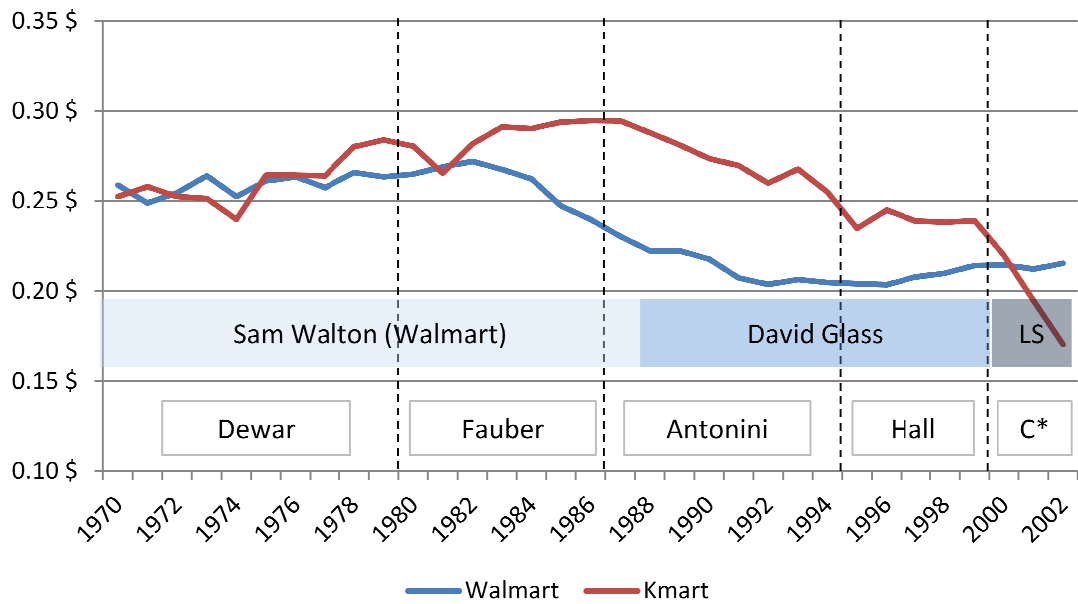### Figure 1

Kmart's Original Business Model
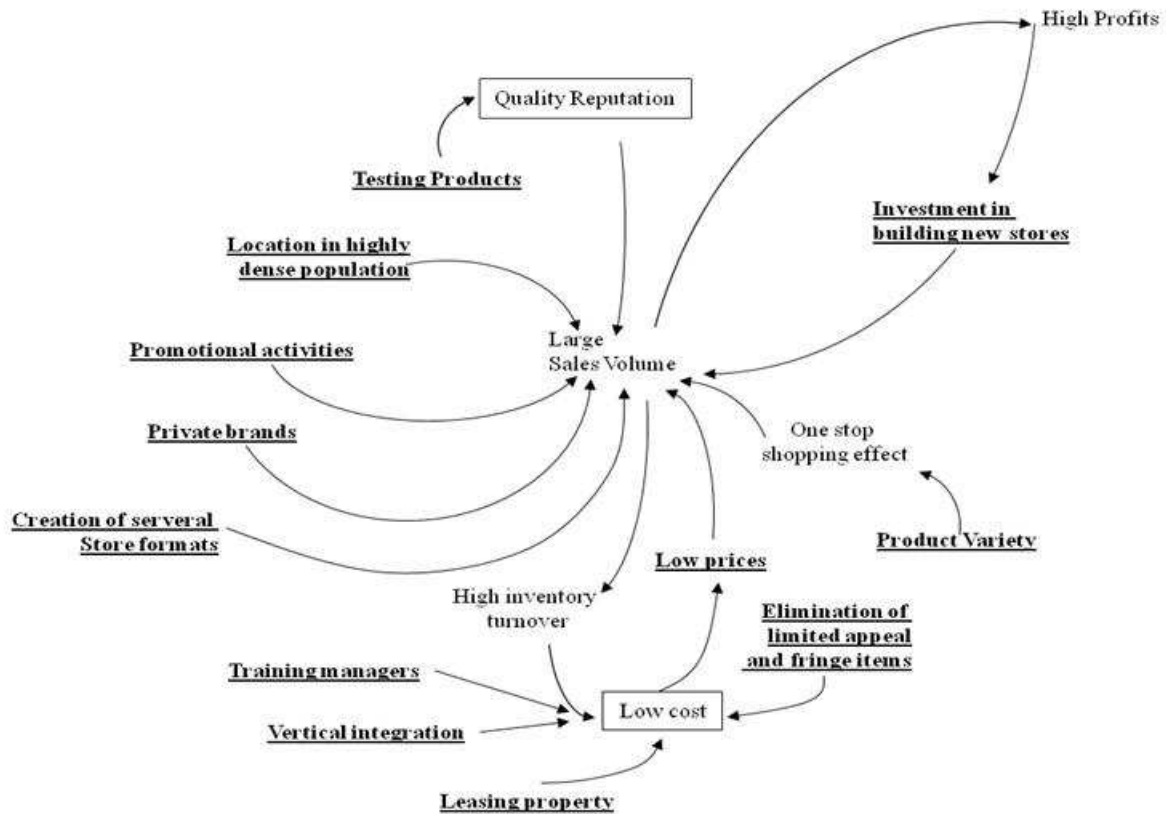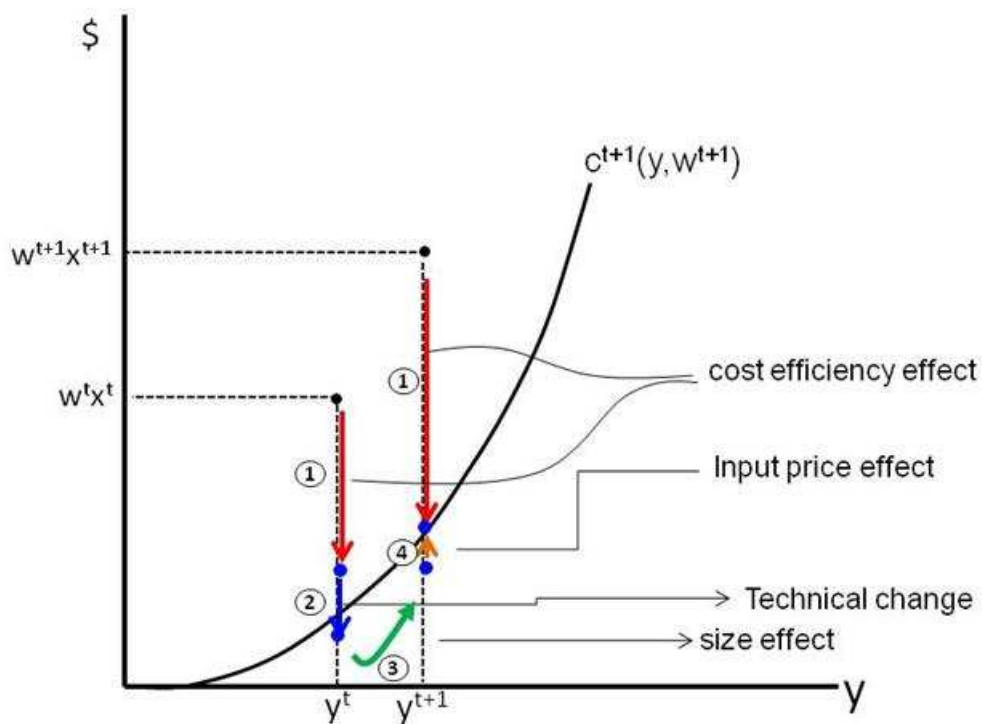

Figure 2

The Growth Virtuous Cycle
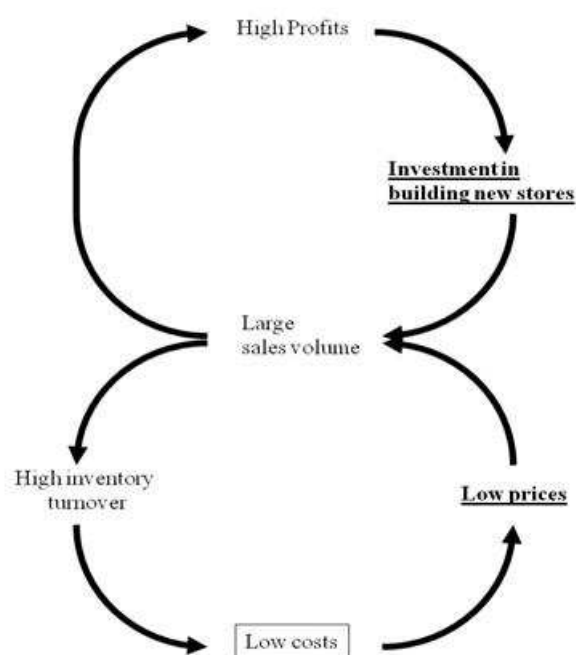
Figure 3

Markup per dollar sold Kmart vs. Walmart

C*: Conaway (Kmart) LS: Lee Scott (Walmart).

Figure 4

Cost Approach Decomposition

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Figure 5

Revenue Approach Decomposition
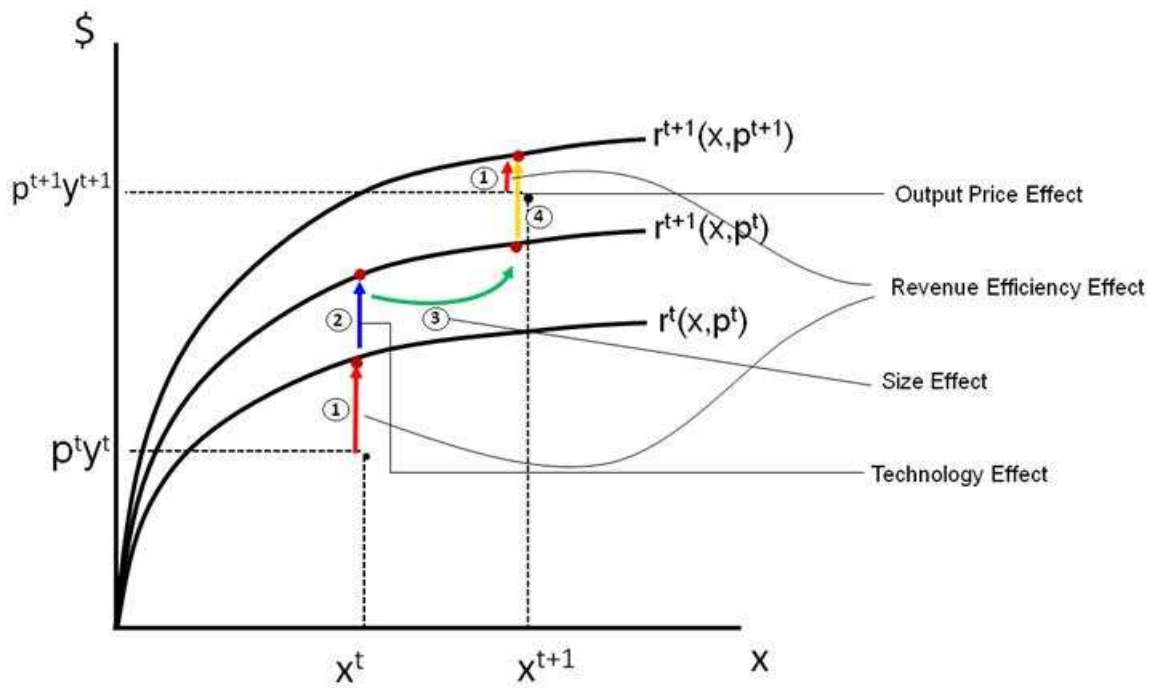
Figure 6

Profit Decomposition Walmart vs. Kmart
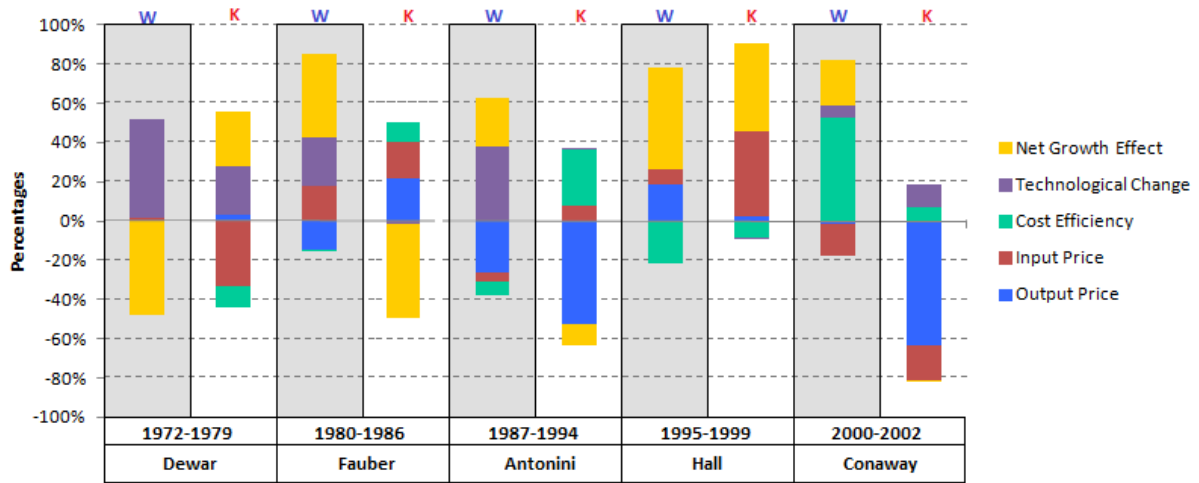
Millions of 1970 Dollars

		Variation	Output Price Effect	Input Price Effect	Net Growth Effect	Cost Efficiency	Technological Change
1972-1979	Walmart	27.45	-2.96	12.04	-388.29	0.08	406.58
	Kmart	111.79	32.50	-326.30	272.43	-107.96	241.12
1980-1986	Walmart	235.3	-49.74	58.74	141.80	-0.07	84.57
	Kmart	5.95	192.63	166.05	-430.31	88.23	-10.65
1987-1994	Walmart	548.38	-581.62	-109.04	532.31	-139.23	845.96
	Kmart	-294.03	-580.13	88.98	-119.90	310.97	6.05
1995-1999	Walmart	1058.86	350.64	146.78	973.10	-413.23	1.57
	Kmart	279.8	6.80	150.46	155.57	-28.48	-4.55
2000-2002	Walmart	665.8	-15.03	-174.04	238.57	552.45	63.85
	Kmart	-710.85	-715.90	-201.50	-0.50	79.37	127.68

Figure 7

Kmart Revenue/Cost Ratio
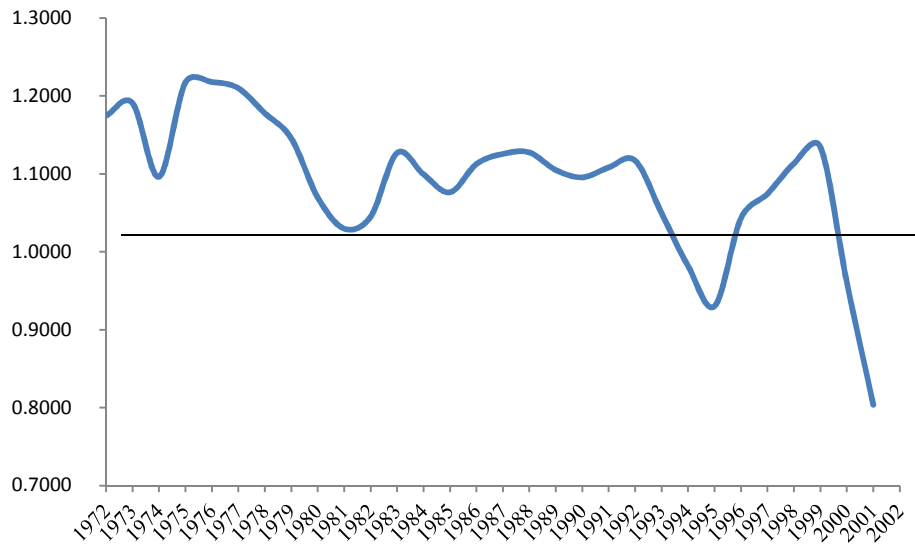
Figure 8

Kmart-Walmart Sales Ratio
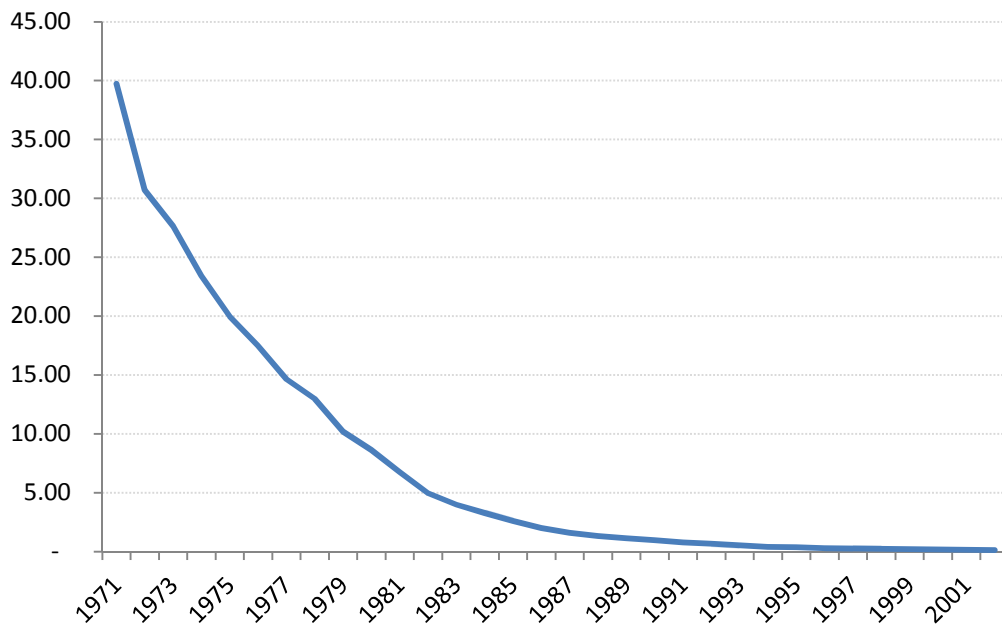
TABLE 2: KMART BUSINESS CHOICES, COMPARISON ACROSS CEOs.

	Dewar (1972-1979)	Fauber (1980-1986)	Antonini (1987-1994)	Hall (1995-1999)
Pricing and Niche	The company set low prices and tried to attract "value-conscious" consumers from all income groups.	Kmart introduced high price assortment. The target group was middle-class, homeowner, younger to middle-aged consumers.	The firm sought actively to become a leader in low prices. The objective was to attract low- and middle-income consumers.	Low price approach sustained. The target audience is low and middle income homeowner women with family.
Expansion Policy	Accelerated rate of construction of new stores. The stores were placed in metropolitan areas densely inhabited.	Significant reduction of construction rate. Stores were refurbished applying the "Fashion of the 80s" style.	$2.3 billion was set aside in 1989 to modernize Kmart's stores. Stores would have wider aisles, better lighting and a good selection of merchandise.	Kmart stores would be transformed into "Big Kmarts". This new retail format would contain more frequently purchased items. Hall closed underperforming stores. Super Kmart format was expanded.
Acquisition Policy	The company mainly acquired firms that were related with the retailer business, the only exception being PMA and Furr's Cafeteria. Licensed departments were incorporated.	Fauber created a conglomerate. Kmart started new businesses and acquired others. The majority of these businesses were not related with discount retail. Jupiter and Kresge stores were discontinued. Investment in Mexico and joint venture with a Japanese retailer.	Antonini expanded the conglomerate by acquiring firms. A large amount of resources was invested in acquiring new businesses and restructuring them and building new stores. Second failed attempt of expansion in Mexico. Kmart bought stores in Eastern Europe.	Elimination of the Special Retail Unit. The company was to focus only on discount retailing. All the international interests were sold.
Investment in Technology	The company authorities acknowledged the importance of technology for future development.	The firm invested heavily in improving its inventory management.	Kmart completed the installation of POS technology. The company centralized its operations and finished the satellite network.	Kmart created its webpage and started the internet provider bluelight.com. Computer-based training was provided.
Private Brands and Merchandise	Private brands were offered and sometimes favored over national brands.	High-quality assortment was introduced. National brands were preferred to private brands. Some items were discontinued because they did not have exceptional value. Celebrity endorsed items were introduced.	Celebrity endorsed items became a major source of revenue for Kmart. Great success with the Martha Stewart line.	Kmart continued with the celebrity endorsed lines strategy and created private brands such as KGro and American Fare.
Labor Policy	The firm was interested in training its workers well and attracting college graduates. The company was an equal opportunities employer.	Labor expenditures rose considerably during Fauber's tenure. Kmart changed its structure to accommodate its new acquisitions. The firm wanted polyvalent workers.	A cost reduction program was implemented which included actions such as modifying the work schedule and varying vacation policies.	Kmart made a great effort to reduce labor expenditures. Salary was linked to achieving the company's goals. The firm attracted talent from outside the organization.

Table 2

Descriptive Statistics

Variable		y	p	x^k	w^k	x^l	w^l
Name		Output Qty	Output Price	Capital Qty	Capital Price	Labor Qty	Labor Price
Units		Millions US$	US$	Millions US$	Millions Us$	Workers (000)	000 US$
Kmart	**Average**	7,482.90	0.2641	1,694.55	0.1254	272.33	5.99
	Min	3,265.77	0.1553	320.39	0.0796	148.61	4.90
	Max	10,142.68	0.3034	2,629.31	0.2021	394.96	7.04
	Std Dev/Avg	23.98%	12.82%	47.50%	20.60%	24.65%	9.66%
Walmart	**Average**	12,306.77	0.2610	2,699.02	0.1338	359.71	5.89
	Min	95.33	0.2122	9.74	0.0762	2.50	4.76
	Max	50,227.07	0.3096	12,150.90	0.2782	1,391.50	8.56
	Std Dev/Avg	122.78%	13.52%	134.55%	36.89%	118.93%	15.05%
Dataset	**Average**	5,945.75	0.2579	1,489.14	0.1590	195.89	6.15
	Min	95.33	0.1029	9.74	0.0439	2.50	3.25
	Max	50,227.07	0.3587	12,150.90	0.3548	1,391.50	10.67
	Std Dev/Avg	126.65%	22.42%	120.84%	56.40%	111.82%	24.90%

Number of years	30		Number of Observations	235

Table 3

Kmart's Profit Decomposition Using Cost Approach

		Variation	Output Prices	Input Price	Net Growth Effect	Productivity Effect	Cost Efficiency	Technical Change
Dewar	72-73	29.33	-27.22	-38.59	59.36	35.78	0.00	35.78
	73-74	-71.33	-75.68	0.33	-10.96	14.97	0.00	14.97
	74-75	139.72	138.24	3.50	83.75	-85.76	-85.78	0.01
	75-76	38.95	23.36	-163.82	17.51	161.91	85.78	76.13
	76-77	21.28	-35.75	-130.53	107.19	80.37	-0.00	80.37
	77-78	2.76	90.83	-142.35	20.40	33.88	-0.00	33.88
	78-79	-48.91	-81.27	145.16	-4.81	-107.99	-107.96	-0.02
	111.79	**32.50**	**-326.30**	**272.43**	**133.16**	**-107.96**	**241.12**
Antonini	86-87	36.42	-27.69	-51.94	-114.01	230.05	230.17	-0.12
	87-89	3.75	-76.76	103.40	-102.36	79.47	79.41	0.06
	88-89	-44.64	-50.26	43.46	66.81	-104.65	-104.48	-0.17
	89-90	-19.76	-74.84	5.88	6.92	42.28	42.31	-0.03
	90-91	32.46	-31.46	46.18	-100.12	117.86	126.42	-8.56
	91-92	24.45	-68.40	129.23	123.41	-159.79	-174.96	15.17
	92-93	-159.89	-74.04	-201.00	0.26	114.88	115.04	-0.16
	93-94	-166.80	-176.68	13.77	-0.81	-3.08	-2.94	-0.14
	-294.01	**-580.13**	**88.98**	**-119.9**	**317.02**	**310.97**	**6.05**
Hall	94-95	-111.84	-82.86	13.49	-61.28	18.81	18.86	-0.05
	95-96	233.17	-21.37	143.18	227.73	-116.37	-115.27	-1.10
	96-97	49.85	69.78	-42.86	-4.56	27.49	29.60	-2.11
	97-98	65.71	21.94	44.14	29.45	-29.81	-27.98	-1.83
	98-99	42.90	19.31	-7.49	-35.77	66.86	66.31	0.54
	279.79	**6.8**	**150.46**	**155.57**	**-33.02**	**-28.48**	**-4.55**
Conaway	99-00	-311.94	-203.52	-225.37	-72.52	189.47	114.15	75.31
	00-01	-301.76	-248.12	-134.46	38.60	42.22	-4.10	46.32
	01-02	-97.15	-264.26	158.33	33.42	-24.63	-30.68	6.05
	-710.85	**-715.9**	**-201.5**	**-0.5**	**207.06**	**79.37**	**127.68**

Table 4

Kmart's Profit Decomposition Using Revenue Approach, Fauber's Years

		Variation	Output Price	Input Price	Net Growth Effect	Productivity	Revenue Efficiency	Technical Change
Fauber	1979	-123.07	-19.22	84.66	-152.68	-35.83	-34.93	-0.89
	1980	-68.32	-44.74	-48.57	150.91	-125.92	-124.32	-1.60
	1981	27.86	23.20	-46.05	48.39	2.31	4.74	-2.43
	1982	155.60	217.84	-35.91	-18.20	-8.13	-5.94	-2.18
	1983	-30.74	7.60	-9.77	-100.11	71.53	73.70	-2.17
	1984	-41.22	-62.94	187.09	-261.22	95.86	96.90	-1.05
	1985	85.84	70.90	34.59	-97.41	77.75	78.08	-0.33
	5.95	**192.63**	**166.05**	**-430.31**	**77.58**	**88.23**	**-10.65**

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2.9 Appendix: Kmart's Business Model Description: 1980-2002.

Fauber's Years: The creation of a Conglomerate

Bernard M. Fauber assumed the management of Kmart on January 31st, 1980. He changed Kmart's strategy by diversifying the portfolio of the company's investments. In addition, Fauber modified Kmart's original concept by trying to appeal more to an affluent middle class. This detour from Kmart's traditional path had a heavy toll on the company's business opportunities. Too much cash was "burned" in these failed businesses while its rivals, Walmart and Target, progressed.

Instead of describing all the characteristics of the new Kmart, we will focus only on the main changes from the previous models.

Acquisitions and Discontinued Businesses

According to Kmart's documents, each potential investment project must comply with three criteria to be undertaken. First, the potential acquired company must demonstrate good performance and have a good team of managers. The second criterion was that the expected growth rate of the industry to which the potential company belongs must be higher than the expected growth rate of the whole retailing industry for the next seven to ten years. Finally, the third criterion was that the managers must accept a rapid expansion program. These criteria were the foundations for the Kmart spending spree that characterized Fauber's years. During Fauber's administration Kmart bought several businesses that had no relation with the discount retail business.

Although the acquisition of PMA could be categorized as straying off the path, the creation of the conglomerate really began with the purchase of Furr's Cafeterias in the first quarter of the 80s. This was a failed attempt to introduced Kmart to the food-away-from-home business. The price paid for Furr's was $70 million and it was not the only purchase in this sector. Bishop Buffets Inc. was acquired on December 20th, 1983 in an exchange for 760.840 shares. Furthermore, Kmart opened two experimental restaurants called "Abra K Dabra" in 1982. Abra K Dabra was never mentioned again in the company records after 1982. Kmart heavily invested in expanding the number of cafeteria units from 76 in 1980 to 161 in 1986. Nevertheless, the cafeteria business did not reach the return of investment expected. Kmart sold both entities to Calvacade Foods Inc. for $238 million in cash.

Designer Depot was the most serious attempt by Kmart to take over the high-end apparel market. The retail chain was launched in December 1982. The idea was to sell brand-name merchandise at competitive prices. In November 1983, Kmart launched a spin-off called Garment Rack, which only had very special merchandise but it was promptly discontinued. Kmart built several units of Designer Depot in the following years. The concept did not work well and three years later the company announced that it had to switch to middle range price points. In 1986, Kmart decided to discontinue this format because it was not profitable. The retail chain built 73 stores of this type. Although the discontinuation of Designer Depot and the sale of the cafeteria business provided $28 million of net earnings to Kmart in 1986, we consider that the missing opportunities hindered by these operations exceed that minimal benefit.

Designer Depot, Furr's and Bishop were not the only failed businesses undertaken by Kmart. For instance, Kmart Canada sold the freestanding shoe stores because they did not reach the return of investment requirements. Accent-of-price was another short-lived business bet inaugurated in 1983. This home-fashion store sold top-of-the line china, crystal and home accessories at competitive discount prices. It was placed in upscale neighborhoods and surrounded by similar appealing stores. After 1983, it disappeared from the company records, despite being considered earlier as a success.

Kmart also attempted to expand its businesses internationally. Kmart already had Canadian and Australian subsidiaries, when it invested in the Mexican retailer Astra S.A. The American company bought 44% of Astra's equity for $50 million dollars in 1981. In 1985, it reported $31 million in losses as a result of that acquisition. Kmart blamed the poor economic conditions of Mexico as the reason for that failed investment. The retail chain decided to divest from Astra in 1985. Kmart agreed with the Japanese retailer Daiei to form a joint venture but this agreement failed to open the doors for the big Asian market and it was later discontinued. Kmart also invested $107 million in its Australian partner, Coles Myer in 1985. This investment increased the participation in the Australian subsidiary from 20.0% to 21.2%

Another business line that was cancelled in 1985 was the insurance business. Kmart opened several insurance centers inside the stores located in Texas in an effort to diversify the range of services offered by the company. Nonetheless, KMI was modestly profitable but never fulfilled Kmart's expectations. KMI reported a net operating loss of $11 million in 1985 due to an adverse claim experience and start-up costs. The firm had to make a provision of $250 million for future losses related with Astra and KMI divestitures.

Kmart Canada Limited opened 8 Big Tops stores, which offered limited merchandise at discounted prices, in 1983. In 1985, the number of Big Tops units increased to 41. It was the same year when Kmart Canada bought Bargain Harold's Discount Limited for $16 million. We assume that all Big Tops were converted to Bargain Harold's since in 1986 the recorded number of establishments for that business was exactly the sum of the two stores.

Other businesses acquired during Fauber's tenure had better luck and were not discontinued or sold until later years. That was the case of Walden Book Company Inc. Walden Book was the largest bookstore chain in the United States when it was acquired by Kmart for $300 million dollars in cash in 1984. Kmart bought the drugstore chain Pay Less Drug Store for $509 million and Builders Square, a home improvement store, for $88.2 million in cash. These acquisitions consolidated the specialty retailing business group which, together with the general merchandise group, constituted Kmart's conglomerate.

Pricing Strategy and Product Variety

In the Annual Report of 1980 it was stated that the company replaced the aroma of popcorn with the shine of real gold at the jewelry department. This was not an understatement. Kmart changed its pricing policy and as a consequence its target consumer group. The company introduced high price assortment and emphasized national brands instead of its own private brand. Moreover, the retail chain discontinued selling products that did not have exceptional value or that did not meet a certain level of sales.

Kmart was very proud of the change and emphasized this in the company's communications. For example, in the Annual Report of 1984 it was stated that: "According to a national ongoing survey by Simmons, a leading consumer research firm, 23.3% of Kmart's customers in 1980 lived in households with incomes between $25,000 and $39,999. By the end of 1984, 28.1% of our customers have attained this income level. In fact, the proportion of our customers in this income group was higher than that represented in the total U.S. population. Even more importantly, in 1980 only 8.3% of Kmart's customers came from households with annual incomes of $40,000 or more. Today 18.9% of our customers are from households with incomes at this level." AR 1984 P. 3.

Kmart undertook several sales programs designed to emphasize name-brand merchandise and to appeal more to the affluent middle class. The name-for-less program was one of them. It was designed to attract people with a preference for designer label clothing while keeping the frequent customer of Kmart satisfied too. Another program was the Kitchen

Korner which introduced brand-name houseware into the home departments. Kmart also created several types of departments and introduced them into selected stores. These included bed and bath, nutrition and health food, wicker shops and unfinished furniture. The company expanded the book departments and upgraded stationary and greeting card departments.

Kmart executives claimed that the strategy shift was more evident in the women's apparel department. This department incorporated well-known designers' clothing at affordable prices. At the beginning the response from the public to the emphasis on fashion was good. The women's and girls' clothing department posted a 17.6% increment in sales in 1981. In later years the firm manager team would complain about the excessive competitive environment in the retail sector. The company had to implement aggressive promotional activities to overcome the price competition. This tactic affected the gross margin.

Expansion Policy

The company diminished the rate of construction of new discount stores. Instead, Kmart switched to refurbishing the stores, giving them a modern look. The idea was to change the layout and appearance of the stores in a way that emphasized the high quality merchandise inside. The modernization program was called "Fashion 80s". The layout rearrangements were usually done in one day.

Kmart created the Development Division in 1982. This new division was in charge of handling all matters involving the construction of new stores. Previously, the company hired private contractors to construct the new stores. The development division would also put the properties on sale and then lease them back. The new division had four areas: property acquisition, construction support, property marketing and property management. In 1983, 126 regional teams were involved in the accelerated effort to implement the new Kmart around the country. The company incorporated more executive staff to ensure completion of the program. In 1983 alone, two-thirds of the 400 million budgeted for capital expenditures had been spent.

Technology

Kmart began serious efforts to automate its distribution network as part of its modernization program. The first step was to develop the Kmart Information Network KIN. This network linked the stores with a central computer making it easier to accumulate information about the performance of the stores. 1,386 stores had a network connection in 1981. By 1982, the installation of the network was complete and all US Kmarts, distribution

centers, regional offices and 400 vendors were connected to the company's headquarters. However, full retail automation systems would not be achieved until 1990. During the first years of Fauber's tenure several information systems were tested.

Kmart created the Total Retail Inventory Management Program (TRIM) designed to keep Kmart's inventories at optimal levels. In 1981, Kmart tested an electronic wand used to scan hard line goods on the sales floor and in the stockroom in order to determine availability levels. The device was linked to the central headquarters and when necessary, it ordered automatic replenishment of certain items. However, the installation of point-of-sale devices was to take longer than first expected.

In 1982, Kmart decided to implement Universal Product Code (UPC) to mark all merchandise and to create an administrative unit for speeding up the installation of point-of-sale devices (POS). The aim was that all stores would have POS technology by the end of the decade. When Fauber left the CEO position, 400 stores had POS technology.

Merchandise Ordering Processing System (MOPS) was another system that linked Kmart to its suppliers. MOPS provided valuable information to the company's buyers in order to negotiate better deals with the vendors. Vendors also benefitted from this technology since the information provided enabled them to make adjustments to their offering.

Retail Automation was the name given to all the efforts made to introduce the latest technology to improve the operation of the company. As a part of this effort, in 1986 Kmart installed GTE Skystar, a private data and video communications satellite network. Besides speeding up the checkout process, POS and Skystar had the function of freeing up personnel to serve customers. This function would reduce overheads. The $50 million state-of-the art GTE Skystar satellite network would start working in 1987.

Labor Policy

Three features characterized the labor policy executed during Fauber's years. The first element is the increasing labor expenditures. Employee compensation and benefits expenditure rose by 84.3% from 1980 to 1986. The company experienced a double digit growth rate in 3 of the 7 years that Fauber was in charge. Kmart blamed the increments in minimum wages as one of the reasons for the rising labor costs. The "ripple effect" was the term used by the company's executives to describe how the increments in the minimum wage called for increments in salaries for the rest of the workers. The acquisition of new companies as well as the creation of additional managerial layers contributed with these increments as

well. Finally, the rising costs of medical and disabilities insurance also raised employees' compensation costs.

Another important element was the restructuring of Kmart's human resources in 1984. The restructuring process obeyed two criteria. First, the diversification of the company made it necessary to change the reporting relationship. Second, Kmart's attempt to increase its market share required an increasing number of managers. Despite the diversification, Kmart centralized some of its operations into one unit. That was the case of Kmart's apparel operations which were all placed under the control of Kmart Apparel Corp. The centralization of the apparel division served as an example to other centralization efforts made by the company during the following years.

The last element of Kmart's labor policy was the training process. The company trained its managing personnel to be polyvalent. The training process began in the stockroom and from there the employee moved to different parts of the company. The worker ascended to positions with more responsibility until reaching the company headquarters. Kmart wanted its managers to become generalists; experts in the whole business of retailing.

<u>Acknowledgement of competition</u>

Kmart's executives changed their mentality during the 80s and started to pay more attention to competition. Previously, competitors were not even mentioned, while during Fauber's years, competition was characterized as being very intense. In 1982, the company experienced 10 consecutive periods of sales below the levels of the corresponding period of the previous year. Although the event was blamed on the bad economic conditions in the United States, it was one of the first years that Kmart used the word competition. Kmart resorted to promotional activities to offset the competitive pressure that was eroding its bottom line. The firm was not able to fund its expansion and modernization plans only with cash obtained from operations; Kmart had to complement its internal funds with short-term borrowing.

In our opinion, Fauber's business decisions denaturalized the original Kmart concept. Being a low cost retailer and at the same time appealing to the affluent middle class is a difficult, almost impossible task. The diversification effort made by Fauber would prove to be the wrong strategy in the future. It is unfeasible to satisfy the needs of all the consumers.

Antonini's Years: A timid response to Walmart's rise.

Antonini's period can be characterized as a timid attempt to increase the level of competitiveness of the company. Kmart reorganized its organizational structure and completed the elimination of many underperforming businesses. Antonini refocused the company toward low- and middle-income customers and further developed the concept of the lifestyle department that began with Fauber and introduced private label brands backed by celebrities such as Martha Stewart.

Kmart was aware that it was under very competitive pressure. For instance Richard S. Miller, an executive vice president, predicted that many retail chains would disappear at the end of the 90s because of the intense competition in 1991.

Reorganization of the company structure

Kmart's executives realized that transforming the firm into a conglomerate of retail chains demanded a reorganization of the company structure. The company underwent many changes during the first years of Antonini's administration. Kmart reorganized its hard goods buying department into 6 buying divisions. The Central Regional Office was closed on February 1st, 1988 and the five remaining regions were realigned. The firms created a separate marketing department in 1987. In 1989, a seventh division was created to exclusively handle the Martha Stewart brand.

Price Policy

Kmart wanted to become a price leader by selling everyday low prices merchandise. The first element of this new strategy was the change to one-week ad circulars with a seven-day-duration instead of twice-a-week circulars lasting three to four days. In 1987, Kmart lowered the prices of 2,500 items to become price leaders of those items in every market. In 1988, 500 prices were lowered, and in early 1989, 3,000 items. The company acknowledged that its efforts to become a price leader had hit the bottom line.

Technology

Kmart made great efforts to install the POS technology in all its stores. 759 stores had POS technology in 1987, 1,183 in 1988, 1,739 in 1989 and in 1990 all the stores had POS devices. This technology facilitated management of the inventories, provided information about consumer purchase patterns which it translated into better forecasts, helped reduce superfluous job positions and facilitated centralization efforts.

Centralization was perceived as an important step for reducing costs. The objective was to reduce the number of layers between customers and vendors. When Antonini assumed the CEO position, very few departments were centralized like the clothing department. Hosiery, infants, camera, home electronics, small appliances and jewelry departments progressively became centralized. In 1990, the process of centralization for the hardline merchandise finished. Kmart's executives wanted at least 75% of the merchandise to be handled centrally.

One of the major headaches for Kmart's administration was the speed of the checkout process. In 1987 the firm experimented with leased phone lines and a check authorization system to expedite checkouts. The completion of the satellite network also contributed to this task by reducing the cost of transmission, especially the handling of customers' credit operations. Furthermore, the satellite network enhanced the communication between the headquarters and the stores.

Kmart created several programs and working practices to improve its performance. On-trend was the name given by Kmart executives to the process that assured having the latest merchandise delivered on time to satisfy customers' needs. CMAR (Central Merchandise Automatic Replenishment) was the program used for automatic replenishment at Kmart enabled by POS technology. The retail chain implemented inventory programs such as Quick Response and Just-in-time. Partner-in-Merchandise Flow program was the name given to the use of the latest technology to exchange information with vendors and assure Just-in-Time merchandise.

Acquisitions and Discontinued Businesses

During Antonini's term, Kmart expanded its conglomerate empire. Nevertheless, the company changed its expansion methods. Rather than initiating new business from scratch, the company shifted to purchasing already viable businesses. The shift was progressive since in the first years of his tenure, there were some startups such as American Fare, Office Square and Sports Giants that later merged with other established firms.

American Fare was Kmart's first attempt at joining the grocery business. It started in 1987 as a joint venture with Bruno Inc., a food retailer, to create hypermarkets. Kmart only built two of these hypermarkets. In 1992, Kmart decided to fully incorporate the two American Fares and transform them into Super Kmart Centers. This last retail format was

smaller than the hypermarket concept and it was the selected choice of the three big retail chains of United States, Walmart, Kmart and Target.

In March 1988, Kmart bough Makro, a warehouse club company with four stores. In November 1989 Kmart acquired PACE Membership Warehouse Inc for 326 million and consolidated the Makro operations in the first half of 1990 under the name of PACE. Kmart also bought Price Savers Wholesale Inc., an operator of warehouse clubs in the western part of the United States in 1990.

Kmart's entry into the office supply business started with the opening of two Office Square in Chicago in 1988. In the last quarter of 1990, Kmart acquired a 21.6% stake in OfficeMax Inc. a large discount office supply super store chain. Office Square stores were sold to OfficeMax in 1990. Afterwards, Kmart raised its interest in OfficeMax to 93% and paid $115 million in cash for it. In 1992, OfficeMax acquired OW Office Warehouse with 41 stores and completed the acquisition of BizMart, Inc. an operator of 105 stores. The BizMart acquisition represented an investment of $264 million.

Kmart purchased 24 OSCO Drugstores and converted them into Pay Less Drugstores in 1987. In 1991 the retail finished the acquisition of the drugstore chain OSCO with the 52 remaining stores. In July 1992, Kmart bought 124 of the Pay n' Save drugstore chain and merged them with the Pay Less Drugstore chain. On the other hand, Kmart built two Sports Giant stores in Detroit in 1989. In 1990, Kmart purchased the Sports Authority, a sportswear retailer with 8 stores, and transformed the Sports Giant stores into Sports Authority. In the bookstore business, Waldenbooks purchased 50 Coles' bookstores in 1987, and in October 1992, Kmart acquired the bookstore chain Borders. This last acquisition was made by issuing 784,938 shares of Series B convertible preferred stock in an exchange for all outstanding Borders' shares.

Internationally, Kmart purchased six stores in the Czech Republic and seven stores in Slovakia. In 1991 the company announced its intention to build Super Centers in Mexico through a joint venture with El Puerto de Liverpool S. A. CV. This was the second time Kmart tried to enter the Mexican market. The first time occurred in 1981 when Fauber was the CEO. The company had to divest from its Mexican interest in 1985.

Kmart not only acquired new businesses, but also invested heavily in building new stores, improving their operations, training and hiring new personnel. The amount of money invested in these businesses went beyond the payments for acquisition. Some stores had to be

transformed in order to be merged with other acquisitions. According to the company documents the plan was to "… acquire and create retailing businesses with growth rates above the general retailing over the next seven to 10 years." (AR 1989, p. 2.)

Kmart also closed some underperforming businesses under Antonini's administration. In 1987, eight experimental Bargain Harold's stores in upstate New York closed. The Canadian Bargain Harold was sold to Quebec Equity and Capital in October 1990. The reasoning behind this decision was the desire to invest resources in other retail activities. The disposal of Furr's Cafeterias, Bishop Cafeterias and Designer Depot was completed in 1988 and produced an after-tax gain of $28 million. Finally, Kmart completed the sale of its insurance operations in 1989 and terminated the agreement of some of its former division to provide insurance services inside Kmart stores.

Private Brands

Although the first successful private brand to be endorsed by celebrities occurred under Fauber's administration, Antonini went one step further by incorporating other celebrities into Kmart's portfolio. The idea was that customers would come to Kmart stores seeking exclusive brands endorsed by celebrities and once in the store they would satisfy other purchasing needs. Martha Stewart, a home-fashion private brand, was launched in this period. Many good categories were included under Martha Stewart Everyday brand. The company's records account that launching private lines and using celebrities as spokespeople usually took two years' preparation. Other celebrities included were Mario Andretti, the racing driver and Fuzzy Zoeller a professional golfer.

Store Modernization Program

Kmart's executives planned an aggressive store modernization program. The company predicted that it would have 2,500 establishments by 1995. The cost of the program was set to 2.3 billion dollars in 1989. This investment, according to the company records, showed the management's commitment to discount retailing. The modernization would make stores more inviting to customers by providing more space to walk, better lighting and a good selection of merchandise. In 1992, 50% of the stores had the new look.

The Super Kmart Center was a store combining a grocery store with a general merchandise store but it was smaller than a hypermarket. Kmart announced in 1992 that it would include the creation of more Super Kmart Centers in its improvement efforts. Four

super Kmart centers were in operation as of January 27th, 1993. During 1992 the two existing American Fare stores were converted into Super Kmart Centers.

Labor Policy

The accumulated rate of growth of Kmart's labor expenses was approximately 32.11% between 1987 and 1994, while sales increased by 32.77% in the same period. Kmart implemented a cost reduction program to make the company more competitive. Some of the actions included in this cost reduction program are: modification of labor scheduling and a change in vacation policies among others. The inclusion of PACE in the company's accounts also helped to reduce sales-related costs since employees who worked for this division had lower salaries.

Antonini's period had many well-conceived strategies. The company concentrated more on price-conscious consumers, invested heavily in technology, implemented a cost reduction program and introduced private brands with celebrity endorsement. The problem was its insistence on building a conglomerate of specialty stores. This insistence drew on resources that would have been necessary to stop Walmart's progress in the discount retailing sector.

Floyd Hall: The last attempt to steer the course of Kmart

Floyd Hall's period started when Antonini resigned from his CEO position in March 1995. The company reported poor results in the last two years of Antonini's tenure and lost much of its market value according to some media reports[50]. The Board of Directors led by Donald S. Perkins conducted a nationwide search for a new CEO to replace Antonini. In the meantime, the company executives undertook several major changes to boost Kmart's competitive edge.

The change began before Antonini's resignation when, in a summer review of Kmart's performance, many important transformations were decided upon. Firstly, Kmart would recruit people from other companies to bring fresh ideas to the firm. Kmart decided to divest from its specialty retail stores. Many PACE assets were sold to Walmart in 1994. PayLess was sold to an entity called Thrifty PayLess Holding Inc. although Kmart acquired a significant participation in this holding. Kmart sold its participation in Coles Myer Ltd,

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[50] "Kmart's Antonini Steps Down", Chicago Sunday Times, March 21st, 1995.

reduced its stakes in The Sports Authority and Office Max and planned an IPO over the Borders Group. The company's aircraft was sold. In addition many changes were introduced to the workers' compensation scheme. A profit sharing plan was designed to link the pension plan with the company's performance. Bonuses were offered for the accomplishment of three specific objectives on pre-tax profit, measurements of in-stock position and customer traffic.

Kmart's executives gave a precise definition of the company's target customer: "She is a middle income homemaker who often must balance both job and family. She shops at Kmart not only for the convenient price but also for the opportunity to "stock-up" on needed items. Kmart can be the store where this customer goes to buy basic consumables." (Kmart's Annual Report 1994, p.2)

Floyd Hall followed the company's new strategy. In this section we summarized the most important business decisions that occurred in this period.

Divestiture Policy

One of the measurements taken in the company's performance review of 1994 was the elimination of the Specialty Retail Store business group. Kmart reduced its stakes at OfficeMax and The Sports authority to 25% and 30% respectively in 1994. The net-tax gain from this operation was $101 million. In 1995 the remaining interests in these entities were sold and the company had an after-tax gain of $155 million. Borders Group, which included Waldenbooks, was sold in 1995. The sale was made in two parts: 87% first and the remaining 13% one month afterwards. The net loss for this operation was $185 million.

Kmart sold PayLess to Thrift PayLess Holding Inc., a company formed with capital from Thrifty Drug Store, in the first quarter of 1994 for $595 million in cash; $100 million in senior notes of TPH and 46% of the common equity of TPH. During the following years Kmart reduced its position in TPH until 1997. That year, Rite Aid bought TPH and Kmart sold the Rite Aid shares it received in exchange for its remaining stake at TPH. 93 PACE stores, almost the entire inventory and the customers' accounts were sold to Walmart in 1994 for $774 million in cash. The 34 remaining stores were closed. In November 1995, Kmart sold 860 automotive service centers at book value, receiving $50 million in cash and $34 million in interest-bearing notes. The decision to sell Builder Square was made in 1996. Builder Square was sold to Leonard Green & Partners Ltd, who also bought Hechinger, a firm in the same business sector. Hechinger declared bankruptcy in 1999, forcing Kmart to record a non-cash charge of $230 million after taxes to cover the leases of 117 former Builders

Square locations. The leases of these locations were warranted by Kmart as part of the sale agreement with Leonard Green & Partners Ltd.

In 1994, Kmart made two joint ventures with retail chains from Mexico and Singapore. It was the second time Kmart tried to enter the Mexican and Asian markets. The Singapore joint venture was discontinued in 1996. Controladora Comercial Mexicana bought the four Mexican Kmart stores for $74 million in 1997. The Czech and Slovak stores were sold in the first quarter of 1996; the net earnings for the sale were $115 million. The 21.5% stake at Coles Myer Inc., an Australian retailer, was sold for $928 million in 1994, realizing a net gain of $48 million. Finally, the Canadian subsidiary was sold for $56 million in cash and $76 in notes payable in 1997. Kmart retained 12.5% of the non-voting equity interest of its former subsidiary.

As a result of all these actions, Kmart was a lean organization with only one business line, discount retailing. Certainly, the divestiture procedure consumed a lot of effort and resources and sometimes the company reported losses from these operations. However, we consider that the main losses came from the lost opportunities that Kmart missed as a result of this "experimental conglomerate."

Change in Merchandise Mix

The company's executives reoriented the merchandise mix of the stores toward frequently purchased items. Big Mart was a prototype store developed with the intention of providing more space to habitually purchased goods. The company had 670 Big Marts operating in 1997, 1245 in 1998 and 1860 stores in 1999. The goal was to transform all the stores into Big Kmart. The transformation of Kmart Stores into Big Marts as well as the expansion of the Super Kmart Center cost $1.1 billion dollars in the three years that it lasted. In 1999, it was reported that shoppers were expending 10% more in Big Marts.

Reducing stock-outs

Kmart made reducing stock-outs one of its priorities. The company tested several ways to distribute merchandise and to better predict customer demands. The company cleared out $700 million worth of aged and discontinued merchandise in 1995, in order to make room for items in greater demand. In 1994, Kmart stores were stocked less than 90% of the time; that number increased to 96% in 1995. In 1998 it was reported that Kmart increased the flow of goods within 24 hours, from 4% to 45% of the merchandise.

Controlling costs

Hall set the goal of reducing the Selling and General Administrative Expenses as a percentage of sales. Besides the labor policies and the technology expenditures aimed at accomplishing this goal, Kmart implemented other measures such as closing underperforming stores, outsourcing certain functions, selling the company's aircraft among others.

Private Brands

Hall continued Antonini's policy of promoting private brands. Martha Stewart Everyday Bed and Bath was introduced in 1996. KGro (horticulture) and American Fare (consumables) brands were also available at that time. Other brands such as Sesame Street, White-Westinghouse and Penske Automotive were later introduced. The Martha Stewart line was the most successful of all the brands introduced. Kmart reported one billion dollars' worth of sales of Martha Stewart items in 1999.

On the other hand, Kmart's executives claimed that the company did not neglect the national brands. For instance, in 1996, the company held a conference with 280 producers in order to establish the foundations of a new "partnership" with its vendors. Recognized national brands were placed alongside exclusive private brands.

Labor Policy

Kmart changed its relationship with its workers during Hall's administration. The company made a great effort to keep the labor expenditures as low as possible. This was part of the effort to reduce the selling, general and administrative expenses. The other main change was the variation in the compensation plans to link salary payment with the achievement of some company goals.

Kmart stressed the quality of service of its stores. For that reason, interaction skills were emphasized and working hours increased. In order to assess the outcomes of these efforts, Kmart designed the program "Mystery Shopper." These mystery shoppers would visit the stores several times a year and would evaluate different aspects of service. The bonus earned by the store managers would depend on the "Mystery Shopper" assessment. Other activities in the same line were the "Pledge for Excellence" made by all Kmart employees and the reorganization of the internal structure of the company, including the reduction of the number of stores supervised by a district manager. Kmart also changed its hiring policy for

managers by attracting employees from other organizations who would bring fresh ideas to the business.

Technology

After the deployment of the POS technology in the 80s, Kmart continued to invest in technology. For example, in 1999 Kmart installed computers inside the stores offering customers a broader range of products than those available in store. The online service kmart.com was launched in May 1998. One year later, bluelight.com was created from a joint venture with Softbank Venture Capital. Bluelight.com was an internet service provider and an e-commerce website. The company documents asserted that it was a total success; within 90 days one million people had subscribed to the service. Technological investment also improved workers' skills by offering computer-based training, long-distance learning and satellite broadcast.

Floyd Hall's period symbolizes the return of Kmart to its core. The elimination of the specialty retail units, the changes in the merchandise mix, and the serious efforts to reduce costs gave Kmart a small opportunity to offset the downward trend in which it found itself. However, Hall's successor failed to continue with these good practices and the company followed an accelerated path to bankruptcy.

Charles (Chuck) Conaway: The end of Kmart

Floyd Hall retired from the CEO position in 2000. Charles (Chuck) Conaway, a former CEO of the pharmacy chain CVS, replaced him. The new CEO promised a complete turnaround of the company by August 2002. Two years later, on January 22nd, 2002 Kmart filed a voluntary petition for reorganization under chapter 11. Kmart was financially stable when Hall left his position in 2000. A chain of bad decisions had led to the failure of the company. All the details on how Kmart went down are not clear. As recent as February 10th, 2010, a federal judge ordered the ex-CEO of Kmart to pay a fine of $10 million dollars for misleading investors about the financial situation of the company.[51] In particular, Conaway was accused of not disclosing the liquidity shortage problems and the fact that the company was delaying payments to its vendors in a conference call with investors two months before the bankruptcy filing.

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[51] Fisk, Margaret C. & Raphael Steve. (2010) "Kmart's Former CEO Must Pay More Than $10 Million (Update2)." Bloomberg http://www.bloomberg.com/apps/news?pid=newsarchive&sid=abQpeMmCe47s
Published on February 25th, 2010; accessed on May 10th, 2010.

Conaway decided to engage in a price war with Walmart when he assumed the CEO position. Bluelight special, an old trick used by Kmart stores to attract customers to the stores, was the centerpiece of his strategy to gain a market share. According to Layton-Turner (2002), a bluelight special consisted of announcing promotions inside the stores at specific intervals of time. The idea was that customers would visit stores more frequently, attracted by the great discount prices offered during the promotion. Bloomberg[52] reported that Kmart spent $850 million dollars in the summer of 2001 on stocking its inventories. Kmart lowered the prices of 30,000 items and at the same time reduced its marketing expenses. This was a recipe for disaster. The Christmas season of 2001 was regarded as "disappointing" in the Annual Report of 2001. This event worsened the liquidity problem that the firm was facing and eroded the vendors' and creditors' confidence even more. In January 2002 the company had to declare bankruptcy.

When Conaway assumed the CEO position, Kmart had some chronic problems with its supply chain. The former executive explained in the company documents that the firm did not have minimal metrics for measuring performance and the company's culture was not adapted for competition. In order to change that, Conaway planned a major overhaul of the supply chain by investing $1.7 billion in equipment, software design and implementation of several projects under the "play-for-win" initiative. Some of the projects under the play-for-win initiative were already finished by 2001, such as the Electronic Merchandise Operations ELMO to reduce soft-inventory lead times, and the Blue Dot Program in order to improve the in-stock position of the company. In addition, the out-of-stock definition was changed to "missing from shelf" in order to represent what customers really experienced.

Despite all of these efforts, the decision to engage in a price war with Wal-Mart was ill-fated. Kmart tried to recover its former niche when it was too late. One of the reasons that we consider to be an explanation for such a poor judgment of reality is the fact that the managerial team had very little experience of discount retailing. In the year 2000, 31 of the 40 corporate officers were new to the company. 16 of them had only spent six months at Kmart. The original idea of bringing new ideas to the company was carried to the extreme. In a letter addressed to Kmart shareholders, the interim CEO of Kmart during the restructuration period,

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[52] ibid

James B. Adamson, stated that "We have installed a new management team consisting of seasoned executives with considerable turnaround and retail experience"[53]

On the other hand, there were many accusations about mismanagement of the resources of the company. Creditors of Kmart filed a lawsuit against six former employees including the CEO and the COO accusing them of using the resources of the company to their own benefit.[54] For instance, it was reported that Conaway billed Kmart for home improvement expenses, had two jaguars, a Lincoln Navigator and a driver. In addition, creditors also accused Conaway of having poor managerial skills and replacing senior managers at Kmart with people without experience in the field.

As we have previously mentioned, James B. Adamson assumed the position of CEO of the company after Conaway left in March of 2002. His contract stipulated that he would receive a "success payment" of 4 million dollars if Kmart was able to emerge from bankruptcy before July 31st, 2003. Mr. Adamson had the difficult task of reorganizing the company, closing stores, terminating many employees' contracts, and facing the anger and frustration of creditors and shareholders.

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[53] Adamson, B. James (2001) Kmart's Annual Report 2001, page 2.
[54] Cosgrove-Mather, Bootie (2003) "Too Many Perks at Kmart." Website: CBS, http://www.cbsnews.com/stories/2003/05/06/national/main552617.shtml Accessed: May 15th, 2010.

Expectations with Unrealistic Optimism:
An Empirical Application

Several studies claim that people have a tendency to be overoptimistic (Coelho; 2010; Lovallo & Kahnenman, 2003). Furthermore, some researchers suggest that optimism could be prevalent in managers as a result of the selection process (Heaton, 2002). Nevertheless, there is very little literature about the subject of optimism and managerial decisions (Coelho, 2010). In this study we present a frontier model of expectations with an optimistic bias based on the adaptive expectation model. In our framework, optimism is considered as a positive random term which skews expectations from a normal forecast based on rational assumptions. We model investment decision based on expectations about key variables such as sales or cash flow. We posit that managers have a skewed viewpoint of reality.

An application of the empirical model in the context of the American retail industry is provided. This paper contributes to increasing the literature about unrealistic optimism as well as applying productivity and efficiency techniques in the management field.

3.1 Introduction

Expectations are the cornerstone of the decision-making process. It is safe to claim that people usually make decisions based on their ideas about the future. Expectation formation has been the subject of analysis of a diverse array of disciplines. There are several theories that try to explain how individuals make forecasts about future events. For example, expectations can be the result of an adaptive adjustment, where predictions are based on the most recent values of a variable. Expectations can be formed just as the economic theory predicts, using all the available information. There is a wide range of different concepts about how human beings make predictions.

This study is based on the adaptive expectations model. Expectations are generated based on the most recent mistakes. We modify the original adaptive expectation model to include the possibility of a positive systematic bias and we offer a new interpretation of the stochastic frontier model inefficiency term. In this context, the inefficiency term measures optimism. Our hypothesis is based on the growing literature about the prevalence of overoptimism among decision-makers. We modeled investment decisions based on predictions about future sales in the American retail industry.

We posit that managers make systematic errors when they create their expectations about the future. Specifically, managers overestimate future performance. In statistical terms, we claim that the prediction error term has a positive mean. Overoptimistic behavior could be potentially detrimental to the company's performance. Several authors (Coelho, 2010; Hackbarth, 2008 and Heaton, 2002) have stated that the issue of optimistic bias has not been studied in depth. Coelho (2010) claims that "positive illusions create distortions which may be the most important source of efficiency loss in the economics systems, and as yet their policy implications may be ignored." On the other hand, being overoptimistic can be considered rational (Van den Steen, 2004). The explanation offered by Van den Steen (2004) is similar to the winner's curse. People tend to choose the actions that they consider more likely to happen. Although excessive optimism can be associated with underperformance, there is no direct connection. Choice-driven overoptimism does not rule out the possibility that best performers are excessively optimistic as they correct their estimates through time.[1]

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[1] In addition, overconfident managers could increase their level of confidence as they obtain more data. See Van den Steen (2011).

Our hypothesis differs from the rational expectations framework. We do not consider that on average the difference between the observation and the anticipated value is zero (Lovell, 1986). Historically, the rational expectation theory has been tested using survey information (e. g. Lovell, 1986; Levine 1993 and Benitez-Silva & Dwyer 2003). These surveys seek to "observe" people's expectations. The analysis of the survey contrasts these expectations with the actual realizations of the anticipated variables in order to verify rational expectations hypothesis. We do not have information about these expectations. Instead, our methodology is based on the assumption that managers make positive systematic biases in their predictions and tests whether or not this assumption is correct.

We use a dataset with the main discount retail chains (Walmart, Target, Kmart, Sears and May). We have two objectives: first, we want to verify that optimistic bias exists, by calculating an LR rest on whether the biased error term is equal to zero or not; the second objective is to observe what kind of companies exhibit the largest systematic biases: the successful firms (Walmart and Target) or the companies that failed or had poor performance (Kmart, Sears and May). Our methodology requires a grid search using the Maximum Likelihood Estimation (MLE). To our knowledge, this has been done using OLS (e.g. Hansen, 1999; Yélou et al. 2010) but not with MLE. This implies an additional level of difficulty.

The rest of the chapter is organized as follows: section 3.2 provides a brief literature review about the topic of excess optimism; our model is presented in section 3.3; the dataset is described in section 3.4; results are analyzed in section 3.6, and section 3.7 contains the conclusions.

3.2 Literature Review

Excess optimism or unrealistic optimism was first studied in the psychology field. In the Journal of Applied Psychology, Larwood and Whittaker (1977) published the results of several experiments aimed at demonstrating that optimistic bias exists and that it leads to overestimating organizational performance, in particular sales volume. They state that this bias is reduced if the agents have failed in their earlier forecasting experiences but it remains high despite being advised to be "realistic." Weinstein (1980) carried out a very important study on the subject of unrealistic optimism in the social science field. The author defines unrealistic optimism as the tendency to assign low probability to negative events and high probability to positive events. Weinstein (1980) lists two possible sources of unrealistic optimism. The motivational explanation describes excess optimism as the byproduct of

defensiveness or wishful thinking. On the other hand, this irrational bias could be the result of a cognitive flaw. For example, people can overlook the similarities with respect to others and assume that the likelihood of an extreme event is different from the general population (extreme probability bias). Furthermore, agents could be unfamiliar with the assessed event or have the illusion of control. Coelho (2010) claims that motivational circumstances or cognitive bias seem to be more prevalent in the managerial population.

Roll (1986) was one of the first to study unrealistic optimism with respect to investment behavior. The author analyzed why mergers and tender offers fail to deliver the expected results. Roll (1986) claims that a manager's evaluation of future acquisitions could be the result of manager's hubris, which is a presumption that his/her assessment is more accurate than the market valuation. An interesting aspect of Roll's framework is that he considered managers' valuation as a random variable the left tail of which is never observable. Managers' assessment would only be observable if the assessment is higher than the average, which is the market valuation. His insights are similar to the approach taken in this study. We model excess optimism as a positive half-tail random error.

There is increasing evidence that capital structure decisions are very sensitive to the presence of overoptimistic bias. The idea is that "irrational managers" perceive external funds as excessively expensive and prefer to use internal funds instead. Irrationality is defined as having unrealistic optimism or being overconfident[2]. Overconfidence is excessive confidence in the precision of a forecast and it is related with optimism. It has been stated that irrational managers prefer free cash flow than debt or equity (Heaton, 2002; Malmendier and Tate, 2005) and prefer debt than equity[3] (Hackbarth, 2008) if they hold an optimistic bias. Managers' distorted perception makes them overestimate the returns of their projects. Therefore, if they have access to internal funds they probably could undertake projects with a negative net present value. On the other hand, if managers lack internal funds, they may reject projects with positive net present values because they consider external funds costly.

The relationship between optimism and firm value has been characterized as non-monotonic (Hackbarth, 2008). A similar finding was obtained when overconfidence levels

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[2] Coelho (2010) states that researchers adopt different definitions for the terms overoptimism and overconfidence in literature. In this study we express overoptimism as the positive bias in the prediction of a future variable. We consider our definition to be equivalent to that of Weistein (1980).

[3] Hackbarth (2008) distinguishes between optimism and overconfidence. He found that optimistic managers prefer debt than equity but overconfident managers prefer the opposite. Overconfident managers underestimate the risk levels of a project and consider that equity is overvalued.

were analyzed (Goel and Thakor, 2008). In general, shareholders would prefer optimistic rather than rational managers. Nevertheless, for extreme values of optimism the relationship is found to be negative. The reasoning behind these findings comes from the risk averse nature of managers. Risk averse managers underinvest meanwhile managers with overconfidence or optimism select higher levels of investment which are closer to the optimal values for the shareholders. After a certain threshold the overinvestment is detrimental to the company's value. Furthermore, moderately optimistic managers could reduce principal-agent conflicts because the high debt levels constrain them to use discretionary funds (Hackbarth, 2008).

Goel and Thakor (2008) argue that the internal selection process of a company favors irrational, and in particular overconfident, managers. Internal tournaments might encourage managers to take more risks (Heaton, 2002). Since overconfidence makes the agent underestimate risks, people with this trait are more likely to be chosen than those who are rational. Therefore, "overconfidence is likely to be a more prevalent attribute than in the general population." (Goel and Thakor, 2008; p. 2739).

Besides investment decisions, unrealistic optimism and overconfidence has been studied regarding entry decisions, (Camerer and Lovallo, 2003) and search behavior (Papenhaussen , 2010). It has been found that distorted perceptions of self-skills encourage an excess of entry in competition. The effect is even larger when agents know a priori that their chances of success depend on their skill levels (reference group neglect). These findings could explain why people choose performance-based incentives more than expected. Regarding search behavior, moderately optimistic managers put more effort into searching for a solution than rational agents. However, if there is a considerable excess optimism, managers might choose to do nothing and wait for the solution to arrive. Once more, the effect of optimism seems to be non-monotonic.

Rational expectations:

According to Muth (1961), the average expectations in an industry are as accurate as elaborated equation systems. This author is the precursor of the rational expectation theory. He asserts that firms' expectations of the future are distributed similarly to what the economic theory would predict. Although firms make mistakes in their forecasts, the mean error is equal to zero. Moreover, it is also assumed that it is not a waste of information. These assumptions exclude the possibility of a systematic bias by the decision-maker since this would imply that he/she has not used all the available information to correct his/her expectations.

Some tests have been developed to validate the rational expectation theory predictions (Maddala, 2001). These tests are based on information collected through surveys. Lovell (1986) analyzes some of the empirical evidence about rational optimism. He illustrates that in some studies on forecasting inventory needs based on sales, some companies are chronically overoptimistic while others are pessimistic. However, the overestimation of the overoptimistic firms cancels out the underestimation of the pessimistic firm; thus the general picture represents a scenario with no bias. Nevertheless, at the individual level, the rational expectation theory was not corroborated. The author explains that there are two versions of rationality. Weak rationality requires the error measurement to not be correlated with past values of the forecasted variable. On the other hand, the strong rationality assumption imposes no correlation of the error term with all the information available for the decision - maker. Lovell (1986) reports, that in Hirsh and Lovell (1969), weak rationality is not satisfied. Furthermore, the author reviews other works on rationality tests in subjects such as inflation, wages, national accounts, budget, and EPA mileage. In most of these studies, the rationality hypothesis is rejected or the evidence is inconclusive.

More recently, Benitez-Silva and Dwyer (2003) studied the rational expectation hypothesis using micro-data such as retirement age, health, employment and income, among others. The results of their research do not reject the rational expectations hypothesis after controlling for measurement errors and sample selection biases. In the management field, Levine (1993) analyzes whether corporate executives hold rational expectations using survey data. The difference from previous studies is that managers paid money for participating in the study and were interested in the results. Levine (1993) argues that this characteristic answers the criticisms about testing rationality. It has been stated that participants in these surveys are not truthful and accurate in their responses. The results reject the rational expectation hypothesis. We found it interesting that managers seemed particularly optimistic. For instance, it was reported that if managers predicted 8% market growth, the market would actually grow by 2%. Another example was the price forecast; if the managers predicted a 5% increment in their output prices, in reality prices would have increased by 0.5%. Furthermore, Levine (1993) shows that managers put too much importance on the most recent observation instead of taking into account the entire history. Nonetheless, the author tests other model specifications including the adaptive expectation models. All of these specifications are rejected as well.

Finally, Van den Steen (2004) proposes that overoptimism could be considered a rational choice. Instead of relying on an unobserved mechanism to explain this behavior (such as a cognitive flaw or motivational theories), Van den Steen provides a theoretical model where agents' optimal choices make them overoptimistic. These agents choose those actions that have a higher probability of success. Nevertheless, they have different prior assumptions, thus the agent will choose those actions with an overestimated subjective probability. It is not explicit whether overoptimism will imply poorer performance or not.

Expectation Formation

The starting point of our empirical background is the adaptive expectation model. According to Begg (1982) the adaptive expectation model was introduced by Cagan (1956) and Nerlove (1958); although, Evans and Honkapohja (2001) and Maddala (2001) claim that the origin can be traced back to Fisher (1930). In simple terms, the adaptive expectation theory states that people revise their expectations based on previous forecasting mistakes (Attfield, Demery and Duck, 1991).

Attfield et al. (1991) explain that there are three advantages to the adaptive expectation model. First, the theory implies that people could have wrong expectations in the short run but not in the long run. The second "attractive feature" is that this theory can be used in different contexts such as GDP growth, unemployment rate and interest rate, among others. In this study we focus on sales forecasts. The third feature is that it relates the current expectations of a variable to the past values of this variable.

One important issue that we need to clarify is who the predictor is. The adaptive expectation model implies that expectations are formed based on the past values of the analyzed variable. Hence, if we claim that the predictor forms their sales expectations based on past values of this variable we are implicitly stating that these predictors "remember" sales values from a long time ago when they make their forecasts about the future. Nevertheless, as we will explain in the next section, the adaptive expectations model imposes geometric declining weights as the variable goes back in time. Therefore, the most recent observations are relevant in determining current expectations and very old information contributes insignificantly in the formation of these expectations as Attfield et al. (1991) pointed out.

The adaptive expectation models in macroeconomics assume that the coefficients of past information represent averages of all the agents involved in the economic process. Similarly, in our application, these coefficients correspond to the market assessment.

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Therefore if two firms have exactly the same past sales history, they would have the same forecast for future sales if there is no unrealistic optimism bias. Consequently, in our study, managers with overoptimistic bias deviate from the market prediction and this deviation is modeled by adding a positive bias error term to the market expectation.

In this chapter, we define excessive optimism as the error made by managers in the process of expectation formation. This error has a right half-tail distribution and an average close to zero. The reason justifying these conditions is the presumed characteristics of the managers identified in the previous literature. Optimism bias seems to be a prevalent attribute of managers; pessimism or rationality are not traits that shareholders promote in a managerial team. It is difficult to imagine a scenario where managers expect to perform below the industry average and remain in their positions for a long time. Even in the situation that exogenous variables such as economic or social conditions alter future expectations negatively; managers' self-confidence in their skills would make them believe that they could handle the critical condition much better than rationality would imply. Furthermore, our definition of optimism is in keeping with the "unrealistic optimism" proposed by Weinstein (1980). Positive events such as a higher sales volume would be presumed to be more likely than a low sales volume.

In the next section we will further describe the empirical model applied in this study.

3.3 Empirical background[4]

Consider the following equation:

$$y_{i,t} = a + bx^*_{i,t+1} + \varepsilon_{i,t} \qquad [1]$$

Where $y_{i,t}$ stands for firm i investment in period t[5], $x^*_{i,t+1}$ is the firm's expected sales during period $t+1$ and $\varepsilon_{i,t}$ is a zero-mean symmetric error term.

We assume that these expectations are formed using, partially or entirely, past history. Hence, we adopt a traditional Adaptive Expectation Model to model expectations and assume that:

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[4] This section is mostly inspired by Maddala's (2001) textbook.
[5] In this study we use capital as a proxy for investment. With the information we have on investment we get a correlation coefficient of 0.84. We did not use investment directly because of problems of convergence.

$$x^*_{i,t+1} = \beta_0 x_{i,t} + \beta_1 x_{i,t-1} + \beta_2 x_{i,t-2} + \cdots + \beta_k x_{i,t-k} \qquad [2]$$

This model is called *distributed lag model of expectations* since it uses a weighted average of past values of the forecasted variable to summarize the formation process of expectation implied in the data. Several naive models of expectations are nested in [2]. For instance, if we assume that $\beta_0 = 1$ and the remaining coefficients are zero, we get a model in which the expected sales will be equal to the current sales. On the other hand, if we assume that $\beta_0 = 2$, $\beta_1 = -1$ and the remaining coefficients are zero, we obtain a model in which it is expected that future sales will increase by the same quantity as the latest increase.

The model in [2] is called a *finite* distributed lag model since the number of lagged past values is finite. Koyck (1954) suggested using an infinitive lag distribution with geometrically declining weights. In this case, the deterministic relationship between expectation and past values can be written as:

$$x^*_{i,t+1} = \sum_{k=0}^{\infty} \beta_k x_{i,t-k} \qquad [3]$$

Where $\beta_k = \beta_0 \lambda^k$ and $0 < \lambda < 1$. If the sum of the infinitive series is $\beta_0 / (1 - \lambda)$ and this sum is equal to one we get:

$$x^*_{i,t+1} = \sum_{k=0}^{\infty} (1 - \lambda) \lambda^k x_{i,t-k} \qquad [4]$$

It is straightforward to get the following relationship:

$$x^*_{i,t+1} - \lambda x^*_{i,t} = (1 - \lambda) x_{i,t} \qquad [5]$$

This equation can be written equivalently as:

$$x^*_{i,t+1} - x^*_{i,t} = (1 - \lambda)\left(x_{i,t} - x^*_{i,t}\right) \qquad [6]$$

This equation says that expectations are revised based exclusively on the most recent error. For this reason the model above is called an *adaptive* expectations model. Imagine that $\lambda = 0.5$, in this case future expectation, will be the sum of the previous expectation plus 50% of the previous forecast mistake. If we lag equation [1] by one period and multiply throughout by λ, we get

$$\lambda y_{i,t} = \lambda a + \lambda b x^*_{i,t+1} + \lambda \varepsilon_{i,t} \qquad [7]$$

Subtracting equation [7] from [1], and after some straightforward manipulations, the equation to be estimated can be written as:

$$y_{i,t} = \alpha + \beta x_{i,t} + \lambda y_{i,t-1} + \left(\varepsilon_{i,t} - \lambda\varepsilon_{i,t-1}\right) \qquad [8]$$

Where $\alpha = (1 - \lambda)a$ and $\beta = (1 - \lambda)b$ are parameters to be estimated. This model cannot be estimated directly by ordinary least squares (OLS) because $y_{i,t-1}$ is correlated with an error term that is autocorrelated as well. This problem could be avoided by using the instrumental variables method as long as valid instruments for $y_{i,t-1}$ are found.[6] An alternative strategy is using an OLS estimator combined with a grid search over the λ parameter. In this case, the model is estimated in two stages. In the first stage, given a particular value of the λ parameter, the remaining parameters are estimated by OLS. The next step requires the residual sum of squares *RSS* under the estimated parameters. The value of the *RSS* is also a function of λ because the estimated parameters are functions of λ. Since λ is unknown, it must be estimated from the data set. We might choose the value of λ for which *RSS* (λ) is the minimum, that is: [7]

$$\hat{\lambda} = \arg\min_{0<\lambda<1} RSS(\lambda) \qquad [9]$$

A model of expectations with excess optimism

In the previous section we have modeled managers' expectations as a deterministic function of past values of firm sales. Two comments are in order regarding this relationship. First, as all parameters of the expectation function [4] are common to all firms in the market, two firms would receive the same prediction if they shared the same past information. Therefore, we can interpret this function as the "normal" expectation that a particular firm would receive in the market given its own past history. Second, as the adaptive expectation model is unbiased, we have implicitly assumed in the previous section that firm managers are efficient in the sense that they do not make systematic mistakes when forming their expectations. However, a scenario characterized by "excess optimism" might be possible, in the sense that managers' expectations are persistently higher than normal. This situation can be incorporated into our model by modifying the equation [4] as follows:

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[6] For instance, we can use in this framework x_{t-1} as instrument for y_{t-1}.
[7] A similar two-stage model that involves a search procedure has been used, for instance, in Hansen (2003) and Yélou *et al.* (2010).

$$x_{i,t+1}^{*} = z_{i,t+1}(\lambda) + u_{i,t}^{+} \qquad [10]$$

Where $z_{i,t+1}(\lambda) = \sum_{k=0}^{\infty}(1-\lambda)\lambda^{k}x_{i,t-k}$ denotes the deterministic relationship between expectation and past values, and $u_{i,t}^{+} \geq 0$ is a non-negative random term capturing the excess optimism. We use λ because z_{t+1} depends on this parameter. Since $u_{i,t}^{+}$ is not observed it is assumed to be random following one of the one-sided distributions traditionally used in the stochastic frontier literature, e.g. half-normal distribution.[8] A reason for $u_{i,t}^{+}$ to follow a one-sided distribution is that managers are required to make the company perform at least as well as the average performance of the industry. This requirement is even more pertinent for publicly traded companies. If a manager is perceived as unsure about their ability to perform better than the market, then the shareholders would replace the manager.

We also expect that $u_{i,t}^{+}$ is asymmetrically distributed where high levels of excess optimism are less likely because most managers in a particular market do not make decisions based on unsustainable expectations, and they are used to sticking to the normal expectations in the market.[9] This asymmetry assumption plays a critical role in our model because we precisely take advantage of the asymmetry (skewness) of the excess-of-optimism term to identify firms with unsound expectations that might go bankrupt in the future.[10]

In this context, testing that this non-negative random term exists is equivalent to testing the existence of excess optimism or upward-biased expectations. Hence, this test resembles the so-called "tests for rationality". These tests assume that both current data and

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[8] It is worth noting that in this literature an equation like (10) is equivalent to a *deterministic* frontier function because the function to be estimated ignores other determinants of expectations that are observed by firm managers, but not by researchers. This issue is addressed in the stochastic frontier literature adding a symmetric random term to equation (10), that is:

$$x_{i,t+1}^{*} = \left[z_{i,t+1}(\lambda) + v_{i,t}\right] + u_{i,t}^{+}$$

where $v_{i,t}$ is a random term capturing other determinants of expectations that is conventionally assumed to be distributed as a normal random variable with zero mean. The term in brackets is equivalent to a *stochastic* frontier function because the function to be estimated is stochastic as it takes into account unobservable factors that determine managers' expectations. It can be shown that the final equation to be estimated does not change if we use a stochastic expectation frontier function, except that the error term in this equation is actually the sum of two random terms, $\varepsilon_{i,t}$ and $v_{i,t}$, that cannot be distinguished because both are symmetrically distributed. For this reason, we will assume hereafter that there are no other determinants of expectations, except the firm-specific past values of profits or sales.

[9] Obviously, this is correct except in "bubble" situations where overall market expectations are also unsustainable.

[10] The empirical strategy to distinguish the one-sided random term from other random terms in the model when the one-sided term is also symmetrically distributed is an issue that, nowadays, is at the center of a heated debate among researchers in the stochastic production frontier area of research (see, for instance, the proposals presented in the last EWEPA conference held in Pisa).

predictions are available, and test whether predictions are unbiased *ex post*. This cannot be done in our application, as managers' expectations are not observed by researchers. We use a different approach. Our test endeavors to examine whether expectations are (upward) biased by modeling *ex ante* the existence of these potential biases in the data generating process.

The model in [10] can be considered as a frontier model where the dependent variable (i.e. firm manager's expectations) is not observed by researchers. What we do observe are the consequences of these expectations throughout the investment equation [1].

Regarding the alternative estimation strategies, it should be noted that equation [5] can be written in a scenario characterized by excess optimism such as:

$$x_{i,t+1}^* - \lambda x_{i,t}^* = (1 - \lambda)x_{i,t} + \left(u_{i,t}^+ - \lambda u_{i,t-1}^+\right) \tag{11}$$

And hence the equation (8) to be estimated takes the following form:

$$y_{i,t} = \alpha + \beta x_{i,t} + \lambda y_{i,t-1} + \tau_{i,t} + b\left(u_{i,t}^+ - \lambda u_{i,t-1}^+\right) \tag{12}$$

Where $\tau_{i,t} = \varepsilon_{i,t} - \lambda \varepsilon_{i,t-1}$ is a symmetric (but auto-correlated) random term with zero mean, the last term in [12] is the difference between two one-sided random terms, the distribution of which is not known. Wang and Ho (2010) face the same problem, though in a different context, and propose using a one-sided random term that satisfies the so-called scaling property.[11] This property allows us to get a tractable likelihood function. Indeed, let us assume that the non-negative random term capturing the excess optimism can be written as:

$$u_{i,t}^+ = g(t,\theta) \cdot u_i^+ \tag{13}$$

Where $g(t,\theta)$ is a deterministic function of time and u_i^+ is a *time-invariant* one-sided random term.[12] In this case, we can rewrite the last term in [12] as follows ignoring the parameter *b*:

$$u_{i,t}^+ - \lambda u_{ti,-1}^+ = [g(t,\theta) - \lambda g(t-1,\theta)] \cdot u_i^+ = H(t,\theta,\lambda) \cdot u_i^+ \tag{14}$$

And placing [14] in [12] we get the final equation to be estimated:

$$y_{i,t} = \alpha + \beta x_{i,t} + \lambda y_{i,t-1} + \tau_{i,t} + bH(t,\theta,\lambda) \cdot u_i^+ \qquad [15]$$

The distribution of u_i^+ is not affected by the transformation, thus the whole model can be estimated by maximum likelihood. This model is similar to that introduced by Wang and Ho (2010) except for the first-differencing transformation of the variables. While these authors used *pure* first-differences of the variables, in our application we use a *partial* first-difference since for each variable we do not subtract the total value of the lagged variable. In this sense, while Wang and Ho (2010) need to assume that the scaling function $g(\cdot)$ is not constant in order to make the likelihood tractable, our model can be estimated even when optimism is time-invariant.[13]

It is noteworthy that model [15] looks similar to the traditional panel data stochastic frontiers model, except for one characteristic. Our model is dynamic as it involves a regression of $y_{i,t}$ on $y_{i,t-1}$. This model cannot be estimated, as is customary, by using a maximum likelihood estimator (ML) because $y_{i,t-1}$ is correlated with both $\omega_{i,t}$ and u_i^+. Thus estimation of equation (15) by MLE gives us inconsistent estimates of the parameters. To avoid this endogeneity problem we might use the instrumental variable method if valid instruments for $y_{i,t-1}$ are found.

Since it is unlikely that the time path of the excess-of-optimism term is the same for all firms in the market and finding good instruments is difficult in non-linear models like equation [15], we propose an estimation two-stage method that does not require making the above transformation and involves using MLE combined with a grid search over the λ parameter. In this case, equation [1] is estimated in the distributed lag form once we place expression [10] into [1]:

$$y_{i,t} = a + b\left[z_{i,t+1}(\lambda) + u_{i,t}^+\right] + \varepsilon_{i,t} \qquad [16]$$

Since $z_{i,t+1}$ involves an infinitive series and we do not observe the infinitive past values of $x_{i,t}$, we split $z_{i,t+1}$ into two parts, one observed and the other not.

$$z_{i,t+1}(\lambda) = \sum_{k=0}^{t-1}(1-\lambda)\lambda^k x_{i,t-k} + \sum_{k=t}^{\infty}(1-\lambda)\lambda^k x_{i,t-k} = z_{i,1t}(\lambda) + c\lambda^t \qquad [17]$$

---

[13] Indeed, if we assume that $(t,\theta) \equiv g(t-1,\theta) = 1$, then $H(t,\theta,\lambda) = H(\lambda) = 1-\lambda$, and the model collapses to:

$$y_{i,t} = \alpha + \beta x_{i,t} + \lambda y_{i,t-1} + \tau_{i,t} + b(1-\lambda) \cdot u_i^+$$

This model can be estimated to identify firms with unsound expectations if $\lambda<1$.

Where

$$c = \lambda^{-t}\left[\sum_{k=t}^{\infty}(1-\lambda)\lambda^k x_{i,t-k}\right] = \sum_{j=0}^{\infty}(1-\lambda)\lambda^j x_{i,t-j} \ , \ j = k-t \qquad [18]$$

c is an unknown parameter to be estimated that can be interpreted as the expected profit for the first period. The equation to be estimated can be then written as:

$$y_{i,t} = a + b\left[z_{i,1t}(\lambda) + c\lambda^t + u_{i,t}^+\right] + \varepsilon_{i,t} \qquad [19]$$

or

$$y_{i,t} = a + bz_{i,1t}(\lambda) + c'z_{i,2t}(\lambda) + bu_{i,t}^+ + \varepsilon_{i,t} \qquad [20]$$

Where $c'=bc$ and $z_{i,2t}(\lambda)=\lambda^t$. We again use λ inside z_{1t} and z_{2t} as both depend on this parameter. It should be noted that *for a given* λ the equation [20] is a traditional stochastic frontier model with two random terms and, hence, the other parameters of the model can be estimated, as is customary, by MLE techniques.

While assuming that $\varepsilon_{i,t}$ follows a normal distribution with zero mean and conventional variance σ_ε^2, we need to choose a distribution for the asymmetric random term capturing the excess optimism, $u_{i,t}^+$, to estimate [20] by maximum likelihood. Although several simple distributions for the one-sided random term can be estimated, we choose the *half-normal* distribution for tractability reasons. The half-normal distribution, which is one of the most one-sided distributions employed in production frontier literature, is obtained from the truncation below zero of a random variable which follows a normal distribution with zero mean and variance σ_u^2. Skewness and truncation allow us to isolate the asymmetric random term capturing the excess optimism from other random shocks. The most important characteristic of the half-normal distribution is that the modal value of $u_{i,t}^+$ (i.e. the most frequent value) is close to zero, and higher values of $u_{i,t}^+$ are increasingly less likely (frequent). Therefore, the random term that captures the excess optimism is positively skewed, indicating that firms with unsustainable expectations are unusual and most of the firms have reasonable expectations about the future.

The marginal density function of $\omega_{i,t} = bu_{i,t}^+ + \varepsilon_{i,t}{}_{i,t}^+$ is given by

$$f(\omega_{i,t}) = \frac{2}{\sqrt{2\pi}\sigma}\left[1 - \Phi\left(\frac{-\rho\omega_{i,t}}{\sigma}\right)\right] \cdot exp\left\{-\frac{\omega_{i,t}^2}{2\sigma^2}\right\} = \frac{2}{\sigma}\phi\left(\frac{\omega_{i,t}}{\sigma}\right)\Phi\left(\frac{\rho\omega_{i,t}}{\sigma}\right) \qquad [21]$$

Where $\sigma^2=(b\sigma_u)^2+\sigma_\varepsilon^2$, $\rho=b\sigma_u/\sigma_\varepsilon$, $\Phi(\cdot)$ and $\phi(\cdot)$ are the standard normal cumulative distribution and density functions respectively.[14] As $\rho\to 0$ either $\sigma_u\to 0$ or $\sigma_\varepsilon\to\infty$ and the symmetric error term dominates the one-sided error component in the determination of the composed error term, $\omega_{i,t}$. In this case the stochastic frontier model collapses to the single model introduced in the previous section with just a symmetric error term that can either be estimated by OLS or MLE.

From equation [21], we can obtain the log likelihood function for a sample of N firms observed over T periods:

$$lnLF = \frac{NT}{2}\cdot\ln(2/\pi) - NT\cdot\ln(\sigma) + \sum_{i=1}^{N}\sum_{t=1}^{T}ln\left[\Phi\left(\frac{\rho\omega_{i,t}}{\sigma}\right)\right] - \frac{1}{2\sigma^2}\sum_{i=1}^{N}\sum_{t=1}^{T}\omega_{i,t}^2 \quad [22]$$

where $\omega_{i,t} = y_{i,t} - a - bz_{i,1t}(\lambda) - bc\cdot z_{i,2t}(\lambda)$. Assume that λ is known. *For a given* λ, the ML estimator of the remaining parameters is the parameter vector that solves:

$$\left(\hat{a}(\lambda),\hat{b}(\lambda),\hat{c}(\lambda),\hat{\sigma}(\lambda),\hat{\rho}(\lambda)\right) = argmax_{a,b,c,\sigma,\rho}\, lnLF(a,b,c,\sigma,\rho|\lambda) \quad [23]$$

Next we can obtain the value of the likelihood function under the estimated parameters. Note that the ML estimator of (a,b,c,σ,ρ) is a function of λ. Since the estimated parameters are functions of λ, the value of the likelihood function is also a function of λ, that is, $lnLF=lnLF(\lambda)$. Since λ is unknown, it must be estimated from the dataset. We choose the value of λ for which $LF(\lambda)$ is maximum, that is:

$$\hat{\lambda} = \arg\max_{0<\lambda<1} lnLF(\lambda) \quad (24)$$

This estimation strategy is the same as that mentioned in the previous section, except that we use MLE instead of OLS in the first-stage of the procedure. Both OLS and MLE are equivalent when the error term is made up of a single random variable; therefore, MLE or OLS yield the same parameter estimates. Since our error term in (15) is made up of two random variables and one of these variables is asymmetrically distributed, a MLE should be used. [15]

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[14] See Stevenson (1980) and Kumbhakar and Lovell (2000, p. 140). Here, we have taken into account that the asymmetric random term capturing the excess optimism is multiplied by the parameter *b* in equation (20).

[15] If $u_{i,t}^+=0$ and managers' expectations are normal, the log likelihood function to be estimated is:

$$lnLF = -\frac{NT}{2}\cdot\ln(2\pi) - NT\cdot\ln(\sigma_\varepsilon) - \frac{1}{2\sigma_\varepsilon^2}\sum_{i=1}^{N}\sum_{t=1}^{T}\epsilon_{i,t}^2$$

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3.4 Dataset Description

The dataset used in this chapter came from a diverse range of sources. Information about capital and sales was collected directly from the annual reports. Both capital and sales were expressed in billions of dollars of 1970. Capital is a constructed variable that is equal to capital of previous period minus amortizations plus investments. The variable capital assigned to each year is the average of the beginning of the year and end of the year values.

We studied five different firms (Walmart, Target, Kmart, Sears and May). Kmart declared bankruptcy in the year 2002 and merged with Sears in 2004. Therefore, we only include information about Kmart until 2002 and in the case of Sears until 2004. May acquired the company Associated Dry Goods in 1985. We decided to treat May as a different company after this event. Hence, we have six companies (Walmart, Target, Kmart, Sears, May pre-acquisition and May post-acquisition). We only have information about May until 2003.

We have collected control variables for improving the analysis such as the University of Michigan Consumer Sentiment Index and labor costs. Labor costs were calculated as general administrative expenses (SGAE) expressed in dollars of 1970 over the total number of employees. On the other hand, The Michigan index is based on 50 core questions about the general sentiment of American consumers about their personal finances, business conditions and buying conditions[16]. It was generated for the first time in 1946 and the base period is 1966[17,18]. We consider that these two variables influence capital investment decisions made by the discount chains. Tables 1 and 2 summarize the descriptive statistics for the dataset used in this chapter. It is important to note that average capital growth is similar to the average

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This is the log likelihood function of a variable that follows a normal distribution. The resulting ML parameter estimates can be equally obtained in this case by using the method of least squares. As in Yélou et al. (2010), the equation (20) can be written in a more compact form as $y = \theta Z(\lambda) + \varepsilon$, where $Z = (1, z_{i,1t}(\lambda), z_{i,2t}(\lambda))$, and $\theta = (a, b, c')$. The ordinary least squares estimator of θ (as a function of λ) is given by

$$\hat{\theta}(\lambda) = (Z(\lambda)'Z(\lambda))^{-1}(Z(\lambda)'y)$$

and the residual sum of squares is

$$RRS(\lambda) = \left(y - \hat{\theta}(\lambda)'Z(\lambda)\right)'\left(y - \hat{\theta}(\lambda)'Z(\lambda)\right)$$

λ estimate can be defined as the value of λ with the minimum residuals sum of squares, that is, $\hat{\lambda} = \arg\min_{0<\lambda<1} RSS(\lambda)$.

[16] See "Survey of Consumers" published by The Survey of Consumer, Thomspson-Reuters; University of Michigan. Webpage: http://www.sca.isr.umich.edu/main.php Accessed on July 15th 2011.
[17] Ibid.
[18] Other variables were tested, but not included in the final version of the theses due to the impossibility of reaching convergence. These variables were Housing Price Index (as a proxy for Retailing Space Price Index), and consumer credit.

growth of sales. More importantly, capital grows faster on average than the sales for every company.

3.5 Results

In this section we detail the steps that we followed to: (1) verify that OLS and MLE estimation provides the same results for the simplest scenario; (2) confirm the existence of a positive bias; (3) calculate the model with unrealistic optimism and (4) modify the original model by including additional variables that make our estimations more robust.

The first step requires the estimation of the expression [9]. The grid search over the parameter lambda is done over 396 possibilities (from lambda equals to 0.0125 to 0.9975 in increments of 0.0025). The calculations were done using sales as an independent variable and capital as a dependent variable. We performed the grid search using the OLS technique and the MLE technique like in equation [23] under the premise that $\rho \rightarrow 0$. The results are shown in figure 1. It is important to note that the residual sum of squares reaches its minimum exactly when the log likelihood function is the maximum. Lambda is equal to 0.81. Table 3 presents the results for the OLS estimation when the RSS reach the minimum and Table 4 shows the coefficients using MLE technique.

The OLS residuals allow us to perform a test on the existence of a positive u. Kumbhakar and Lovell (2000) list two types of tests where the null hypothesis is that u=0. The first test was developed by Schmidt and Lin (1984) based on the second and third moments of the OLS residuals. Nevertheless, the distribution of this test is not widely published (Kumbhakar and Lovell, 2000, p. 73). The other test was developed by Coelli (1995) and it is asymptotically normally distributed with mean zero and variance equal to one:

$$\frac{m_3}{\sqrt{6m_2^3/I}} \qquad [25]$$

Where m_3 and m_2 are the third and second moments of the OLS residuals, and I is the number of observations. For our estimation, the test yielded 16.04. This means that the residuals are positively skewed (as expected) and that u is different from zero with a 0.01% of significance. However, these tests are based on asymptotic theory (Kumbhakar and Lovell, 2000, p.73). Therefore, the test result is good, but it is not conclusive.

The next step is the calculation of equation [20] in the simplest form possible. After performing the grid search we found that the lambda that minimizes the log likelihood

function is 0.795, smaller than in the standard case. Table 3 shows the coefficients for equation [20]. In this scenario $a \approx -0.9653$; $b \approx 0.3657$ and c' ≈ 0.6293. All the coefficients were significant. This outcome implies that if the predicted sales volume increases by 1 billion, total capital would increase by 365 million approximately. The log-likelihood ratio test rejects the null hypothesis that u is equal to zero at 0.01 significance level. We call these results "model 1".

Now we can make an estimation of the level of optimism for each of the five firms. Figure 2 reflects the calculations for the simplest case. The results show higher levels for Target. Walmart, the company with the best performance in terms of sales volume, has a moderate level of optimism and Kmart has the lowest level of optimism. The value of u, which measures optimism, is very large in most of the cases and it seems to increase with time. We try to correct this by adding a trend.

The coefficients with the trend are in table 5. All of them are significant and very close to those reported in the previous regression. The trend has a positive influence on capital acquisition. Figure 3 shows that the reported optimistic levels are much more moderate although they are still high.

The final step is to include some control variables besides the trend. Equation [20] is modified as follows:

$$y_{i,t} = a + bz_{i,1t}(\lambda) + c'z_{i,2t}(\lambda) + \theta \, Trend + \theta \, \widehat{x_{1t}} + \cdots + \theta \, \widehat{x_{Rt}} + bu_{i,t}^{+} + \varepsilon_{i,t} \quad [21]$$

Where $\widehat{x_{rt}}$ is a control variable and r=$1,..., R$ represent the number of variables analyzed. We test whether control variables make a difference with respect to our findings in the simplest model. We have two additional models. The third model includes the University of Michigan Consumer Sentiment Index and the fourth model includes labor costs. Table (5) reveals that the coefficients for z1, z2 and trend are stable and significant. An increment of one billion in expected sales, increases future capital by more than 300 million. Every year capital investment increases by approximately 6 million.

The influence of consumer sentiment captured by the Michigan index is negative. This might seem paradoxical. If consumers are more confident about the future, managers choose lower capital levels. An explanation could come from the nature of the discount retailing business. Some of these businesses thrive during bad times (e.g. Basker, 2008 finds that Walmart sells "inferior goods" in the economic sense, increasing its revenues during

economic downturn). Therefore, if consumers have a negative sentiment about the future, it might be an opportunity to increase their clientele. Labor costs also have a negative effect on capital investment. It seems coherent that if labor costs per worker are increasing the company has less money to invest in capital.

The values for sigma v and u are positive. The null hypothesis of the LR test u=0 was rejected with 1% significance in the first two models and 5% and 10% in the last two models. Lambda did not fluctuate much. It was between 0.75 and 0.795. If lambda is equal to zero, then the expected volume of sales is equal to the previous one plus the bias term. Conversely, if lambda is equal to one then the expected sales volume is equal to the previous prediction plus a difference among the biases of two consecutive periods. Therefore, if lambda is close to one it means that the prediction error is not taken into consideration when expectations are formed. The outcome reveals that managers usually correct their estimations only taking into consideration 20% to 25% of the previous mistake.

Figures 3 to 5 represent graphically the optimistic levels derived from models 2 to 4. We found that the results are very similar. Target is the company with the highest level of optimism and Kmart has the lowest. Walmart and Sears have moderate levels of optimism. May's decision to acquire a new company had a negative effect on the levels of optimism reported. Before the acquisition May had the highest levels of optimism. After the acquisition, May's levels of optimism dropped substantially.

From these results, we cannot conclude that high levels of optimism are related with business failure. Kmart has the lowest levels of optimism of the five companies. With the exception of 1984, Kmart's reported levels of optimism were almost flat. Sears reported diminishing levels of optimism as its market share shrank. May's post-acquisition drop might signal an adjustment period after a merge. On the other hand, Walmart's optimism decreased with time and their reported performance levels are moderate. Target and Walmart's results support the idea that optimism is related with high performance. Nevertheless, our results are far from conclusive.

3.6 Conclusions

In this chapter we presented a new application of the stochastic frontier literature. We apply this methodology to assess the level of optimism interpreting the previous technical inefficiency as excess optimism. The stochastic frontier estimation had an additional level of

difficulty since it was dynamic which could require the use of instrumental variables. We selected an alternative approach by using a grid search over the parameter lambda.

Our results corroborate partially with our expectations. First, it has been proved that under the assumption of no bias, OLS estimation and MLE estimation yield the same results. We performed a test with the OLS residuals to verify whether or not unrealistic optimism exists and the result confirmed this assumption. We consider this a partial confirmation since the test relies on asymptotic theory. The next step was to estimate the model with the positive bias. The log likelihood test rejected the null hypothesis that the bias term was different from zero. However, when this *u* term was calculated, the outcome reveals very high levels of excess optimism. The final step was to incorporate additional control variables like a trend, the index of consumer sentiment and labor costs into the model. The outcome did not modify our previous assessment much. The new results show that in general the companies that perform poorer such as Kmart, exhibit low levels of optimism while other firms such as Walmart or Target present high levels of optimism. Our results challenge the idea of rational expectations; managers make systematic mistakes in their assessments of future performance.

3.7 References

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3.8 Figures & Tables

Figure 1

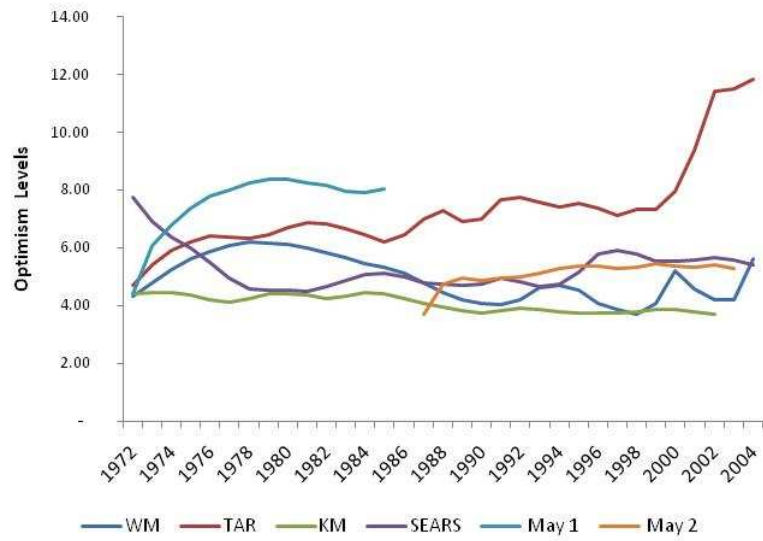### MLE & OLS Estimation First Model (Equation 9)
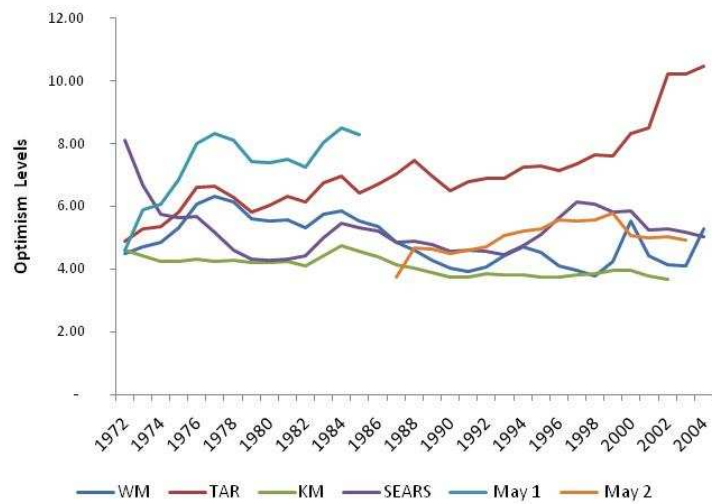
Using sales as an independent variable
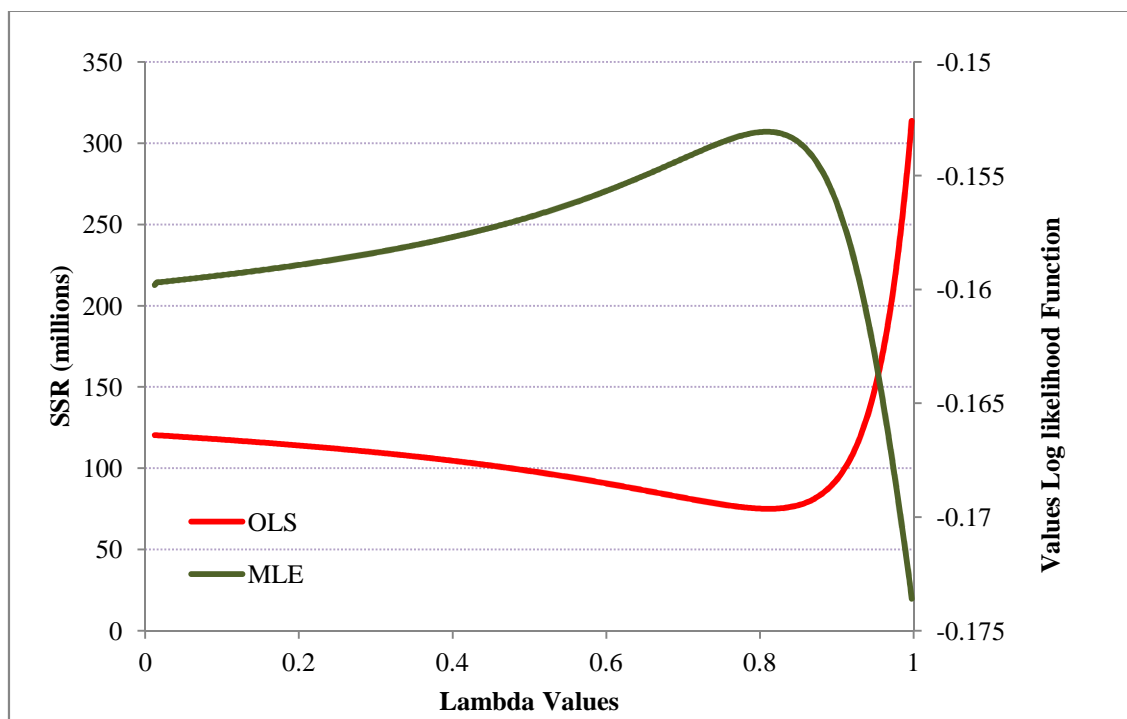
Figure 2

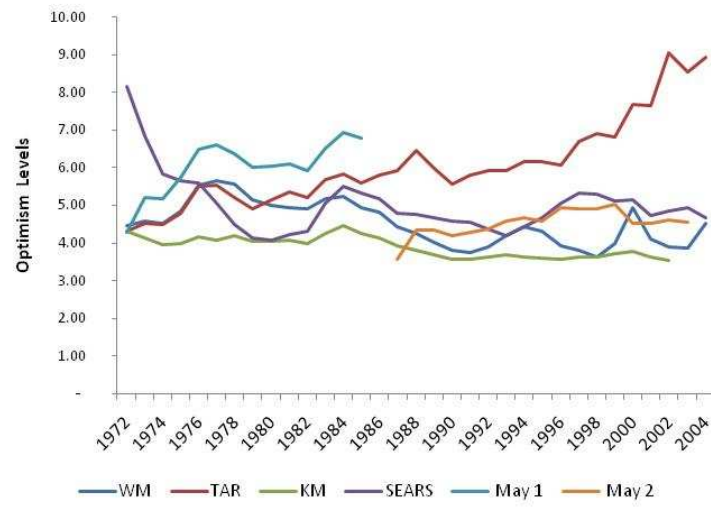### Optimism Level for the Five Selected Firms.
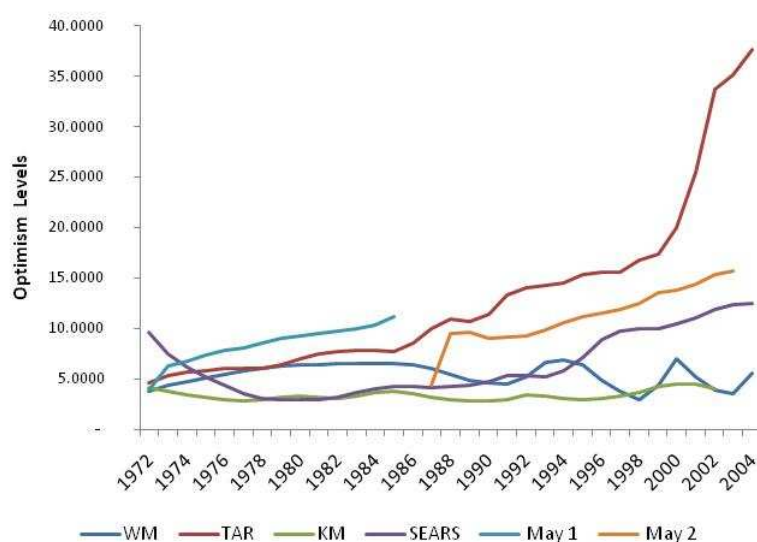
Figure 3

Model 2; Adding a Trend Variable

Figure 4

Model 3; Adding Michigan Index

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Figure 5

Model 4; Adding Labor Costs

Table 1

Description of the Variables Used in this Chapter

Variable	Source	Description
Capital	Annual reports of the studied companies. Calculated from the Balance Sheet.	Amounts expressed in billions of dollars of 1970.
Sales	Annual reports of the studied companies. Calculated from the Income statement.	Amounts expressed in billions of dollars of 1970.
Michigan Index of Consumer Sentiment	Thompson Reuters/University of Michigan http://www.sca.isr.umich.edu/main.php	It is based on a survey conducted by the University of Michigan since 1946. The survey has 50 core questions and it is conducted telephonically. 500 people are interviewed. The base period is 1966.
Labor costs	Annual reports of the studied companies.	Calculated as the ratio of selling, general and administrative expenses (SGAE) to the total number of employees.

Table 2

Descriptive Statistics

		Average	Std. Dev/Avg	Geo. Avg. Growth	# obs
Sales (Millions 1970)	Walmart	20,369.64	114%	20.17%	37
	Target	4,944.42	65%	6.70%	37
	Kmart	6,269.46	52%	2.71%	31
	Sears	7,851.81	37%	-0.86%	33
	May Pre-merge	402.83	130%	2.08%	14
	May Post-merge	997.85	111%	-1.59%	17
	Total general	**6,806.00**	**172%**	**5.99%**	**169**
		Average	Std. Dev/Avg	Geo. Avg. Growth	# obs
Capital (Millions 1970)	Walmart	5,169.54	129%	23.86%	37
	Target	2,148.15	81%	9.11%	37
	Kmart	1,419.76	68%	6.97%	31
	Sears	2,447.55	40%	2.32%	33
	May Pre-merge	235.40	134%	5.68%	14
	May Post-merge	558.57	113%	3.51%	17
	Total general	**1,996.50**	**165%**	**9.55%**	**169**
		Average	Std. Dev/Avg	Geo. Avg. Growth	# obs
Labor Costs (Thousands 1970)	Walmart	5.40	11.94%	-0.48%	37
	Target	5.04	20.66%	1.60%	37
	Kmart	5.97	10.77%	0.97%	31
	Sears	7.57	13.37%	-0.29%	33
	May Pre-merge	4.45	7.35%	-0.82%	14
	May Post-merge	4.96	7.61%	0.62%	17
	Total general	**5.73**	**22.17%**	**0.39%**	**169**
Michigan Index of Consumer Sentiment		**86.77**	**13.25%**	**-0.06%**	**169**

Table 3

OLS Estimation of the Model with No Excess Optimism

Source	SS	df	MS		# of obs	169
					F(2, 166)	2240.56
Model	2040600000	2	1020300000		Prob > F	0
Residual	75591080.9	166	455367.957		R-squared	0.9643
					Adj R-sqr	0.9638
Total	2116100000	168	12596101.5		Root MSE	674.81

Y	Coef.	Std. Err.	t	P>t		[95% Conf.	Interval]
Z	0.37	0.01	62.47	-		0.36	0.39
L	80.81	211.86	0.38	0.70	-	337.49	499.10
_cons	59.16	83.92	0.70	0.48	-	106.53	224.86

Table 4

MLE Estimation of the Model with No Excess Optimism

Lambda:	0.81			Number of obs =	169
				Wald chi2(2) =	770993.71
Log Likelihood	-153071.66			Prob > chi2 =	0

Y	Coef.	Std. Err.	z	P>z		[95% Conf.	Interval]
Z	0.37	0.00	819.48	-		0.37	0.38
L	80.81	16.15	5.00	-		49.15	112.46
_cons	59.16	6.40	9.25	-		46.62	71.70

sigma2							
_cons	2,646.66	22.15	119.50	-		2,603.25	2,690.06

Table 5

Results of Modified Version

	Constant	Z1	Z2	Trend	Michigan Index	Labor Costs	Lambda	Sigma v	Sigma u	LR Test H0: u=0
Model 1	-0.9653	0.3657	0.6293				0.7950	0.0534	1.1554	0.0000
	0.0795	0.0065	0.1848					0.0254	0.0673	
	***	***	***							***
Model 2	-1.2938	0.3155	1.1615	0.0533			0.7550	0.3342	0.7045	0.0070
	0.1198	0.0053	0.1971	0.0067				0.0614	0.1065	
	***	***	***	***						***
Model 3	-0.6690	0.3149	1.2505	0.0619	-0.0087		0.7550	0.3434	0.6720	0.0250
	0.3181	0.0053	0.2014	0.0078	0.0041			0.0666	0.1182	
	**	***	***	***	**					**
Model 4	-0.2720	0.3305	1.2435	0.0611	-0.0086	-0.0709	0.7800	0.3735	0.6046	0.0600
	0.3734	0.0055	0.2109	0.0080	0.0041	0.0329		0.0651	0.1287	
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