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STRATEGIC RESPONSES TO STRUCTURAL CHANGE IN AGRIFOOD MARKETS:
ESSAYS FROM THE FRESH PRODUCE MARKET OF SÃO PAULO BRAZIL

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STRATEGIC RESPONSES TO STRUCTURAL CHANGE IN AGRIFOOD MARKETS:

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ABSTRACT

STRATEGIC RESPONSES TO STRUCTURAL CHANGE IN AGRIFOOD MARKETS:

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By

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Agrifood markets have seen dramatic change worldwide as the result of the emergence of large international supermarket and hypermarket chains as dominant players. Increased retail concentration and new competition patterns have affected the participation and welfare of actors throughout the marketing chains. Important questions concern how different actors in agrifood chains have been affected by the rise of large retail chains, and how they have responded strategically to the competitive challenges the large retailers present. This dissertation attempts to contribute to knowledge in this area. It examines the strategic responses of diverse retailers and suppliers to the rise of large retailers as major players in the fresh produce markets of São Paulo Brazil.

Three broad research questions are addressed: 1) What gave rise to the emergence of large retail chains as major actors in Brazil, and how has the market structure changed since their emergence? 2) How have retailers responded to the competitive pressures that they have experienced since the emergence of large chains, particularly in terms of the organization and institutions governing fresh produce procurement? 3) How have growers responded to the changed conditions in the market in terms of their market channel choice and technology use?

The dissertation finds that large retail chains gained prominence in fresh produce markets due to changes in the incentives they faced as a result of economic stabilization. The large retailers' fresh produce procurement and merchandising strategies permitted them to reduce their costs and improve the quality of their merchandise. As the large retailers increased their share of the market, smaller retailers were in a position of having to respond if they were to remain competitive. Independent retailers were most proactive in changing procurement strategies to meet new market conditions, changing the organization, sources and coordination of their fresh produce procurement. Traditional retailers were less responsive, making few changes to their procurement strategies. This was likely a significant factor contributing to their decline in numbers and market share over the past decade. Shifts in retailers' competitive strategies led to changes in the structure of the market, particularly the emergence of a Supermarket Channel characterized by high quality and service requirements, as well as high returns, risk and entry requirements for suppliers. Growers participating in the supermarket channels had higher levels of human capital and used more capital-intensive technology, except in the case of tomatoes where market intermediaries played a major role in ensuring that supermarket channel quality and service requirements were met, thus facilitating the participation of growers with lesser levels of technology.

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CHAPTER 1

Introduction

Supermarkets are among the major movers in agrifood markets today. They have gone from being peripheral players just a few years ago to powerful actors today, with major shares of food retail markets in more and less-developed countries alike.

The rise of supermarkets was enabled by a number of technological and economic factors underlying supply and demand conditions in agrifood markets. On the demand side, increasing urbanization, the growing participation of women in the paid labor force, and rapid growth in real mean per capita income during the 1990s shifted consumer purchase patterns in favor of supermarkets. On the supply side, trade liberalization and reduced regulation of foreign direct investment facilitated the proliferation of the large retailers in both developing and more developed economies. Meanwhile, advances in production, communications, processing, storage and transportation technologies led to innovations in organization and coordination that reinforced scale economies. This led to consolidation at the retail level and favoring a shift in the balance of economic power from the wholesale to the retail level.

The emergence of large supermarket and hypermarket retail chains as major actors in agrifood markets has been accompanied by increased competition and consolidation. Their activities and the competition they present have had both direct and indirect impacts on structure of agrifood markets. Direct impacts include shifts in flows of agrifood products along the marketing chain from the farm to the retail outlet, Indirect impacts stem from the changes in competitive strategies enacted by other retailers who

seek to keep pace with them, as well as the shifts in production, marketing and technology choices of their suppliers.

In Brazil, the ten largest retail chains increased their share of the retail market from 24% to 37% between 1994 and 2000, and supermarkets (including both chains and independents) currently account for about 75% of food retail sales. The dissertation investigates the effects of the rise of large supermarket chains within the context of São Paulo's fresh produce markets, focusing on the strategic responses of diverse firms to the challenges the large retailers present and their responses to the structural changes that have occurred in the market. The dissertation addresses change on three levels: a structural level looking at the entire fresh produce marketing chain, the retail level, and the grower level. Three broad sets of research questions are addressed: 1) What factors gave rise to the emergence of large retail chains as major actors in Brazil, and how has the market structure changed since their emergence? 2) How have retailers responded to the competitive pressures that they have experienced since the emergence of large chains, particularly in terms of the organization and institutions governing fresh produce procurement? 3) How have growers responded to the changed conditions in the market in terms of their market channel and technology choices?

The dissertation employs two conceptual fields in its general theoretical framework. Industrial Organization's Structure Conduct & Performance (SCP) theoretical framework studies interactions between the basic market conditions, firm strategic conduct, and the market structure, and their implications for market performance. Transaction Cost Economics looks at the effects of information costs, information asymmetry and asset specificity on the governance of transactions. These are

factors underlying the basic conditions of the market that condition firms' strategic conduct, particularly with regard to their willingness to make investments and the governance of relations between suppliers and buyers.

Data was collected during a year-long field research period in São Paulo. The field research involved key informant interviews with specialists in academia, government, and industry; case studies at both the retail and grower levels, and surveys of retailers, wholesalers, and growers. In total surveys were conducted with 33 retail firms, 15 tomato wholesalers, 23 tomato growers and 33 lettuce growers. Though the research focused on issues in the fresh produce markets in general, where greater specificity was needed then focus was directed to tomato and lettuce markets. These are two of the most important fresh produce items produced and consumed in São Paulo, and their marketing chains reflect very different physical processes and information problems. Analytical methods used in the essays are case study analysis, sub-sector analysis, and statistical procedures including cluster analysis and descriptive statistics.

The dissertation is comprised of five essays. Each essay constitutes a chapter. Chapter 2's essay establishes the background and context for the ongoing changes in the market. It describes the rise of large retailers and reports survey results on trends in retailers' merchandising and procurement strategies and supplier's production and marketing strategies. Chapters 3, 4 and 5 analyze retailers' responses to the changing competitive environment following the rise of large retail chains. They focus on the institutional innovations that retailers utilize to ensure adequate supplies of produce that meets their quality and quantity needs. Chapter 3 analyzes the determinants of retailers' choices between public and private grades and standards. The chapter builds on the

existing literature on the exogenous factors affecting the emergence of public and private grades and standards regimes by proposing firm-specific characteristics that drive firms' adoption decisions. Hypotheses are addressed through a study of retailers' procurement behavior in the fresh produce market. Chapter 4 applies the Peterson, Wysocki & Harsh (PWH) theoretical framework for firms' coordination strategy decision-making to case studies of four firms' fresh produce procurement strategies. The chapter analyzes the evolution of the firms' coordination strategies and draws from the results to propose further hypotheses aimed at refining the framework. Chapter 5 narrows in on the case of Brazil's largest retailer, Companhia Brasileira de Distribuição, and presents the strategic challenges that they have faced designing and implementing their own procurement strategies. This is a teaching case where the problem decision facing CBD and relevant information to the decision is narrated and the reader is asked to recommend a course of action. Accompanying teaching notes provide insight into the conceptual issues that are relevant to the case and reveal the actual decision that was made by the firm. Chapter 6 examines the ongoing changes in the fresh produce market at the grower level. The paper uses cluster analysis and descriptive statistics to test hypotheses about the determinants of firms' market channel and technology use decisions. The dissertation concludes with a synthesis of the major results.

CHAPTER 2

Strategic Responses to Structural Change:

The Recent Evolution of the Fresh Produce Markets of São Paulo Brazil

1 Introduction

Over the past decade, Latin America's agrifood markets have undergone dramatic change. Large, internationally capitalized retail chains have become major players, capturing power from the wholesale level and a large portion of market share from other retailers. Concern among policy makers and other agents in agrifood markets has intensified, regarding what the concentration of market share among large retail chains means for competition in the market and for the welfare of diverse market actors. Evidence shows that large retail chains have significant effects on the structure and organization of agrifood supply chains both horizontally and vertically, consequently affecting the participation and welfare of diverse actors. Their activities have been linked both directly and indirectly to the marginalization and exclusion of smaller and more resource-poor actors as well as changes in market flows and price discovery (Loseby 1997; Green and Schaller 2000; Reardon, Codron et al. 2001; Farina 2002; Ghezán, Mateos et al. 2002; Rodrígues, et al. 2002; Reardon and Berdegué 2002; Dolan, Humphrey et al. nd).

These trends are manifest in Brazil, where large retailers have taken a major role in the post-Real Plan[1] economy, as evidenced by an increase in retail concentration from

[1] The Real Plan was the final of a series of financial plans instituted by the Government of Brazil that were aimed at stabilizing the economy, in particular putting an end to the hyper-inflation that had dominated the Brazilian economy for more than a decade. The Real Plan's basic approach included 1) the de-indexation of

24% to 47% between 1994 and 2000 (Farina 1999). Some optimism exists, however, over the prospects of smaller players in food retail markets, as they have made a slight resurgence in terms of both numbers and market share relative to large chains over the same period (A.C. Nielsen 2001).

This paper outlines the processes of strategic and structural change in São Paulo's fresh produce markets, in order to provide insight into questions that are relevant not only in Brazil, but throughout Latin America and the rest of the developing world. First, how have changing economic conditions shaped the evolution of the fresh produce market over the past decade? Second, how have retailers, wholesalers and growers responded to the changing economic conditions in their strategic behavior and how have these responses shaped the current market structure? Finally, what hypotheses can be drawn regarding the continued participation and roles of diverse actors in the fresh produce market in the near future?

Fresh produce provides an important and interesting case for analysis. It is a sector in which large retailers tend to lag in capturing market share—their participation is generally about two-thirds their overall participation in agrifood markets at the country level (Reardon and Berdegué 2002). Furthermore, fresh produce is considered a small farmer-friendly sector due to both its high-value for volume produced and high labor and management-intensity of production. São Paulo provides an appropriate site for research since it produces more than 25% of Brazil's fresh produce. The state is also responsible

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prices and salaries, 2) the establishment of a new currency, the *real*, and 3) liberalization and privatization of numerous government regulated or owned industries.

for more than 20% of its consumption, which is concentrated in metropolitan São Paulo, a city of more than 18 million.

The remainder of the paper is organized in three sections. In Section 2, a framework for understanding the interlinked processes of structural and strategic change in agrifood markets is presented, then applied to the evolution of São Paulo's fresh produce market from the late 1980s to the late 1990s. In Section 3, retailers' merchandising and procurement strategies, wholesaler activities, and growers' production and marketing strategies are depicted, and the current structure of the fresh produce market is described. In Section 4, hypotheses are made about the implications of these changes for diverse actors in the market and policy implications are drawn.

The paper draws heavily on existing literature on the subject (particularly work by Farina and Machado, Belik, and Chaim). Information on trends in retailers', wholesalers' and growers' strategies are drawn from a survey of 35 in metropolitan São Paulo, 15 wholesalers operating in and around São Paulo, and 55 lettuce and tomato growers in peri-urban São Paulo.

2 Conceptual Framework

The interlinked processes of strategic and structural change in markets can be conceptualized with reference to Industrial Organization's Structure-Conduct-Performance analytical framework, which examines the interaction of basic market conditions, firm conduct and market structure, and their implications for performance in the market (Caves 1987; Scherer and Ross 1990). Working in the SCP paradigm, Sutton (1992) analyzes how the endogenous and exogenous elements of sunk cost investments

interact to influence patterns of industry evolution. Following Sutton, the focus in this chapter is on how "first-moving" retailers' investment decisions and other strategic responses to changes in the basic conditions in the market affected the market structure, and the second-round investment decisions that "follower" firms made in response to these changes.

The basic conditions of the market are fixed in the short to medium term and include the institutional environment and basic conditions of supply and demand. The institutional environment includes both formal (legislative) and informal (cultural) controls in the market place that establish norms of behavior and seek to curtail opportunistic behavior. Supply and demand conditions include costs structures in production, seasonality of supply and/or demand, the distribution of income, and demand and supply elasticities. Strategic behavior reflects firms' attempts to pursue profit and utility objectives given the constraints imposed by the institutional environment and the interdependence that exists among market actors (North 1990). Strategic behavior includes investment in production facilities, research and innovation, pricing practices, non-price competition, and the organization and governance of relations with suppliers and clients. At an aggregate level, the conduct of many individual firms conditions the market structure—that is, the number of buyers and sellers in the market, the participation of different types of actors, the degree of product differentiation, cost structures, and barriers to entry. This process of basic conditions affecting firm strategies and market structure is iterative, with feedback loops catalyzing continual change in many markets. Finally, an aspect of the market of prime interest is that of market performance. Performance is a multi-faceted concept that refers to the extent to which the

market contributes to diverse valued objectives (Sosnick 1964]. Here two dimensions of performance will be addressed—price and quality. Specifically, a market performs well with respect to quality if the quality of produce that consumers seek and are willing to pay for is available to them to purchase. A market performs well with respect to prices if the prices at which produce is bought and sold approximate the marginal costs of production and the marginal benefits of their consumption (which are equal to one another in a competitive equilibrium).

Of key importance to the evolution of the fresh produce market in particular is how the characteristics of fresh produce lead to high information costs and asymmetry, increasing transaction costs and risks for market actors who have limited access to information and limited information-processing capacities. This increases interdependence between market actors, affects their strategic behaviors and consequently the organization and structure of the market. Specifically, fresh produce is a very perishable product whose quality is sensitive to handling and post-harvest treatment. Damage to fresh produce does not necessarily show up when it is inflicted, increasing the risk of a buyer unknowingly purchasing damaged produce, and making it difficult to allocate responsibility once damage is evident. Furthermore, if produce has value-added attributes that are difficult and costly to identify and preserve, then specialized marketing needs increase the cost and risk of opportunistic hold-up and coordination failures.

3 Empirical Application to São Paulo's fresh produce market

The rise of large retail chains in São Paulo follows patterns identified in other countries, both more and less developed (Loseby 1997; Green 2000; Farina 2002;

Reardon and Berdegué 2002; Dolan, Humphrey et al. nd). Briefly put, shifts in underlying supply and demand conditions affected strategic incentives in the fresh produce markets, altering retailer behavior with consequent effects for market structure. On the demand side, increasing urbanization, the growing participation of women in the paid labor force, and rapid growth in real mean per capita income during the 1990s shifted consumer purchase patterns in favor of supermarkets, especially large retail chains, over traditional retail formats. On the supply side, the proliferation of the large chains was facilitated by trade liberalization and reduced regulation of foreign direct investment, as well as advances in production, communications, processing, storage and transportation technologies, leading to innovations in organization and coordination and resulting in consolidation at the retail level. Together these factors are associated with multinational supermarket and hypermarket chains' quick rise to dominance in agrifood markets worldwide.

Three recent phases of evolution are discernable in São Paulo's fresh produce markets. Phase 1 takes place prior to economic liberalization and stabilization in the late 1980s and to the mid-1990s. This stage is associated with a weak institutional environment and a general lack of economic incentives to invest, and consequently a lack of dynamism among firms in the fresh produce market. Phase 2 is a transitional stage, begun with market liberalization and economic stabilization, which catalyzed new investments and competitive strategies on the part of some "first-moving" firms. Phase 3 is the post-stabilization phase during which the rest of the retailers make their own strategic responses to the new patterns of competition and market structure that have been

forged during Phase 2. The evolutionary phases that are described below are summarized in Table 1.

Table 1 Evolution of Basic Conditions, Firm Conduct and Market Structure

	Basic Conditions	Firm Strategic Conduct	Market Structure
Phase 1	Weak institutional environment Poor incentives to invest	No productive investment Retailers profit through playing inflation-induced "float"	Many small growers Few, concentrated wholesalers Many small retailers
Phase 2	Economic stabilization & liberalization of controls on foreign investment	"First mover" retailers Increase market share through mergers & acquisitions Seek to reduce costs and improve quality through procurement centralization and direct purchases	Increasing retail concentration Bifurcation of marketing chain
Phase 3	Changed structural conditions including Different product flows Different demand characteristics Changed cost structures	"Follower" retailers invest to reduce costs and improve quality "First-movers" seek new market niches	Diversity of retailers et Marketing chain bifurcation reinforced Horizontal and vertical market segmentation

3.1 Phase 1: The pre-liberalization, pre-stabilization market environment

Basic conditions: In the late 1980s, prior to market liberalization and economic stabilization, the functioning of the fresh produce market was heavily influenced by the general economic crisis afflicting Brazil and a weak institutional environment. Brazil's economic crisis was reflected in elevated inflation (up to 80% a month and averaging 105% per year in the late 1980s), reduced real incomes and high price sensitivity among consumers, and legislated price freezes that depressed demand and restricted opportunities for profitable investment (Chaim 1999; Helfand and de Rezende 2001; Retail Forward 2001). The institutional environment in which fresh produce trade took place was also very weak. Poor contract enforcement and low transparency due to the inadequacy of the public system of grades and standards and the lack of a market information system raised the transaction costs and risk involved in trade in fresh produce (Farina and Machado 1999).

Strategic conduct: Together, these factors contributed to a general dearth of incentives to undertake productive investment to increase efficiency, improve coordination, or reduce waste. Retailers', wholesalers' and growers' behaviors reflected this skewed incentive environment. Retailers sought to profit through financial management techniques that took advantage of the inflation-enhanced float on receipts and expenditures rather than productive investments to expand markets or reduce marketing costs (Chaim 1999; Retail Forward 2001). Fresh produce wholesalers were well entrenched in the public markets, and benefited from the information asymmetries caused by the lack of transparency (for example no clearly specified or enforced grades and standards), which left them with privileged information about supply and demand

conditions, giving them advantages in their negotiations with suppliers and buyers. This facilitated tacit collusion and oligopsonistic trade practices (Farina and Machado 1999; Zylbersztajn, Farina et al. nd). Meanwhile, growers' small scales and geographic dispersion left them dependent on wholesalers for the performance of marketing functions and with little access to information on current market conditions. The non-existence of consistently employed grades and standards meant that there was no reward for producing high quality produce, encouraging instead a focus on increasing the quantity of production regardless of quality.

Market structure: During this phase, the fresh produce market was comprised of a primary physical market channel served by a large number of geographically-dispersed small farmers; a large number of wholesalers who were based in the public2 wholesale markets and who worked in close proximity to one another and tended to specialize in the items they traded; and many small traditional retailers including open-air market vendors, corner markets, small and medium-sized supermarkets and food service firms.

Given the general lack of a quality-orientation in the market, the lack of transparency, and the concentration of power at the wholesale level, informal relations of mutual trust and obligation were key institutions facilitating fresh produce transactions. These informal relations were often based on social, ethnic, and community ties, and served as the basis of "preferred" buyer and supplier relationships which mitigated incentives to undertake opportunistic behavior (Makabe 1999; Zylbersztajn et al. nd). In the absence of such relationships, or in combination with them, firms also relied on labor-intensive procurement practices involving the inspection of individual lots of fresh produce prior to their purchase and sorting for quality afterwards.

[2] The term "public" is used here to refer to access, rather than ownership.

Market performance: At first blush, one might surmise that the fresh produce was performing very poorly during this period. This was true in some respects, but not all. Considering the performance dimensions of the quality and price of produce available to consumers, and the price at which they could purchase it, it is apparent that organoleptic quality tended to be quite low. This does not in itself indicate poor performance, however, in fact given the lack of demand for high quality produce due to the economic conditions in the country, the quality can be said to have been roughly reflective of demand in the market, which would be a positive indicator of performance. In terms of price, however, the concentration of market power at the wholesale level and the information asymmetries that they benefited resulted in both lower prices to growers than would likely have been seen in a market environment that more closely resembled "perfect competition." Likewise, it is likely that retailers and consumers also paid more than they otherwise would have.

3.2 Phase 2: Market liberalization and economic stabilization transition

Basic conditions: In the late 1980s and early 1990s, the Brazilian economy was the subject of programs of market liberalization and economic stabilization that significantly altered a number of the basic conditions underlying market structure and firm conduct (Farina 1999; Belik and dos Santos). The most fundamental change was economic stabilization that resulted from implementation of the 1994 Real Plan. Economic stabilization ended hyperinflation and opportunities for firms to profit through financial management strategies. It also increased consumers' incomes, boosting demand for fresh produce among other products. As the attractiveness of São Paulo's fresh produce market

grew for investors, trade liberalization reduced constraints to international retail participation, facilitating the entry of international investment capital and new competition.

Strategic conduct: The changes in these basic conditional variables led to rapid responses in some retailers' competitive strategies. "First-moving" retailers' adopted a mix of strategies oriented to market expansion and cost reduction. Market expansion was generally pursued through mergers and acquisitions (de Oliveira e Silva 1999) and entry into emerging markets for high-value products. Between 1997 and 1999, the five largest supermarket chains in Brazil absorbed 17 other supermarket chains (Chaim 1999 p34). Meanwhile, economic stabilization led to growth in consumer purchasing power across all income strata, and increased demand for produce with a wide range of attributes, such as convenience, perceived healthfulness, and better organoleptic quality. Markets for "specialty" product lines like organic, fresh-processed, hydroponic, and pre-packaged produce emerged.

As mergers and acquisitions led to increases in the volume of fresh produce traded by individual firms, "first movers" capitalized on their large scale and scopes (volume-wise, product-wise, and geographic) to implement innovative procurement systems that enabled them to reduce costs and improve the variety, quality, and consistency of the products and services offered. They constructed centralized facilities for fresh produce procurement, shifted procurement away from the public wholesale markets towards direct purchases from production regions and instituted more formal governance of relationships with suppliers (Farina and Machado 1999). These investments, though

involving high startup costs, allowed firms to reduce the marginal search costs of produce acquisition as volumes of throughput grew.

Market structure: Following the strategic moves of the dominant retailers, the fresh produce market structure shifted to reflect 1) increased concentration at the retail level, 2) changed cost structures, and 3) a bifurcation of the marketing chain. Each of these shifts in discussed below.

1) Increased retail concentration: While yearly data on concentration in fresh produce markets is not available, figures on concentration in retail food markets provide a good indication for fresh produce markets. Between 1995 and 1998, the share of supermarket and hypermarket chains in retail markets (food and non-food) increased from 44.4% to 46.6% (A.C. Nielsen 2001), and supermarkets currently account for 75% of retail food sales in Brazil (Farina 2002 p3). These figures are expected to be lower in markets for perishable foods like fresh produce due to the tendency for smaller stores to specialize in their provision and the persistence of consumers' traditional purchase patterns for such products.

2) Changed cost structures: Among the largest chains, the investment in centralized purchase and distribution facilities has four major implications for cost structures of fresh produce procurement. First, they permit the retailer to integrate the wholesale function, allowing direct purchases from growing areas, cutting out the wholesale stage of the marketing chain. Second, the integration of the wholesale function enables cost savings through economies of scale and scope, facilitating chains' purchase of large lots of

produce for redistribution to individual stores and providing cost savings of up to 30% (Belik 2000 p152). Third, they are crucial to the establishment of more advanced logistical systems such as mechanization of loading and unloading, palletization of shipments and information-intensive logistical procedures such as Electronic Data Interchange and continual replenishment. Fourth, their establishment presents a barrier to entry in the market, both because of the large fixed costs of establishing the physical infrastructure, and because they have a minimum efficient scale of operation (estimated at 2000 tons per month (de Souza et al. nd)).

3) Bifurcation of the marketing chain: The concentration of buying power among large retailers and their tendency to buy direct from the growing areas led to shifts in the structure of the marketing chain that supplies these retailers. Initially, the marketing chain consisted of a single predominant channel (referred to here as the "traditional marketing chain") along which produce moved from growing regions through the public wholesale markets to retailers. With shifts in large retailers' procurement practices, there was a bifurcation of the marketing chain to also include a series of private supply channels that moved produce from the growing area to private distribution centers and then to individual retail outlets.

Market performance: In the move from the first to the second phase, the shifts in the basic conditions, consequent strategic responses and resulting structural changes in the market led to improvements in market performance. Specifically, increases in demand for quality produce were matched by efforts to provide the quality and varieties of

produce sought due to higher levels of competition in the market. This was accompanied by price reductions for consumers due to increases in the efficiency along the marketing chain. Furthermore, growers not only saw new opportunities for production (to respond to demand for new products), but the shift away from reliance on the traditional wholesale market also provided them with alternative avenues to market their produce that circumvented the traditional wholesale market.

3.3 Phase 3: Post-stabilization

Basic conditions: Changes to the basic conditions in the market in the third phase were a direct result of the market restructuring that resulted from the "first movers'" strategic actions in the prior stage. This market restructuring presented new challenges to the "follower" or "non-dominant" retailers in the market, inducing shifts in their own strategic behavior in the third phase.

Strategic conduct: Four types of retailers currently operate in the market (definitions of these are also given for reference in a Glossary in Appendix A)3. The "first-moving" retailers of the second phase of evolution became the "dominant" retailers of today. These are the large super and hypermarket chains. Three other groups, categorized here as "non-dominant" retailers include small and mediums grocery and supermarkets, discount green grocers, and open-air fairs.

The market share held, competitive points and sizes and scales of each of these retail formats are summarized in Table 2. The size and scope of the fresh produce sectors

[3] A fifth group, depicted in the figure, are food service providers. These are not discussed here due to scarcity of data.

of different formats are summarized in Table 3. Super and hyper-market chains, and small and medium-sized supermarkets are both full-line retailers selling general merchandise, dry foods, and perishables (including meats, dairy, and fresh fruits and vegetables). The large chains tend to focus on carrying bulk produce, while specialized products such as organics, pre-packaged, pre-processed, and hydroponic produce often have an important place in stores that attend a wealthier clientele. Small and medium-supermarkets firms generally carry relatively small volumes of a variety of fresh produce items, and seek to respond to consumers' willingness to pay for convenience, quality and variety. Discount green grocers and open-air fairs, on the other hand, are specialized vendors of fresh produce, though they sometimes carry a limited range of other perishable foods as well. Discount green grocers offer low prices, variety, freshness, and the convenience of extended hours. Open-air fairs attract clients who value the product variety, quality, customized service, and tradition that they offer. The Household Budget Survey of 1996 (the most recent available) attributes 23% of retail sales of fresh produce in São Paulo to supermarkets and hypermarkets (of all sizes), 24% to discount green grocers, and 43% to open-air fairs, and just under 8% to grocery shops who are treated here under the category of small and medium-sized grocery and supermarkets (IBGE 1996). This reflects a 22% decline in purchases from open-air fairs for fresh produce since 1986, in favor of increased purchases from supermarkets and discount green grocers (which are a relatively new format).

Table 2 São Paulo's Fresh Produce Retailers

	Large super and hypermarket chains	Small and medium supermarkets	Discount green grocers	Open-air fairs
Share of produce sales	31%		24%	43%
Competitive strengths	Price, convenience (one-stop shopping)	Price, convenience (hours, location)	Price, service, convenience (hours, location)	Variety, service, freshness, tradition, quality
Number of outlets	105	2	7	1
Store sales area (m2)	5760	837	730	23
Revenue (R$,000/yr)	2,561,985	4,084	1,468	102
*Source: IBGE Houshold Budget Survey 1996				

"Follower" retailers have responded strategically to the changing market conditions in two areas: 1) merchandising and 2) procurement. Their efforts in merchandising have been directed to increasing their participation in emerging niches for specialty products such as pre-packaged, fresh-cut, organic, and hydroponic produce. Specialty produce markets represent a small share of fresh produce sales, but are among the most dynamic markets, showing high growth rates particularly among wealthier clientele who are willing to pay for the extra convenience, healthfulness, and quality that

specialty produce is perceived to offer relative to conventionally-produced produce. These high-value segments are served primarily by large retail chains and small and medium-sized supermarkets oriented to high-income clientele where they constitute on average 32% and 41% of retailers' fresh produce sector revenues, respectively, as seen in Table 3.

Table 3 Role of Fresh Produce Sector by Retail Category

	Large super and hypermarket chains	Small and medium supermarkets	Discount green grocers	Open-air fairs
Number of fresh produce items sold	359	232	111	42
Fresh produce sales area (m2)	473	202	636	23
Number of FLV employees per store	8	8	14	5
Fresh produce share of total sales area	13%	14%	88%	100%
Fresh produce share of firm revenue	8%	15%	89%	94%
Specialty produce share of fresh produce revenue	32%	41%	12%	15%

Trends in retailers' procurement activities: Some retailers, but not all, have also changed their procurement strategies with the aim of improving product quality and reducing costs. Changes to procurement strategies have most commonly involved shifts in the organization of procurement and sources of produce. Produce procurement can be centralized, decentralized or contracted out. Centralized procurement means that the headquarters of the firm or some other central authority is responsible for tasks such as deciding what to buy, choosing suppliers and making product orders and delivering produce to individual outlets. Decentralized procurement means that each of these tasks is the responsibility of individual outlets. Contracted out procurement means that the tasks have been contracted out to a third party, often a supplier or distributor who conducts them on the retailers' behalf. Table 4 summarizes trends in procurement strategies for each major retail format for tomato and lettuce. The table shows the consolidation of shifts in procurement on the part of large chains—five years ago 2/3 of the respondent firms had centralized procurement for tomatoes compared to 100% in the current period. For leafy greens, on the other hand, there was a process of decentralization—five years ago 100% of procurement was centralized, however in the current period 2/3 of the firms decentralized their procurement. This is due to the high perishability of lettuce and the lack of a cold chain in the area which make decentralized procurement better for product quality. It is important to note, though, that while the individual retail outlets are responsible for procurement in a decentralized system, among the large chains the outlets must still choose from a list of approved suppliers and follow negotiation guidelines provided by the headquarters. In contrast to the large chains, smaller retail formats have been less prone to alter the organization of their procurement

activities, with the most significant exception being shifts among some discount green grocers to decentralized procurement strategies in place of contracting out for lettuce procurement.

Table 4 Trends in the Organization of Bulk, Leafy Green, and Specialty Produce Procurement

	Large Supermarkets & Hypermarkets		Small & Medium Supermarkets		Discount Green Grocer		Open-air Fair Vendors	
	Current	5 years ago	Current	5 years ago	Current	5 years ago	Current	5 years ago
Tomato (Bulk)								
Centralized	100%	67%			42%	40%		
Decentralized		33%	86%	83%	50%	50%	100%	100%
Contracted out			14%	17%	8%	10%		
Leafy Greens								
Centralized	33%	100%			9%	9%		
Decentralized	67%		86%	83%	73%	64%	100%	100%
Contracted out			14%	17%	18%	27%		

Though the organization of procurement has changed little among smaller retailers, there have been significant shifts in the sources of procurement among them. Table 5 shows sources of produce categorized among growers, distributors, wholesalers, and a mix of wholesalers and growers. The Growers category includes individual

producers, associations and intermediaries who are based in the growing regions. Distributors are small firms who purchase produce, typically from the wholesale market, and re-distribute it among retailers who contract their services. Wholesalers are those actors based at the traditional wholesale market. The table shows that over the past 5 years, 2/3 of the large chains shifted from tomato purchases in the wholesale market to purchases from the growing regions. They have also increased the proportion of purchases of lettuce from the growing region to 100%. Small and medium-supermarkets have likewise reduced their reliance on the wholesale market for tomato, shifting instead purchases from the growing region and distributors. For lettuce, the move away from the wholesale market has been even more pronounced—none of the small and medium-supermarkets interviewed relied wholly on the wholesale market for lettuce anymore, whereas 60% of the respondents had five years ago. Among discount green grocers, there has been an interesting shift—over the past five years, some of these firms actually increased their reliance on wholesale markets for tomatoes. This could be due to the fact that they try to make their product available year-round which is easier to do buying from the wholesale market. In lettuce, however, they have followed the overall trend of shifting purchases from the wholesale market toward growers. Finally, the open-air vendors have shown the least tendency towards changing their sources of fresh produce. Among these actors, there has been only a marginal increase in the purchase of lettuce from growers at the expense of the wholesale market.

Table 6 complements the information on trends in retailers' organization and sources with information on trends in the numbers of suppliers of tomato and lettuce over the past five years. The results here are mixed. Large supermarket and hypermarket

chains have only slightly increased the numbers of tomato suppliers, but have greatly increased the number of lettuce suppliers they buy from—from three firms on average to 20. This makes sense given the shift toward decentralization of lettuce purchases among these firms and increased purchases from the growing areas—it takes more firms to

Table 5 Sources of fresh produce by retail type

	Large Supermarkets & Hypermarkets		Small & Medium Supermarkets		Discount Green Grocer		Open-air Fair Vendors	
	Current	5 years ago	Current	5 years ago	Current	5 years ago	Current	5 years ago
Tomato								
Growers	67%	0%	14%	0%	17%	30%	13%	13%
Distributors	33%	33%	29%	17%	0%	0%	0%	0%
Wholesalers	0%	67%	57%	83%	50%	50%	63%	63%
Wholesalers / Growers	0%	0%	0%	0%	33%	20%	25%	25%
Leafy Greens								
Growers	100%	67%	60%	40%	46%	44%	44%	38%
Distributors	0%	33%	20%	0%	0%	0%	0%	0%
Wholesalers	0%	0%	0%	60%	27%	44%	44%	50%
Wholesalers/ Growers	0%	0%	20%	0%	27%	11%	11%	13%

distribute lettuce among the many stores interspersed throughout metropolitan São Paulo, and there is a greater emphasis on buying from growers rather than wholesalers. While large chains and small and medium supermarkets have both tended to increase the numbers of total and regular suppliers or lettuce and tomato, discount green grocers and open-air fair vendors have both shown decreases in the number of suppliers serving them. Discount green grocers have half the number of regular tomato suppliers now compared to five years ago, while fair vendors have shown slight decreases in the number of regular tomato vendors and reductions of approximately 20% in the number of regular lettuce suppliers. It is unclear why these shifts would have taken place.

Table 6 Number of Total and Regular Suppliers, Current & 5 Years Ago

	Large Supermarkets & Hypermarkets		Small & Medium Supermarkets		Discount Green Grocer		Open-air Fair Vendors	
	Current	5 years ago	Current	5 years ago	Current	5 years ago	Current	5 years ago
Tomato Suppliers								
Total	4	2	4	3	7	11	14	14
Regular	3	2	4	3	3	6	9	11
Lettuce Suppliers								
Total	20	11	3	2	3	3	13	17
Regular	20	3	3	2	3	2	12	15

Wholesaler responses to the changed market environment: As both the large chains and some smaller retailers have shifted their purchases to the growing areas, there has been a proliferation in the number of specialized wholesalers based in these areas and working independent of the traditional wholesale markets. These wholesalers have sought to serve retailers' demand for differentiated products and services at competitive prices. In tomato markets, for example, approximately ten new classifying plants have been built in the growing regions around São Paulo since the mid-1990s and several more are being completed (in comparison, there are about 30 tomato wholesalers in the major traditional wholesale market, with approximately 80% of the trade there conducted by the ten largest). These classifiers differ from the wholesalers in the traditional wholesale market (some of whom also have their own classifying plants) in that they offer a quality-differentiated product that moves directly from the growing areas to the retailers. For example, nearly all the tomato moving from the wholesale market is packed in wooden crates that are known to be unsanitary and to damage the product. The newer classifiers, in contrast, pack their tomatoes in sanitized plastic crates and single-use cardboard boxes. They also label them more comprehensively with information on the absolute size (in millimeters) color and % defects, compared to the wholesale market where size is labeled on a relative basis (e.g. large) and other precise quality parameters are absent. Not surprisingly, the large supermarket and hypermarket chains and small and medium-sized supermarkets account for a large portion of their sales while the traditional market wholesalers are more oriented to smaller retailers, as seen in Table 7.

Table 7 Traditional and Growing Region Tomato Wholesaler Market Channels

	Traditional Market	Growing Region
Supermarket Channel Buyers	46%	68%
Intermediary & Wholesale Market Buyers	6%	28%
Small Retailers and Fresh Processors	48%	5%

Trends in growers production and marketing activities: As retailers and wholesalers have accommodated themselves to the new market environment, it is probable that growers have also altered their production and marketing strategies to account for changing economic conditions. Tables 9-12 reports the results of comparison of means tests on trends over the past five years over the role of agriculture and horticulture in family incomes, growers' production activities and their market choices for small and large tomato and lettuce growers. As defined in Table 8, small lettuce growers are those producing on between 1 and 5 hectares, and large produce than 6 hectares. Small tomato producers are those producing on up to 16 hectares, while large tomato growers are producing on 17 hectares or above.

Table 9 reports results for small tomato farmers. It shows an increase in the share of vegetable income in growers' agricultural revenue in general, while the role of agriculture in family incomes did not change appreciably. They also showed an increase of about three hectares in the area of land they dedicated to tomatoes. A larger increase of nearly 15 hectares in the increase in total land cultivated was not statistically significant at a 10% level. Finally, there were no statistically significant changes in the shares of sales going to different types of buyer.

Table 8 Definition of Small vs. Large Lettuce and Tomato Producers (hectares)

	Small			Large		
	Min.	Max	Mean	Min.	Max.	Mean
Lettuce	1	5	3.8	6	120	24.95
Tomato	3	16	8.7	17	125	37.33

Table 9 Small Tomato Growers' Activities Current and 5 Years Ago: Comparison of Mean Values

Variable	Current	5 Years Ago	t-stat	Signif.
Role of Agriculture and Horticulture in Income				
Agriculture share of family budget	78%	79%	-.430	.676
Vegetable production as share of agriculture income	62%*	46%	2.136	.058
Production Activities				
Total area cultivated (ha.)	87	72	1.406	.190
Vegetable area cultivated (ha.)	9*	6	2.090	.063
Marketing Activities				
Share of sales to Intermediary (%)	71%	78%	-.769	.464
Share of sales to Wholesale market	18%	6%	1.369	.208
Share of sales to Classifier	10%	0%	1.146	.285
Share of sales to Other buyers	1%	6%	-.906	.391

*Significant at a 10% confidence level

Table 10 reports results for large tomato farmers. Large tomato farmers showed an increase in the contribution of their vegetable production to their agricultural revenue of 22 hectares over five years. There were no significant shifts in the role of agriculture in the household budget, in their total areas cultivated or in their marketing channels.

Table 10 Large Tomato Growers' Activities Current and 5 Years Ago: Comparison of Mean Values

Variable	Current	5 Years Ago	t-stat	P>|t|
Role of Agriculture and Horticulture in Income				
Agriculture share of family budget	79%	80%	-.142	.889
Vegetable production as share of agriculture income	84%*	62%	2.102	.059
Production Activities				
Total area cultivated (ha.)	108	108	-.010	.992
Vegetable area cultivated (ha.)	39	34	.482	.640
Marketing Activities				
Share of sales to Intermediary (%)	45%	44%	1.000	.347
Share of sales to Wholesale market	23%	22%	.028	.978
Share of sales to Dealer	11%	11%	--	--
Share of sales to Classifier	0%	0%	--	--
Share of sales to Other buyers	21%	11%	.942	.374

*Significant at a 10% confidence level

Table 11 Small Lettuce Growers' Activities Current and 5 Years Ago: Comparison of Mean Values

Variable	Current	5 Years Ago	t-stat	P>|t|
Role of Agriculture and Horticulture in Income				
Agriculture share of family budget	96%	98%	-1.232	.237
Vegetable production as share of agriculture income	98%	93%	.610	.551
Production Activities				
Total area cultivated (ha.)	3.8	5.5	-1.464	.165
Vegetable area cultivated (ha.)	3.8	5.5	-1.433	.174
Marketing Activities				
Share of sales to Large Chain	0%	1%	-1.000	.333
Share of sales to Small and Medium Supermarket	3%	2%	1.000	.333
Share of sales to Intermediary	48%*	41%	2.021	.062
Share of sales to Other Retailer	36%*	46%	-2.242	.041
Share of sales to Wholesale Market	1%	5%	-1.035	.317
Share of sales to Processor or Consumer	6%	6%	1.000	.333
Share of sales to Coop	6%	0%	1.253	.229

*Significant at a 10% confidence level

Table 11 shows that there were no significant changes in the role of agriculture or vegetable production in small lettuce growers' incomes, however their market channels did change over the past five years. Specifically, the share of their sales going to traveling intermediaries increased from 41% to 48%, while the share of sales going to small retailers (such as open-air fair vendors who were shown in the section on retail trends to have made little change in the sources of their fresh produce) decreased by 10%--from 46% to 36%.

Finally, Table 12 shows that large lettuce growers made no statistically significant changes to their production or marketing activities over the past five years, nor did the role of agriculture and vegetable production in their incomes change.

Shifts in public sector activities: There have also been responses in the public sector that have been intended to help strengthen the performance of the traditional market channels in order to slow the erosion of the product flows through it. These responses include investments into strengthening the physical, communications and institutional infrastructure at the public wholesale markets. Such efforts include upgrading the physical facilities, the initiation of a database providing information on the payment histories of wholesalers and retailers in the market (to combat the prevalent problem of non-payment by buyers), efforts to establish a stronger system of grades and standards, and experiments with electronic auctions (Anonymous 1999; Lima 1999; Lourenzani, Filho et al. 2001; Gutierrez 2001).

Table 12 Large Lettuce Growers' Activities Current and 5 Years Ago: Comparison of Mean Values

Variable	Current	5 Years Ago	t-stat	P>|t|
Role of Agriculture and Horticulture in Income				
Agriculture share of family budget	95%	97%	-.620	.544
Vegetable production as share of agriculture income	98%	99%	-.620	.544
Production Activities				
Total area cultivated (ha.)	25	226	1.187	.254
Vegetable area cultivated (ha.)	25	22	1.075	.300
Marketing Activities				
Share of sales to Large Chain	9%	5%	1.333	.204
Share of sales to Small and Medium Supermarket	9%	10%	-.344	.736
Share of sales to Intermediary	31%	25%	1.042	.315
Share of sales to Other Retailer	33%	39%	-1.586	.135
Share of sales to Wholesale Market	2%	16%	-1.622	.127
Share of sales to Processor or Consumer	5%	6%	-1.108	.287
Share of sales to Cooperative	11%	0%	1.753	.101

Current market structure: The current market structure has several outstanding features that have emerged as a result of the interaction of the first-moving and follower retailers' strategic responses to the changing competitive environment. First, though there are high levels of retail concentration, these are juxtaposed with a diversity of retail types with different output and procurement strategies. Second, the bifurcation of the marketing chain has been reinforced by the responses of non-dominant retailers as they seek to cut costs and improve quality. Third, the market is highly segmented, both horizontally and vertically, with different coordination requirements for each segment's supply. Each of these features is discussed below. A diagram of the fresh produce marketing chain is shown in Figure 1.

High levels of retail concentration while diversity is maintained: Combining the information on trends in retailers' practices with aggregate information available about market structure and performance, a picture emerges in which the competitive pressures of the late 1990s forced a "consolidation" in fresh produce markets that led to the weakest firms exiting the markets while others found their niches. Contrary to the expectations of many experts, this didn't lead to the emergence of a single retail format—the large supermarket/hypermarket chain—as predominant in fresh produce markets. The retailers who were subject to this process of consolidation can be divided in three groups with reference to the action they took and the results of these actions. First, there are those who either undertook no significant response to the changed competitive environment or for whom the response taken was insufficient. Little is known about the firms that exited the market, but it is evident that small and medium-sized supermarkets saw very variable performance in the second and third phases. According to de Angelo

and da Silveira (2000), small and medium-sized supermarkets saw a 60% drop in real revenue between 1994 and 1998. More recently, however, both the numbers and market share of small and medium-sized independent retailers have increased (at the expense of both traditionals and chains)—from 13.3% of food retail firms and 44% of sales in 1994, to 16.6% of firms and 44% of sales in 2000, as shown in the Table 13. These figures are likely even greater for fresh produce given that smaller firms tend to specialize in the sale of perishable foods including fresh produce (Farina 2002).

Little is known about the firms that exited the market, but it is evident that small and medium-sized supermarkets saw very variable performance in the second and third phases. According to de Angelo and da Silveira (2000), small and medium-sized supermarkets saw a 60% drop in real revenue between 1994 and 1998. More recently, however, both the numbers and market share of small and medium-sized independent retailers have increased (at the expense of both traditionals and chains)—from 14% of food retail firms and 40% of sales in 1994, to 17% of firms and 44% of sales in 2000, as shown in the Table 13. These figures are likely even greater for fresh produce given that smaller firms tend to specialize in the sale of perishable foods including fresh produce (Farina 2002).

Reinforcement of the bifurcation of the marketing chain: Finally, efforts on the part of some of the smaller retailers to cut costs and improve product quality have reinforced the erosion of the public supply chain, begun by the first-moving retailers in the second phase. These efforts have been facilitated by the producer-wholesaler intermediaries in the growing areas, many of whom were established with the express purpose of supplying the largest retail chains, but have since sought to diversify away from them in order to

diversify their buyer portfolios, and particularly to cultivate relations with smaller retailers whose business and negotiating practices they prefer.

Table 13 Food Market Participation in Brazil by Traditional, Chain and Independent Retailers

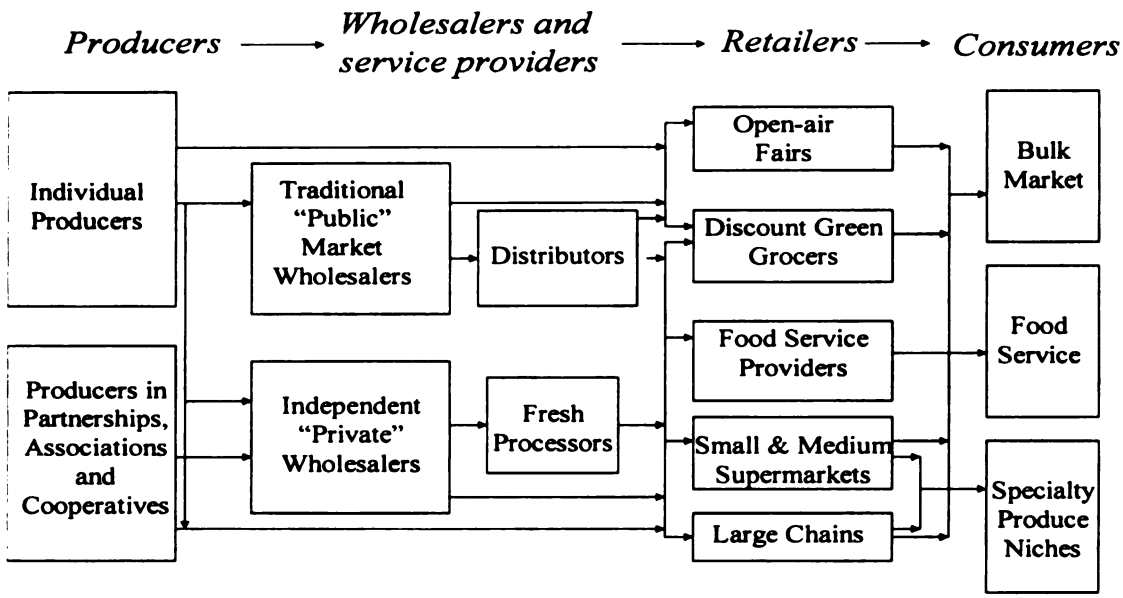
Concentration Index by Number of Stores							
	1994	1995	1996	1997	1998	1999	2000
Traditionals	85.0%	84.5%	84.5%	84.8%	84.4%	82.1%	82.3%
Chains	1.5%	1.5%	1.4%	1.3%	1.3%	1.2%	1.1%
Independents	13.5%	14.4%	14.1%	13.9%	14.3%	16.7%	16.6%
Concentration Index by Sales Volume							
	1994	1995	1996	1997	1998	1999	2000
Traditionals	1.49%	15.3%	15.6%	15.4%	15.6%	13.7%	13.2%
Chains	45.1%	44.4%	44.6%	44.9%	46.6%	44.7%	42.8%
Independents	40.0%	40.3%	39.8%	39.7%	37.8%	41.6%	44.0%

Source: A.C. Nielsen.

The public wholesale market remains an important source of fresh produce for smaller buyers (small and medium-sized supermarkets, open-air fair vendors, and restaurants in particular), discount green grocers to some extent, and also serves to complement large retail chains' purchases of produce from the growing areas. It plays an increasingly marginal role in the provision of highly perishable items, as exemplified by lettuce—in 1990, 55% of the São Paulo's lettuce production passed through the main public

wholesale market, but this figure had declined to only 8% by 1999. In contrast, though the proportion of state production of fresh tomatoes, which are less perishable, marketed

Figure 1 São Paulo Fresh Produce Market Flows



*Note: Box sizes do not indicate relative importance of different market sectors

though the public wholesale market fell from 62% in 1991 to approximately 45% in 1996, it has held steady at this level since. Meanwhile, the public market plays virtually no role in trade in the very dynamic and quickly expanding markets for specialized produce items that have thinner markets and require tight coordination between buyers and sellers. For these products, private supply channels predominate, for example, an umbrella organization of organic brands (themselves comprised of associations of producers or producer-wholesalers), the Group of Organic Marketers, accounts for

approximately 90% of the organic produce sold in the country, all of which is marketed through private supply channels (PENSA/FIPE 2002 p45).

Market segmentation: The segmentation of the market, particularly the emergence of niches for "specialty" produce is also a major feature of the current market environment. Though each niche is relatively small, as shown in Table 14, they are growing very quickly and generating much interest among growers and consumers alike.

Table 14 Specialty produce markets in Brazil

	Value per year	Growth rates	Principal retailers
Bulk	85% sales	2% per year	All
Organic	2% value of horticulture sales,	30-50% per year	Supermarket, farmer markets
Hydroponic	N/A	N/A	Supermarkets, restaurants
Fresh-processed	R$450 million in 1998, (1.3% of fruit & vegetable volume)	200% in dynamic buying areas over 3 years	Supermarkets, food service
Sources: AgriAnual 1999; Costa and Ortiz 2001; Fares and Nantes 2001; PENSA/FIPE 2002 N/A=Data not available			

Market performance: In most respects the performance trends identified in the previous phase have continued in the current phase. Consumers demand for new and novel produce items and their concerns for issues such as food safety is continually met

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by retailers who are eager to gain market share. Likewise, a diversity of retailers participate in the market and prices are competitive. Shifts are seen, however, in terms of prices in relation to suppliers, as the ongoing shifts in market share are seen to be impacting suppliers who both serve the increasingly-powerful large retail chains and those who do not. Many growers are not in a good position to respond to the requirements of the large chains, meanwhile their current market channels are being eroded. Furthermore, some of the practices of the large chains, such as promotional prices that are below production costs, are negatively affecting their suppliers (who are encouraged to participate in these promotions) and suppliers and retailers who compete with them.

4 Implications and policy considerations

This section considers the implications of these developments that have been outlined for suppliers, particularly small farmers, in São Paulo's fresh produce markets. It discusses what the diversity of retail types combined with retail concentration, the emergence of specialty markets, and the shift in market flows from public to private channels imply for the participation of suppliers in the market, and addresses policy considerations that result.

Diversity of retail buyers: How does the diversity of retail buyers affect participation of different types of suppliers? Two points are in order here. First, while there is a diversity of retail buyers, the vitality of these non-dominant buyers is not assured. Of crucial importance is the large chains' efforts to enter niche markets by providing (or imitating) the products and services that consumers seek from those niches, as well as

their aggressive push to guarantee the safety of their fresh produce merchandise. To the extent that the large chains are successful in these efforts, and given that they generally have cost-superior procurement capacities, the hold of these non-dominant retailers might be eroded considerably in the near future. Second, in order to compete in the new market environment, the non-dominant retailers must make their own investments to improve the quality of the products they offer and lower costs, if they are to maintain competitive positions in the market, regardless of whom they sell to.

It is hypothesized that well-capitalized suppliers are in a good position to meet the challenges of the changing market environment since they can diversify their buyer portfolio to reduce their dependence on the relatively few large retailers from whom they tend to receive low margins. Of concern to policy makers are the suppliers who are in a relatively weaker position to make new investments. These may fall into two groups. First, there will be those who are able to make the investments necessary to produce for the large retail chains, but who will then be highly dependent on them for their market and thus vulnerable and generally in a weak bargaining position. It is likely that lower management capabilities and weaker business acumen will likely differentiate these suppliers from those who are more successful in maintaining more diversified portfolios. Finally there will be suppliers who may not make any changes to their product or buyer portfolios, and as a result may be progressively disqualified from the market as their buyers' needs change or if their buyers go out of business. Research is needed to determine what specific characteristics differentiate these three types of suppliers.

Emergence of specialty markets: Specialty produce markets are often promoted for small-scale producers as a potentially profitable alternative to mainstream "commodity"

produce markets. Markets for specialty products tend to be small and production often requires high labor and management inputs, arguably offering a comparative advantage in production given their access to family labor and other characteristics that favor the production of labor and management-intensive crops. Caution is warranted, however, in promoting these markets as a panacea for the challenges that small farmers face in the current market environment, as these markets often have quality requirements that small growers find difficult to meet and that raise their costs to uncompetitive levels. Specifically, though on the surface the high labor and land-intensity of production seems to favor small producers, other aspects of the production economies of specialty products can negate this apparent advantage. Looking at markets for nontraditional exports (which are analogous to the case of specialty markets), Carter et al (1996) point out that the presence of high-value attributes (such as the production processes that lend value to organic products and food safety attributes for fresh-cut produce) means that farmers must adopt certification procedures to identify and preserve these characteristics, which are often large fixed-cost investments which can shift the comparative advantage towards larger-scale producers. Likewise, meeting the stringent quality requirements of these specialty markets can require investments that the poorest strata of small farmers do not have the capital to make.

Also, while specialty produce markets are growing quickly, they represent a very small proportion of the fresh produce marketed. Again, looking at nontraditional export markets, Barham et al (1992) point out that proponents of these markets tend to overlook the effects that widespread adoption and associated production increases can have on market prices. As supply increases and prices fall, then the current price premiums in the

market that result from unsatisfied demand may be eroded (depending on the demand response to lower prices), so that, while specialty produce may continue to be "high-value" relative to bulk produce, there may still be very stiff competition and lower margins all around. Finally, specialty produce markets can offer more price and production risk, again disadvantaging smaller farmers who tend to have fewer coping options (Barham et al. 1992).

Bifurcation of the marketing chain: What are the roles of public and private marketing channels for both private actors and public goods? A reduction in reliance on public wholesale markets in favor of direct purchases of fresh produce is not a recent phenomenon, nor one unique to developing countries. In the U.S. for example, terminal wholesale markets are responsible for only 25-30% of the fresh produce volume traded today. Though their importance has declined as large chains have increasingly sourced direct from production areas, public wholesale markets tend to retain their importance for some buyers and sellers (usually smaller) for whom direct purchases are infeasible or uneconomical, and for certain types of products, particularly those which are less perishable and for which supply and demand is less predictable. Furthermore, public wholesale markets are also argued to play a key role in the provision of certain public goods, particularly for agriculture sectors (characteristic of developing countries) where the farm structures are fragmented and producer organizations are weak (Seidler 2001). Specifically, their accessibility and large numbers of buyers and sellers make them important sources of market information (on prices and the movement of products), thus enhancing transparency and competition. These benefits are subject to network economies—they increase as the number of users of the public markets increases, and

conversely are eroded as reliance on public markets wanes. Supporting institutions, such as clear and objectively applied grades and standards, are key to the efficient functioning of wholesale markets.

In Brazil, however, the shift toward reliance on private marketing channels that is precedented in many other countries such as in the U.S. and Europe has been reinforced by the fact that the public market does a relatively poor job in performing even some of its "public good" roles. The lack of transparency and market concentration raise the costs of fresh produce procurement for firms using the market, and hasten the departure of firms relying on it, for those who are able. Thus it is important to appreciate that the shift from a public to private-dominant supply chain does not represent a departure from the "perfectly competitive" ideal of neoclassical economics, given the historic concentration of market power and lack of transparency at the wholesale level. Discussion of the merits of relying on public versus private marketing channels should be explicit about whether they are considering the historic or the potential role that the market plays, and take into account the feasibility and cost of promoting the public market's performance of its potential role.

Furthermore, while the shift in market flows from public to private supply channels may have been started by the large retail chains, it has since been adopted by many non-dominant firms as a proactive means of reducing costs and improving quality. This improves both their competitiveness and promotes consumers' welfare in both the short term, through provision of a better quality and less expensive product, and in the longer term by keeping a diversity of firms in the market as alternative source of fresh produce. It also increases the competitiveness of these proactive retailers, despite the erosion of the

public market flows and consequent effects for those firms that depend on it for the bulk of their business. It is thus unconstructive to base debate on the roles of the public and private marketing channels on a simplistic, "straw man" model which depicts the public market as being the bastion of small actors and the private supply channels as the stronghold of the large retail chains. Given the presence of diverse small firms in both market channels, then it is important to weight the private and public costs and benefits and implicit tradeoffs of investing in each market channel.

Taking these points into consideration, four arguments are made here about the appropriate roles of the public and private fresh produce marketing channels. First, though its role in transactions of some goods (such as leafy greens) are very minimal, the public market can be expected to continue to play an important role in transactions of some goods, in particular those that have broader geographic markets (permitting greater competition), in which institutions such as grades and standards are in place and well-employed (permitting low cost transactions), and in markets for which supply and demand is less predictable but which are relatively minor commodities making high cost coordination efforts inefficient (such as some exotic goods). It can be argued that the government will play a more effective and appropriate role in such markets by playing a facilitative role, such as in the provision and enforcement of grades and standards regimes, and strengthening transparency and communications. Concurrent with this could be an increased emphasis on the role of the public market in a "virtual" form rather than its current physical form. That is, it may become less and less the site for simultaneous exchange of information, money and product, and more a network of institutions facilitating these activities, that then take place in private channels. Indications of this

tendency include growing reliance on pre-arranged transactions and the use of bankcards for payment within the public market.

Second, given that the gradual erosion of the public market's role reflects both historic trends (as seen in other countries' markets) and the public markets' failure to perform a number of key roles adequately, then it is hypothesized that firms which continue to rely primarily on the public market (and which have been hypothesized to lack the capital resources that permit them flexibility to change sourcing strategies) might become increasingly marginal in the overall scope of the market. If so, then the decision of whether to invest in the public market with the specific intent of supporting these firms might be judged on the basis of welfare rather than efficiency objectives. It is worth consideration, then, that other welfare measures might also be appropriate.

Third, the potential role of private market channels in providing public goods (as well as supporting the provision of private goods that promote social objectives such as broad participation) has generally been under-emphasized. The role of intermediaries in the growing regions has been under-appreciated in terms of the potential they could have in the provision of public goods such as price information, as well as their role in promoting inclusiveness in the market by serving as intermediaries between resource-poor farmers and retail buyers. These firms already play a role in facilitating the access of resource-poor suppliers to retail markets, for example through buying and re-mixing products, and providing credit to growers. In order to explore this potential, attention must be given to understanding the functioning of the private market channels. For example, it is not clear how prices are currently formed in the market and to what extent the purchases of the large retailers and other actors in private supply chains affect price

formation. Furthermore, the public sector should play a role in encouraging the establishment of alternative formats of growing area intermediaries, for example farmers' associations, with the aim of influencing the distribution of benefits that are associated with such activity.

Finally, there is a need to bring together discussions about the potential roles of public and private marketing channels by asking where public activity in these separate spheres might merge. That is, whereas currently the public marketing chain is associated with public (government) activity in the provision of both institutional (e.g. grades and standards, market information) and physical (e.g. buildings) infrastructure, an emphasis on the public's role in institutions that are relevant to both public and private marketing channels might bring about a softening of this public/private distinction.

5 Conclusion

This paper addresses several important questions about the recent evolution and current structure of São Paulo's fresh produce market, and their implications for the participation of diverse actors at both the retail level and upstream. The discussion provides insight into issues about the implications of the emergence of specialty markets, shifts in product flows from public to private market channels, and diversity of retail players for the participation of diverse suppliers. The discussion points to the potential for small suppliers to benefit from a number of these features and their related trends, however it emphasizes the mixed results that may come about in actuality due to the underlying economics of participating in these markets that may restrict small suppliers' access, constrain their comparative advantage, or reduce the profitability of participation.

A closer analysis of how these issues play out for suppliers with different characteristics, in different specialty markets, and for different commodities is called for as a means to both better understand the ongoing evolution of the market and to be able to influence this evolution through effective public policy.

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APPENDIX

Glossary of Terms

Large Supermarket and Hypermarket Chain: General merchandise retailers with more than five outlets. They compete on the basis of price, quality and convenience.

Small and Medium Supermarkets: Small chains (less than five outlets) and independent general merchandise retailers competing on the basis of convenience and in some cases quality.

Discount Green Grocer: Specialized in perishables (primarily fresh produce but also sometimes eggs and fish), these retailers sell produce using some version of a "single-price-per-kilogram" marketing strategy. These firms compete on the basis of price.

Open-Air Fair: Open-air fairs operate in specific locations on a weekly basis. They are comprised of numerous vendors each specialized in different products, including perishable goods such as leafy greens or other fresh vegetables. These retailers compete on the basis of quality, service and tradition.

CHAPTER 3

Determinants of Retailers' Decisions to Use Public or Private Grades & Standards: What Policy Makers Should Know

1 Introduction

The role of grades and standards (G&S) in the organization and governance of agrifood markets has come into increasing focus with reductions in trade barriers and growing concerns over food quality issues relating to food safety and the environment, among others. One important tendency that has been identified in the literature has been firms' increasing reliance on private G&S regimes over public ones, particularly in situations where public regimes are perceived to be inadequate to the needs of individual firms and where there are potential gains to be made from the promulgation of private G&S (Farina and Reardon 2000; Reardon et al. 2001; Reardon and Farina 2001; Giovannucci and Reardon nd). This is due, in part, to a worldwide shift in the balance of power in agrifood markets to the retail level. Large modern chains have emerged as dominant players in agrifood systems, and they have actively promulgated private G&S in order to be more responsive to their customers' quality preferences and to reduce costs by improving the quality of their inputs (Reardon and Berdegué 2002). Firms' choices between public and private G&S are important to policy for a number of reasons. First, private G&S generally entail new investments by suppliers and require stricter supply chain coordination, which increase barriers to entry and mobility for suppliers, with implications for competition and participation at the retail level and along the marketing chain (Farina 1999; Reardon 2000; Reardon, Codron et al. 2001). Second, private G&S

are less accessible to public policy makers than public G&S, with implications for the effectiveness of quality control and food safety, as well as efficiency implications. Finally, private and public G&S are complementary in many consumers' minds, so that understanding retailers' choices among them is key to the effective and efficient design and employment of public G&S and the regulation of private G&S. At the same time, however, private G&S can be potentially more consumer-responsive, and understanding firms' decisions between them can also help policy makers understand where it is appropriate to maintain a "hands off" approach. Though the determinants of retailers' decisions to use public versus private G&S constitute an important policy issue, this issue is largely unexplored in the literature.

This paper seeks to fill this gap by addressing two questions. First, what are the environmental and firm-specific factors that condition firms' choices between public and private G&S? Second, how do firms implement and regulate compliance with public and private G&S? The focus is on the decision that is faced by retail firms and on their choice of input G&S—that is, G&S that are imposed on suppliers to the retailers. It is a maintained assumption throughout that firms are choosing between public and private G&S, rather than having to choose private G&S in addition to public. This assumption is upheld by Loader and Hobbs (1999) for the European market, and is especially realistic in the developing country context due to weak institutional capacity to enforce even mandatory public standards in many cases.

The paper draws evidence from a case study of the fresh produce markets of São Paulo Brazil. The paper begins by approaching the problem from a conceptual perspective, in which the contextual determinants of the firm's decision between public

and private G&S are explored and hypotheses are offered about the firm-specific determinants of the decision. Then, the empirical context is introduced and patterns of adoption of public and private G&S are analyzed with respect to the hypothesized determinants. The paper concludes by discussing the results with a focus on their policy implications. Data for the paper was collected using key informant interviews with industry experts as well as during the open discussion section of a retail survey, during which respondents were asked about their views on the adequacy of the different grades and standards regimes, their use of different regimes, and how they undertook to ensure the different quality aspects that they sought of the fresh produce they bought.

2 Grades and Standards in Agrifood Markets

Grades and standards consist of technical specifications, terms, definitions, and principles by which goods are categorized or included in product groupings (Jones and Hill 1994). They are used to classify products with respect to valued attributes. Three crucial functions that G&S serve are 1) standardization (classifying products on the basis of explicit attributes in order to ensure their homogeneity and reduce the transaction costs of product acquisition), 2) product differentiation (which have the objective of communicating the uniqueness of products defined by G&S to better inform consumers of their options and decrease price elasticity of demand), and 3) risk reduction (for example food safety standards).

G&S can be promulgated publicly or privately. In this paper, 'public' and 'private' G&S are defined relative to the availability of their specifications, means of compliance, and accessibility to firms. Economic theory holds that G&S are likely to emerge as public

goods when they reflect the economic characteristics of non-exclusivity, non-rivalry, and network economies, which make it difficult for individual firms to reap the returns to their promulgation (Kindleberger 1983). These economic characteristics, however, are in many respects products of the G&S' specifications themselves, including their promulgation in public or private spheres, rather than exogenous. For example, privately promulgated G&S, whose specifications are inaccessible or costly to imitate, lose some of the "public goods" properties of non-exclusiveness. Likewise, the promulgation of multiple private G&S regimes that have similar specifications but limited adoption for each precludes the achievement of network externalities, in which the benefits of adopting G&S would increase with the number of adopters.

There are numerous institutional means available to regulate compliance with G&S, including legislation and testing by public bodies, third-party certification, second-party certification (for example by the buyer) and internal certification (by the supplier). Reliance on trust is a complementary means by which compliance is regulated. The specifications of quality standards and means of ensuring compliance with them together affect the means of governing the transaction (Zylbersztajn and Farina 1999). For example publicly-legislated G&S requirements can lend themselves to spot market transactions as can third-party certification, whereas the governance of G&S compliance on the basis of trust, second-party certification, or internal certification is typically associated with stricter forms of coordination such as contracts or even vertical integration. Different means of regulating G&S compliance require different sorts of investments and involve different distributions for the costs of their compliance. This consequently affects the internal organization of and relations between firms that impose

G&S and those that must comply with them. Overall, as the need to make investments to comply with G&S and qualify for a specific transaction increases, then the interdependence between buyer and seller increases, encouraging firms to rely on strictly coordinated supply systems that seek to economize on (or re-distribute) the associated costs (Zylbersztajn and Farina 1999).

3 Modeling the Decision to Adopt Public vs. Private G&S

A firm's choice between public and private G&S regimes can be viewed from an adoption perspective. The decision maker under consideration is the individual retail firm that seeks to minimize the cost of obtaining fresh produce reflecting a specific vector of attributes, whether these attributes be related to the size, variety and color of a product, the processes by which it is produced, or the absence of chemical or biological contaminants that compromise food safety. In making its decision, the firm must evaluate publicly-available and private standards for their suitability, costs, and benefits. The adoption decision is decided on the basis of a comparison of the costs and benefits of adopting and administering a public versus a private standard. These costs and benefits are conditioned by both the firm's characteristics as well as the characteristics of the product and its market and the general environment in which the firm operates. These factors are discussed below, and summarized in Table 1.

3.1 General Conditioning Factors

The literature introduces three general factors conditioning the emergence of public and private G&S. These are the strategic objective of the standard, the institutional context, and the product and market characteristics.

Table 1 Factors Influencing the Decision to Adopt Public or Private G&S

General Conditioning Factors	Benefit/Cost Effects	Firm Characteristics
Strategic objective of G&S Institutional context Product & market characteristics	Output price differentials Input price differentials Transaction cost differentials	Product requirements Importance of product in sales Scale of operations Market power of firm Reputation & brand capital

Strategic objective. G&S can take standardizing, differentiating, and risk-reducing functions. G&S with standardizing functions are generally associated with public goods in that their benefits show increasing returns to adoption, and are non-rival and non-exclusive (Kindleberger 1983). Differentiating standards are generally assumed to be private goods because they are designed so that their benefits can be captured by the firm or firms that establish them, but can fit into the rubric of collective goods too, as they can be defined so that their benefits are accrued by a limited group rather than an individual firm (an example is appellation-specific wines). G&S with risk-reducing objectives, for example those related to food safety, have often fallen under a 'public goods' rubric due to their non-exclusive nature, for example, the difficulty of distributing the costs and benefits of ensuring safe food (Sporleder et al. 1983). More recently, however, they have increasingly become an important part of private firms' G&S activity (Northern and Henson 2001), due to changes in liability law, the development of technologies that facilitate traceability, and the use of brand capital and private certification of quality as

means for individual firms to generate consumer fidelity and capture the benefits of their food safety investments (Spers 2000).

Institutional context. The institutional environment, defined as 'the set of fundamental political, social and legal ground rules that establishes the basis for production, exchange and distribution" (Williamson 1991), influences the choice between public and private G&S for a number of reasons. First, public institutions are generally slow in adapting to changed demand and technological conditions that might necessitate adaptations to G&S, even if existing public G&S were initially formulated to reflect valued attributes. This is particularly true given that the definition of public G&S is subject to political maneuvering, vested interests, and tailoring to promote social objectives (Krislov 1997; Farina 1999). Private standards, in contrast, are under the control of individual firms, and can be adapted more easily to changing market conditions (Jones and Hill 1994; Aust-Sterns and Reardon 1999; Reardon and Farina 2001). Second, the capacity of the institutional apparatus to monitor and enforce compliance varies widely (and can be especially constrained in the developing country context), creating incentives to either cheat on compliance and compromise the legitimacy of the regimes or to create private regimes to overcome these deficiencies (Loader and Hobbs 1999; Farina and Leles Rezende 2001). Third, the informal institutional environment (that is, cultural rather than legislative controls over behavior) plays a role in determining the feasibility of private G&S regimes, whose success is heavily dependent on relations between transacting firms (Northern and Henson 2001). Fourth, legislation, particularly liability law, plays a fundamental role in determining how the costs of product failures (such as food safety failures) will be distributed, thus motivating private regimes in many cases as

a risk-mitigating measure (Henson and Caswell 1999). Fifth, the institutional environment affects the legitimacy of any external (third-party) certification that is made available to monitor compliance with G&S. The availability of such certification can increase the feasibility of relying on public G&S regimes (if their specifications are adequate but public enforcement is weak) and/or reduce the costs of administering private G&S regimes (if the task of monitoring compliance can be contracted out).

Product and market characteristics. The characteristics of the product and its market also play a major role in influencing the emergence of public and private G&S regimes. Product standards can reflect search, experience, and credence attributes (Codron, Reardon et al 2000), which must be identified and preserved as the product moves along the marketing chain, creating situations of asymmetric information among market agents and consequently room for opportunistic behavior and coordination failures. If production of the attributes defined by the standard requires specialized investments then the risk of losing the value of the specialized investment creates interdependence between the buyer and seller, requiring the retailer to find ways to tighten control over supply, including through its choice of G&S. As the attributes defined by G&S move from search (e.g., produce graded on the basis of easily observed characteristics such as size, color and presence of external defects), to experience (e.g., food safety) and credence attributes (e.g., production using organic processes), market risks and transaction costs increase, calling for stricter coordination of the supply chain and encouraging the use of private standards as part of firms' efforts to economize on the transaction costs of supply chain management (Farina and Reardon 2000; Reardon, Codron et al. 2001).

3.2 Determinants of G&S Regime Benefits and Costs

The choice between public and private G&S will also be driven by the relative financial benefits and costs of each faced by the retailer. This benefit-cost relation depends on any price premium associated with adoption, the cost of adoption, and differences in coordination costs that result from adoption. These factors will, more specifically, be functions of 1) any output price differential made possible by compliance with the standard, 2) any input price differential required to ensure provision of the standard-compliant product, and 3) the differential in transaction costs incurred through use of the standard. Each of these are subject to network externalities, that is, they may change over time as the numbers of adopters of a standard increase.

Differences in output price are most relevant to differentiating standards. Revenue can be increased for differentiating standards if they effectively reduce consumers' sensitivity to price increases. If the firm seeks to differentiate its product from similar products of other firms, rather than from other products (Codron et al (2000) refer to these as producer-inclusive and producer-exclusive strategies respectively), this may catalyze the decision to promulgate a private G&S regime. The benefits of adoption of differentiating standards tend to show a U-curve as adoption increases—some minimal number of adopters are necessary for a differentiating standard to be recognized by consumers in the market, however as retail adoption increases beyond a certain point, its usefulness in differentiating it from other products declines. The U-curve will likely be absent, however, if the firm that promulgates the differentiating standard has a very strong brand that it manages to link to the standard, hence excluding other firms from its

benefits and limiting the number of adopters. Supply increases resulting from widespread adoption can also push down any price premiums that would otherwise be in place. Differences in output price will also be affected by the consumers to whom the product is targeted—specifically, Spers et al (2003) found that wealthy consumers are more willing to pay for private standards than poor consumers, so that private standards can also be seen to have characteristics of a luxury good.

Changes in compliance costs include any additional production costs incurred in producing to meet the standard. Input cost differentials tend to be higher for differentiating standards than for standardizing ones (Reardon, Codron et al. 2001), and are likely to be higher for a private standard than for a public one, too, as the private standard will be diverging from the default public standard and tends to be relatively more complex (Farina 1999). Input costs do not always increase however—they may even decrease in situations where the standard increases efficiency or reduces production costs (Caswell et al. 1998; Reardon and Farina 2001); or where the buying firm has sufficient negotiating power to push the costs of compliance onto suppliers. Again, network externalities also come into play—the broader the adoption of a standard, the lower the costs of compliance are likely to become, as firms become increasingly more specialized in responding to the standard and at the same time find more buyers for it. As adoption increases, scale economies to be achieved in marketing the product further lowering costs. These factors could come into play for a private firm with a very large scale of operations if a large number of suppliers adopt the standard, however in general, public standards, which are more broadly adopted than private standards, are likely to have relatively lower compliance costs.

G&S regimes can reduce transaction costs when they take a trade-facilitating role, or increase them if they necessitate special coordination needs such as the formation of contracts with suppliers, monitoring of compliance, or enforcement of contract terms. Generally, transaction costs will be higher for a private G&S regime than a public one. This is because of the relatively greater requirements for transaction-specific investments that increase interdependence between buyers and sellers for private standards, increasing monitoring costs and the potential for hold-up on transactions (Farina 1999). The distribution of these transaction costs will depend in large part on the negotiating power of each of the parties to the transaction. The transaction costs of private standards can be reduced, however, when third-party certification is possible, as shown by Northern and Henson (2001) , because it allows external firms to specialize in certification of compliance, reducing the costs borne by the buyer. Again, network externalities associated with the promulgation of public G&S can be associated with lower transaction costs as adoption increases. These benefits are typically foregone for private standards except, as mentioned previously, in limited cases when a firm with a very large scale has a large number of supplies who can benefit from network externalities in adopting a private standard.

3.3 Hypotheses on Firm-Specific Factors Influencing the Adoption of Public and Private G&S

Given general conditioning factors and cost/benefit considerations, what determines an individual retailer's decision to adopt public versus private G&S? Here it is hypothesized that five variables will lead a firm to choose private G&S over public.

These are 1) non-mainstream product requirements, 2) the importance of the product in the firm's activities or sales, 3) scale of operations, 4) bargaining power, and 5) investment in brand capital and reputation.

H1: A firm with non-mainstream product requirements is more likely to adopt private G&S.

A firm with non-mainstream product requirements is less likely to have its needs served by public standards, and more likely to find it economical to invest in private standards that more closely reflect their needs. Non-mainstream product requirements can exist when the firm serves a differentiated output market—for example a domestic niche market or emerging export market. They can also emerge on the input side—for example when cutting-edge processing or logistical methods used by a buying firm require specific characteristics for incoming products.

H2: Firms are more likely to adopt private G&S for products that are central to their activities and/or revenue.

The more important a product is in the activities or sales of a firm, the more reward (via either increased sales revenue or reduced costs) the firm can reap by tailoring product standards to its own needs rather than making do with a product meeting a public standard.

H3: A larger scale of operations will increase the likelihood of a firm adopting private G&S.

The scale of operations of the retail firm, over which the costs of administering the standard can be spread, will affect the benefits of a private standard. The establishment of a private standard entails significant fixed costs, for example in its specification and investment in facilities and training of employees to regulate compliance with the standard. In this respect, a large scale of operations can enable buyers to achieve economies of scale and/or scope in the promulgation and administration of a private standard.

H4: A firm with bargaining power of its suppliers will be more likely to adopt private G&S.

Bargaining power will facilitate a firm's promulgation of a private standard by enabling it to demand compliance with the standard and even to push the costs of compliance onto suppliers. A firm with both scale and a large presence in the market (for example a large share of the market) that promulgates a private standard is essentially creating a new niche market for suppliers, perhaps allowing them to achieve scale economies if they specialize in producing for that niche.

H5: Firms with large investments in brand capital and reputation are more likely to adopt private G&S.

Finally, firms that have large investments in brand capital and reputation are more likely to invest in private standards that are more exacting than public G&S because the costs of product failure (which is more likely under a weaker standard) will go beyond the immediate sale to hurt the value of the brand capital and reputation of the firm, thus reducing future sales.

4 Evidence from Sao Paulo's Fresh Produce Market

The hypotheses proposed above are explored here, drawing on research in the fresh produce market of São Paulo Brazil. Retailers' use of G&S was considered for three major product groups: bulk produce, organic produce, and pre-processed or "fresh cut" produce. G&S for bulk produce relate primarily to search attributes—variables such as size, color, type, and the presence of external blemishes, all of which are easily observable upon inspection of the produce. Organic standards are credence attributes in that they are specified on the basis of production processes, the use of which is difficult to detect once production is complete. The G&S most important to pre-processed produce relate to food safety. The assurance that food will not be contaminated with either chemical or microbiological contaminants reflects experience attributes.

4.1 Fresh Produce Retailers in São Paulo

Three categories of retailers can be discerned in metropolitan São Paulo's fresh produce market with respect to the firm-specific decision variables that are hypothesized as determinants. These are summarized in Table 2 below. Dominant in terms of market

share and bargaining power are the large super and hyper-market chains—for example Companhia Brasileira de Distribuição and Carrefour. These firms have significant portions of foreign ownership and control, large investments in brand capital and reputation, and make most of their fresh produce purchases at the firm rather than store level (using centralized purchase and distribution centers), lending them significant bargaining power. The second group consists of small and medium-sized supermarkets, discount green grocers, and open-air vendors that work either individually or in small chains. These firms are locally owned and individually have little bargaining power. Third are the specialized green grocers and restaurants that market to upscale consumers—again these firms are small and do not hold bargaining power, though they have very significant investments in reputation, serving a select and demanding clientele.

4.2 G&S in Sao Paulo's Fresh Produce Markets

A range of public and private G&S regimes exist among the three product groups considered[4]. These are summarized in Table 3. The public G&S regimes that are seen in the market were specified as a result of either formal or informal negotiations between buyers and suppliers. The private G&S regimes that will be discussed were established by retailers relative to their needs, with the exception of private food safety standards, which are established by the firms that process fresh-cut produce in most cases.

[4] Unfortunately, empirical estimates of the value of produce sold under each of these regimes are not available.

Table 2 Characteristics of fresh produce retailers

	Large retailers	Small and medium retailers	Specialty retailers
Product requirements	Non-mainstream	Mainstream	Non-mainstream
Importance of products in sales/activities	High	Medium	High
Bargaining power	High	Low	Low
Scale of operations	Large	Small to medium	Small to medium
Brand capital/ reputation investments	High	Low or medium	High

There are two public regimes in markets for bulk produce. The Brazilian Program for Improved Standards and Packaging (BPISP) is *de jure*, i.e. compliance is required by law however this is not enforced and it shows very low rates of adoption by either buyers or suppliers of fresh produce. The other is the *de facto* regime, in that it has long been the default regime and is used by a wide range of retail firms and suppliers. The *de facto* regime has long been recognized to be inadequate for the provision of produce of

Table 3 Public and private G&S regimes in São Paulo's fresh produce market

	Public	Private
Bulk produce	-*De jure* formal standard—Brazilian Program for Improved Standards and Packaging -*De facto* standard informally administered via personal relations	-Private standards formally administered via contracts -Private standards informally administered via personal relations
Organic produce	-Association of Organic Agriculture -Bio-Dynamic Institute	-Private standards informally administered via personal relations
Fresh-cut standards	-ANVISA (Government of Brazil) and SEMAB (Municipality of Sao Paulo) (both lack monitoring and enforcement capacity)	-Retail firms with private food safety standards administered through own or third-party certification -Supplying firms with own standards -Vertical integration in fresh-cut (firms do own processing)

consistent quality because it is not formally defined and the assignment of grades by buyers and sellers is done each day relative to what is available in the market on that day. This means produce is classified on the basis of a *relative* standard not an *absolute* one, for example the largest and best quality tomatoes of the day are assigned a "best" label, even if they are only half the size of the previous day's "best" tomatoes. In contrast, an absolute standard such as the one used by the BPISP has specific size and quality (such as percent defects) parameters that produce must fall into to qualify for each grade.

Private G&S regimes for bulk produce are also used by retailers who administer them either formally or informally, and by the largest retail buyers—super and hyper-markets, who rely heavily on private G&S that are explicitly specified and implemented through the use of supplier registries and contracts. Even those firms relying on the *de facto* regime also typically integrate an element of private G&S through their reliance on ongoing, informal relationships with suppliers who come to know and respond to their preferences.

For organic produce, 2001 legislation calls for the accreditation of certifiers of organic producers (Farina and Leles Rezende 2001). The two major certifiers of organic produce are the Association of Organic Producers and the Bio-Dynamic Institute. These are non-profit organizations that seek to promote organic agriculture through consumer education, farmer training, and the provision of certification services. The organic standards promoted by these agencies, though administered privately, are public in that any firm can access their specifications and seek certification of compliance with them at a low cost to the firm. Almost all retail firms (including all supermarkets) selling organic produce seek certification from one of these agencies. There are also a few small retailers and specialized restaurants that informally administer private regimes. They sell direct to a known clientele, with which trust has been established and serves as the guarantee of integrity. These retailers are either vertically integrated in production, or they buy from suppliers with whom they have strong, trust-based relationships and a shared understanding of what they feel constitutes an organic product.

Public food safety standards for fresh-cut produce exist at the municipal and national levels, however enforcement capacity is very low due to low levels of financial

and human resources. SEMAB, the municipal department for food inspection had, as of 2000, not closed a single food contamination case (SEMAB 2001). Likewise, ANVISA, which established current food safety legislation at the national level in 2001 also lacks capacity to effectively enforce their mandate.

Given weak enforcement capacity for public food safety standards, retailers are left with the option of either relying on suppliers' assurances of product safety, or creating and administering their own private standards for suppliers to follow (a very high cost activity). In general, any fresh-cut produce that is explicitly marketed as 'safe for immediate consumption' is always marketed under the brand of the supplier which markedly reduces (though doesn't eliminate) retailers' exposure to liability in the case of product failure. Under Brazil's legislative system the onus for product failure lies largely with the supplier, unless it can be demonstrated that the product's safety was compromised subsequent to supply—e.g. due to inadequate handling or refrigeration at the retail outlet. Beyond this generalized, liability-mitigating response among retailers, three diverging responses are seen. First, the large supermarket chains have developed their own food safety standards for their fresh-cut produce suppliers, which they either monitor and enforce themselves or contract out the tasks to third-party certifiers. These private standards tend to be used more to inform selection of suppliers, rather than to communicate a guarantee of quality to consumers, with the quality assurance still originating from the individual suppliers of fresh cut produce. Second, the smaller (non-specialty) retailers rely on the food safety assurances of the suppliers without making extra investments in the form of private food safety standards beyond, in some cases, visits to the supplier to view operations. Third, some retailers verify suppliers' assurances

of food safety through visits to suppliers and/or rely on trust-based relations, or they undertake the fresh-cut processing themselves thus creating and enforcing their own standards for processing in order to bring the risks under their own control. The vertical integration decision (undertaking own processing) is most common among the specialty restaurants (which are specialized in food preparation), and to a lesser extent among specialty retail outlets for which the fresh-cut produce is but one activity among many.

4.3 G&S Adoption Patterns

Adoption patterns for G&S for the different types of firms and products are summarized in Table 4.

Table 4 Adoption and administration of G&S for Fresh Produce in Sao Paulo

	Bulk	Organic	Fresh-cut
Large Supermarkets & Hypermarkets	Private Formal	Public Formal	Private Formal
Small Undifferentiated Retailers	Public Informal	Public Formal	Public Informal
Specialty Retailers	Private Formal	Private Informal	Private Formal & Informal

The first group of retail buyers described, large super and hyper-markets that purchase at the firm level, showed consistent tendencies to use private standards in both the case of bulk produce purchases and fresh-cut produce purchases, though not for organic produce purchases. In terms of bulk produce, the factors leading to the use of private G&S fit along the lines hypothesized. 1) They have specialized (non-mainstream) product needs because of their use of centralized purchase and distribution centers whose efficient operation relies on the use of automated loading and unloading, thus requiring incoming produce to be standardized in terms of quality and packaging for efficient handling. 2) Because of their bargaining power, these firms can push the cost of compliance with the standards onto their suppliers. The suppliers are willing to take on the associated cost in order to retain these large firms as their clients. 3) Because of the large volumes of produce purchased, any increased transaction costs involved in the formal administration of private standards is offset by the reduced waste and economies of scale and scope that are achieved and reduced logistical costs resulting from the custom standardization of incoming produce.

For organic produce, the decision to adopt the public standard is greatly affected by the availability of third-party certification that lowers the cost of adopting a public standard even for a differentiated product. This is reinforced by the fact that the organic market is still nascent and consumers' understanding of the meaning of organic is considered to be limited, reducing incentives to create private G&S to differentiate one firm's organic produce. Furthermore, sales of organic produce under a private label would require that the firm incur the cost of obtaining accreditation by the government.

For fresh-cut produce, formally-legislated public standards are less important to retailers, due to the lack of enforcement capacity, than the threat of media exposure and its effects on their reputation in the case of a food safety failures. Negative media exposure threatens large firms and those with large investments in brand capital relatively more than smaller and lesser-known firms. Most retailers, then, rely on the quality and safety assurances of their suppliers (a form of external certification) that minimizes their legal liability. In addition, large retailers' typically take the additional measure of employing private standards to inform their selection of suppliers. They do not, however, attempt to communicate compliance with these standards to consumers so that liability remains with the private label suppliers in the case of a product failure.

Small and medium-sized retailers serving undifferentiated markets rely on public standards for bulk, organic and fresh-cut sales. This result is as hypothesized given the relatively small size and mainstream product requirements of these firms, which reduce incentives to promulgate private standards for bulk produce purchases. These firms do not have bargaining power to push the costs of compliance onto their suppliers, nor do they process the volumes that would allow them to achieve economies of scale or scope in the promulgation of private regimes. Likewise in terms of organic and fresh-cut food safety standards, there is little impetus to adopt private standards given poor appreciation of privately differentiated products among consumers and limited costs of food safety failures due to the ineffective public capacity to enforce, the default assignment of responsibility to the supplier of privately labeled products, and the relatively low investment in brand capital by these firms.

An interesting result among these small and medium-sized retail firms, however, is the reliance in many cases on private administration of the public standard for bulk produce. That is, due to the relative and informal nature of the *de facto* public standard, firms are left to administer the standard on the basis of their own relations with suppliers—generally through the creation of long term supply relations in which trust and mutual interdependence play an important role. Failure to privately administer the public standard would put the buying firm at risk of opportunistic behavior by suppliers, and increase the frequency of conflict with suppliers over the quality of produce that is delivered.

Finally, the third group of retailers, the specialized firms, were found to rely on private standards to a greater degree than other small and medium firms that target the popular market. In terms of bulk produce purchases, these buyers have an incentive to promulgate private standards in order to accommodate their specialized product needs, and are able to uphold these private standards through the cultivation of personal relations, supported by either formal or informal contracts. Mutual interdependence between buyers and sellers helps to support the transaction in these cases. This group, unlike the other two, shows a willingness to rely on private (informal) standards even for organic produce, again revealing the importance of administrative capabilities that are rooted in personal, trust-based relations with both their clientele as well as their suppliers. Furthermore, in many cases, these firms are partially vertically integrated in production and/or processing. Given the importance of the products in their activities, the firms must make significant investments in the execution of these activities, but this is compensated

for through reduced transaction costs and increased confidence in the quality of the product.

5 Discussion of results

The research shows that across the different product types, a variety of public and private G&S regimes are in use, with varying patterns of adoption on the basis of several contextual and firm-specific variables. In general, strategic purpose, institutional environment, and product and market characteristics were confirmed to be important contextual variables. Case study results supported hypotheses that non-mainstream product requirements, the importance of the product in the firm's activities, bargaining power, investment in brand capital and reputation, and scale of operations are key determinants of individual firms' decisions to invest in private G&S regimes.

Drawing from these results, a further issue can be considered. Are public and private G&S substitutes or complements to one another? What interactions exist in the administration of public and private G&S?

Considering the substitutability of public and private G&S regimes, it can be argued that if firms are establishing private G&S regimes because public regimes are not relevant to their needs, then it is important to consider the extent different efficiency and welfare outcomes and their distributions resulting from the use of private regimes over public ones. An important issue to resolve is to what extent private firms would like to see public regimes modified so that they can use them as substitutes to the private regimes, and to consider the distribution of potential efficiency and welfare gains of promoting adoption of public regimes over private ones. Modifying the public regimes to

better reflect retailers' needs could help to stay the movement towards reliance on private regimes promoting the maintenance of broader supply chains with lower barriers to mobility among them. However the question then arises, drawing from the São Paulo case study, why one such "improved" public regime for bulk produce (the *de jure* Brazilian Program for Improved Standards and Packaging) has not been adopted more broadly. This regime was established and instituted as law with the intention that it replace the *de facto* relative regime which fails to ensure the provision of consistent quality produce to retail buyers. Although the new *de jure* G&S regime is held to be relevant to retailers' quality requirements for bulk produce, it has not taken over as a substitute for private G&S among any group of buyers. Why has this public regime that is held to be relevant to the needs of both small, medium, and in particular large retailers not seen broader adoption, especially among the large retailers who currently rely on private regimes?

Several explanations can be offered. First, it could be that the *de jure* regime is not in reality relevant to the retailers' needs, despite attempts to make it so. The specifications of this regime are held to be equivalent to the privately promulgated G&S in their essential aspects; however, it could be that some key elements (for some retailers) are not accounted for by the public standard. For example, large retail chains have mechanized systems for loading and unloading produce that require palletization, provisions for which are not included in the *de jure* public G&S regime.

Second, even if the specifications are equivalent, the larger retailers who promulgate private regimes may not have incentives to substitute public regimes for private. The argument that retailers may prefer public regimes because they permit the

creation of a broader base of suppliers implies that large retailers *want* a broader base of suppliers. This may not be true. For example, the logistical methods that the large retailers use are dependent on tight coordination involving scheduled deliveries by suppliers. The efficiency of such operations could be compromised by expanding the pool of suppliers. Furthermore, a significant gap already exists in the quality of produce furnished to the largest retailers by their registered suppliers relative to the produce supplied under the *de facto* standard in the public market. The largest retail buyers may not be confident that adopting a more stringent public standard will induce the provision of produce meeting that standard from suppliers.

Similarly, while small and medium retailers also recognize the shortcomings of the *de facto* regime, they likewise haven't tended to adopt the *de jure* regime. The fact that small and medium retailers who rely on the public *de facto* standard for bulk produce tend to administer it through personal relations offers insight into this result. These personal relations are important not only for ensuring that the produce delivered meets buyers' quality needs, but also for the performance of other aspects of the transaction such as ensuring that suppliers will make produce available and protect them from price increases during market shortages. Thus, once again, it could be that the maintenance of the relationship and selection of suppliers influences the decision of what G&S regime to adopt for many of the smaller and medium sized retailers, as has been argued for larger retailers. A counterpoint, however, is that the competition presented by the increasingly powerful large retail chains is forcing smaller retailers to find ways to reduce their costs, and that one way to do this is to increase their own scale through the formation of buying clubs and other collective actions. To date, the emergence of such institutions has been

precluded by the lack of clear and enforceable grades and standards in the fresh produce market, however the incentive to create these (or to adopt the *de jure* regime) is likely to grow given the changing competitive requirements.

These observations lead to the conclusion that public and private G&S are not seamlessly substitutable due to the embedded nature of the standard in the overall relationship between buyer and supplier, and especially its relation to the means by which the transaction is administered. The question remains, then, in what circumstances public and private G&S might be complementary. A manifestation of the complementarity between public and private G&S regimes is seen in the case of small and medium retailers, who tend to rely on the de facto public standard, but administer these through private relations, in effect creating "private" standards that they administer informally using the public standards as a foundation. Such private standards, if they exist, are thus very informal, even implicit, emerging from working experience and mutual interdependence between buyer and seller. An important aspect of them, then, is that they are likely borne of relatively more equal negotiation between buyers and suppliers (relative to large retailers with large market shares who rely on private G&S), given the mutual interdependence between the two parties. Some of the largest retailers, on the other hand, drew from the *de jure* public standard in defining their own private standards but find it economical to administer them formally.

The above case points not only to the potential for complementarity where a public standard lays the foundation for employment of a private standard, but also of complementarity in the inverse sense. The possibility that these retailers can fine-tune

their input supply by "tweaking" the *de facto* public standard likely contributes to its persistence despite the apparent benefits of the *de jure* standard that seeks to replace it.

Finally, another factor that points to complementarity between public and private G&S is the confidence that consumers place on different regimes. This is particularly relevant for input standards whose key attributes are marketed to consumers, for example organic and fresh cut produce. As shown by Spers et al (2003), consumers tend to value food quality information when it is communicated by public and private standards in conjunction with one another, further increasing the potential complementarity between them.

6 Policy Implications

These considerations offer insight into policy issues, particularly regarding the definition and administration of public G&S. First, there is a need to clearly identify the target adopters of a public G&S regime, particularly as large and smaller retailers diverge in terms of the technologies and organization methods that they employ, and consequently their input needs. For example, if the public G&S regime isn't adopted by large retailers because it doesn't reflect the product attributes they value, then one option would be to further modify the specifications to better reflect large retailers' needs. Doing so, however, would entail a tradeoff—on one hand it could successfully encourage adoption by the largest retailers, on the other hand, it might simultaneously make the public regime *less* relevant to the needs of smaller retailers.

Second, it is crucial to consider the interrelation between the choice of G&S and the choice of suppliers and administration of relationships with suppliers. The decision of

what G&S regime to use must be considered as part of a complex of decisions, rather than assumed to be an independent choice or a leading choice with the choice of suppliers and administration of the supply relationship following. The interplay of the different aspects of the decision will likely differ among retailers on the basis of variables such as the strength of their relations with suppliers and the extent to which quality issues are a constraint to their business, as well as on the type of standard being promulgated.

Third, research is needed on the dynamics of adoption of public regimes—particularly to understand when reliance on an extant public regime might preclude the adoption of a potentially better regime.

Fourth, it is key to consider the efficiency and welfare tradeoffs between reliance on public and private regimes, and the distribution of the costs and gains that are experienced as a result of their promulgation. The widespread shift towards reliance on public standards is common worldwide, and in many respects reflects firms' efforts to be responsive to changing industry conditions. At the same time, the exclusionary effects of private regimes have also been documented. It is important to consider to what extent scarce private resources might be directed to encouraging broader use of public regimes versus helping firms that are at risk of being excluded from competing.

The issues that have been raised in this concluding section highlight the complexity of the public versus private G&S issue. The model that was put forth in the paper provides a basis for understanding the decision, and a point of departure for further research. Exploration of issues such as the interplay between choice of G&S regime, administration of the relationship with suppliers, and choice of supplier may help to provide more insight into the question. It is also important for policy makers to

understand that there will be a tradeoff between the relevance of G&S regimes to different types of buyers, as well as the ability of different suppliers to produce to standard. A better understanding of the factors affecting the emergence of public and private G&S regimes might be achieved by examining the evolution and patterns of G&S adoption from a historical perspective—for example whether the emergence of public regimes before private (or vice versa) encourages path dependency, and what the implications are of G&S regimes being oriented to different levels of the marketing chain (for example for supplier-retailer transactions versus consumer-retailer transactions) or being promoted by different actors in the market (powerful retailers, oligopsonistic wholesalers, concerned consumers, etc.).

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CHAPTER 4

Coordination Strategy Decisions in São Paulo's Fresh Produce Markets: An Empirical Test of the Peterson, Wysocki & Harsh Framework

1 Introduction

Transaction cost economics revolutionized economists understanding of coordination strategy decisions, bringing into the economic equation questions of how the attributes of a transaction affect the governance decision, particularly given the reality of bounded rationality and possibility for opportunism among partners in an exchange. Despite the explanatory power of transaction cost models, they have been criticized on theoretical grounds and for operational shortcomings. Specifically, Dow points out that in order to compare transaction costs across different governance structures, the characteristics of the transaction must be constant regardless of the governance structure in question (Dow in Dietrich 1994 p 4). This is rarely the case in reality. In fact, the characteristics of both the transaction and production tend to shift between coordination strategies, which makes it more difficult to assign solely transaction cost explanations to governance structure decisions. Related to this is a further important criticism: implicit in the transaction cost framework is the assumption that costs are the primary driver of transaction cost decisions, while benefits, particularly strategic benefits (which can not be written off merely as negative costs), playing an insignificant role. Several operational shortcomings of the transaction cost model have also been named. For one, transaction cost economics has been criticized as providing such a general explanation of coordination strategy decisions that one can always find what one is looking for, making it impossible to reject hypotheses related to their determinants. Another criticism concerns the lack of

discussion in transaction cost literature of the cognitive process by which transaction costs are taken into account. Together, these criticisms point to the need for an approach to analyzing governance structures that is both theoretically consistent and operationally sound. The need for such an approach has been felt not only in economics but also in the strategic management fields, where there have been appeals for a business literature that not only offers insight into strategic decision-making but also offers general theoretical insights into coordination issues for use in research and hypothesis testing (e.g. Zylbersztajn 1996).

In their 2001 article, Peterson Wysocki and Harsh (PWH) (2001) address these issues, offering a theoretical decision-making model of the firm's coordination strategy decisions. This paper applies the PWH model to the analysis of coordination strategy decisions among firms in São Paulo Brazil's fresh produce markets. The objective is to test the model's explicative power and to explore the unique contributions that it lends to research on firms' coordination strategy decisions. Data is drawn from case study analyses of the evolution of coordination strategy decisions of three retailers and one processor. The case study approach is a suitable method of analysis in situations where a small sample permits in-depth consideration of the complex and interdependent factors entering into a decision (Yin 2003). A survey of the firms' fresh produce marketing and procurement strategies was implemented and interviews with open and structured questions were conducted with each firm's management. A total of eight coordination strategy outcomes are analyzed.

The paper proceeds as follows. After an introduction to PWH's coordination strategy model, the case study context and firms are introduced. Then the coordination strategies

of each firm are analyzed using the PWH framework. The paper concludes with a discussion of the results focusing on the unique contribution that the PWH model lends to the analysis of coordination strategy decisions.

2 Conceptual Framework: The PWH Framework

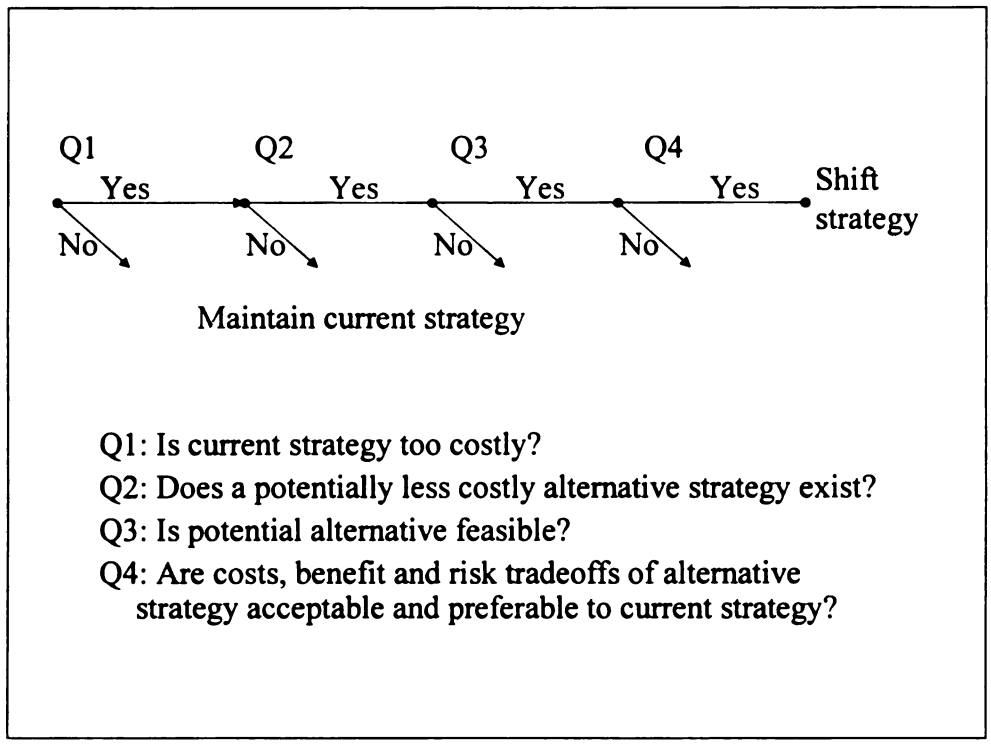
The main objective of the PWH theoretical framework is to identify the decision-making process by which firm managers (decision makers) accommodate issues of asset specificity, complementarity and coordination strategy feasibility in their coordination strategy choices. PWH present a continuum of coordination outcomes that range from low to high levels of intensity of control. At the level of least intense control are spot market transactions, which rely entirely on control methods that are ex ante to the transaction. Ever-increasing intensities of coordination control are seen in specifications contracts, relation-based alliances, and equity-based alliances, with accompanying shifts towards reliance on ex post rather than ex ante transaction coordination. At the far extreme of the continuum is vertical integration, in which one organization has complete control over the coordination transaction. Vertical integration occurs in situations where a single firm owns production resources at consecutive levels of the marketing chain.

The key variables that determine the costliness of different coordination strategies are asset specificity and complementarity. Asset specificity is the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of productive value. Complementarity exists when individual activities produce more in combination than in sum across a specific transaction interface, so that the marginal productivity of each input can't be measured. Asset specificity and complementarity are

affected by private institutional arrangements or public institutions including those that govern transactions, by technology, and by the structure of the marketing chain. Asset specificity and complementarity can be experienced differently by individual firms. As asset specificity and complementarity increase, the optimal coordination strategy shifts from low intensities of control to higher intensities of control. The issue of complementarity is distinct from that of asset specificity. In the case of complementarity it is in the interest of both buyer and seller to achieve smooth coordination. In contrast where asset specificity is an issue, there are incentives for one to profit at the expense of the other, for example through holdup and re-negotiation of the terms of exchange. Put succinctly, the concept of asset specificity emphasizes opportunities for gains through opportunistic behavior, while the concept of complementarity emphasizes opportunities to gain through cooperative behavior.

PWH use results of inductive research to outline a decision process by which firm decision makers synthesize issues of asset specificity and complementarity with consideration of the firm's characteristics and environment to determine a beneficial coordination strategy. The decision process consists of four sequential decisions, each of which must be answered in the affirmative in order for a shift in strategy to be made. The decision-making process is depicted in Figure 1.

Figure 1 PWH Decision-making Process



Initiating the decision process is the subjective question of whether the current strategy is too costly. Costliness can be judged on an absolute scale (for example the current strategy is too costly if it is causing coordination failures that are driving it to bankruptcy) or on a relative scale (where the coordination strategy is considered too costly relative to some perceived alternative). A strategy may be too costly if it causes costly coordination errors, or if the cost of operating the strategy is too high, which can occur in situations where complementarity and asset specificity are present. An affirmative response to the question of whether the current strategy is too costly will lead the firm to initiate the process of considering specific alternative coordination strategies.

Next is the question of whether an alternative strategy exists that might be less costly than the current one. Determining a potential alternative is a matter of matching

the intensity of control offered by an alternative strategy to the combined levels of asset specificity and complementarity inherent in the transaction.

The third question5 is whether an alternative strategy that the firm has identified is feasible for the firm to implement and sustain. Four aspects of this feasibility question can be discerned, two internal and two external to the firm. These are 1) capital availability (including financial, labor, and other resources necessary to the successful implementation of the alternative strategy, 2) control competence (in terms of the firm managers being both willing and able to manage the coordination strategy effectively), 3) availability of willing and able trade partners consistent with the alternative, and 4) institutional acceptability e.g. whether the alternative is considered a "fair" business practice under both cultural and legal views.

Finally, having ascertained the feasibility of the alternative strategy, the firm must reconsider the benefits, costs and risks anticipated to result from its implementation. If these risks and returns are expected to be favorable relative to the current strategy, the firm will choose to implement it. Given this evaluation, the firm decides whether to implement an alternative strategy or maintain their current one.

[5] PWH include programmability as a third decision (addressed before the feasibility question) in their model. Here this step is omitted, as it was not found to be significant (PWH also did not find it to be significant in their own work). It is expected that firms will only seriously consider coordination strategies that they consider to be programmable, so that programmability is addressed implicitly in the range of alternatives that the firm initially chooses to consider.

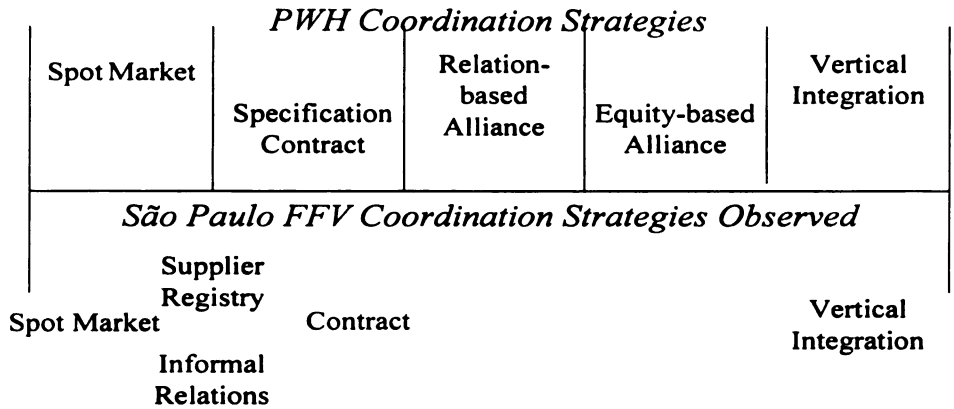
3 Background to São Paulo fresh produce markets

From the early 1980s to about 1994, the Brazilian economy was in a state of instability and stagnation. Inflation rates were high and consumers were extremely price sensitive. Correspondingly, there was little profitability in food retail markets. In the fresh produce sector, there was consequently little specialization at the production level, and there were large fluctuations in the volume, price, and quality of produce available in the market.

Beginning in 1994 with the Real Plan, the economy stabilized and disposable incomes grew for consumers across all income strata. The potential to profit through investment in the food industry increased, drawing new retail entrants and increasing competition. Mergers and acquisitions increased the market share of large retailers—supermarkets currently account for 75% of retail food sales in Brazil (Farina 2002 p3). The emergence of supermarkets as major players and their competitive strategies stimulated investments upstream in the marketing chain, leading many suppliers to invest to expand, modernize, and specialize their operations. This brought some reduction in the variability of prices, quantities and quality of fresh produce available in the market.

Fresh produce markets are one area where large retail chains have had a significant impact on the structure and organization of the market, yet have not come to dominate in terms of market share. Currently, fresh produce markets in São Paulo exhibit a remarkable diversity in terms of the nature of the retailers and their competitive strategies. Five coordination strategies for fresh produce procurement are common in São Paulo's fresh produce markets. Their places along the spectrum defined by PWH are depicted in Figure 2, and they are explained in greater detail below.

Figure 2 Coordination Strategies



The coordination strategy reflecting the lowest intensity of control that is observed in São Paulo is spot market coordination, as defined by PWH. Two more coordination strategies, supplier registries and ongoing informal exchange relationships, are observed lying between the spot market and specifications contracts. Supplier registries are lists of approved suppliers that retail buyers maintain. In applying to be listed on the registry, suppliers are apprised of basic parameters that will guide all transactions, such as product specifications, methods for price formation, and other rights and responsibilities of each party. Thus, they serve as an explicit foundation on which repeated at-will transactions take place, but do not actually include product orders or any commitment to buy or supply produce.

Informally-governed exchange relationships are based on familiarity between buyer and seller, and a sense of mutual benefits to be gained from the continuance of the relationship though no explicit commitment for these relationships to continue exists. In this situation, actors do not make relationship-specific investments on behalf of the other party, so that they maintain their autonomy and flexibility to leave the relationship with minimal losses. Thus these relationships do not reach specification contracts in terms of levels of commitment and control.

Showing an even higher intensity of control are formal contracts between retail buyer and supplier. These include explicit provisions for exchange (for example a commitment to buy or sell produce at regular intervals), in addition to the guidelines found in supplier registries.

Furthest to the right along the spectrum is vertical integration. Vertical integration is most commonly observed directed downstream, e.g. by a farmer who decides to market his own produce; and involves single-ownership of production resources involved in several stages of the supply chain.

In fresh produce markets, a number of factors give rise to asset specificity and complementarity throughout the production, processing and marketing process, with one of the above coordination strategies being chosen as a consequence. The major factor bringing about asset specificity is the perishability of fresh produce, which causes a loss in the value of the product if there is a time-delay in its delivery, for example as might be caused by a transaction falling through (Farina and Machado 1999). Investments that are specific to the needs of a buyer, such as greenhouses or cultivation of special varieties are also asset specific. The primary factor inducing complementarity in fresh produce is the

heterogeneity of supply and demand (Codron et al. 2000), particularly given the perishability of the product. Large variations in the quality of what is produced and what is sought by consumers, and the fact that once it is produced it must move quickly along the marketing chain to the consumer so as to not lose value through natural processes of degradation, make it important for buyers and sellers to have some means of coordinating the product flow with one another.

4 Case analyses

4.1 First case: Companhia Brasileira de Distribuição

Companhia Brasileira de Distribuição (CBD) is the largest food retail firm in Brazil with approximately 15% of market share. With more than 400 retail outlets among three supermarket and hypermarket chains, CBD offers a broad line of food and general merchandise to consumers of all income categories. Perishables, including fresh produce, account for 33% of CBD's sales and are their most important sector strategically. Among perishables, fresh produce can contribute anywhere from 4% to 16% of each individual store's revenue depending on the clientele served and product line carried. Though they offer a broad range of fresh produce items, the focus here is on CBD's procurement of bulk produce.

Phase 1:

Table 1 summarizes the case facts leading to CBD's first procurement strategy shift. CBD's challenge is to coordinate procurement of sufficient volume of consistent quality produce to serve their 400+ stores, and to distribute it among these stores in an

efficient and timely manner. In the 1980s, CBD bought produce at the traditional wholesale market from a registry of approved suppliers. Procurement was decentralized, with each store undertaking its own procurement activities. Quality was controlled by inspections of produce prior to purchase and subsequent sorting at the store level.

With economic stabilization, consumers' incomes increased and consumption patterns began to change, with an increase in demand for fresh produce. At the same time, in part responding to new opportunities in food retail sales, CBD began to grow both through increased sales per store and mergers and acquisitions that increased the number of stores. At this point, CBD's management was faced with the initiating question: Was their current coordination strategy too costly? The answer to this question was affirmative. They had difficulty obtaining adequate quality and volumes of produce and experienced high rates of waste. Furthermore, quantity and quality fluctuations in the market made planning difficult and they had to compete with the rest of São Paulo's retailers for what produce was available in the market. Furthermore, they saw an opportunity to reduce costs and improve quality by constructing centralized purchase and distribution centers for produce that would offer economies of scale and scope. They knew, however, that investment in a centralized procurement and distribution (P&D) center would only yield good results if they were able to assure a constant flow of produce throughput. This made them vulnerable to re-negotiation and holdup by suppliers that they also could not control effectively under their current coordination strategy.

CBD took an alternative strategy which was to make entry onto their registry of suppliers more demanding, and to seek more services such as classification and delivery from suppliers of produce. At the same time, they could vertically integrate the assembly

part of the wholesale function using the centralized P&D centers as a base. CBD anticipated that these changes could reduce their coordination costs—tighter relations with suppliers would facilitate planning and the better product classification would improve the quality of incoming produce and reduce waste. Likewise, a smaller cadre of suppliers with whom they had more regular relations would help to ensure a constant supply of produce throughput for their centralized procurement activities.

The feasibility of the strategy seems apparent. Construction of a centralized P&D center would require much financial capital, but as a large firm that was well reputed in financial circles, CBD had adequate access to such capital. They also had the managerial sophistication (demonstrated in other areas) necessary to coordinate the logistical and contractual functions associated with a more intensely-controlled supplier registry and centralized P&D. CBD anticipated that they would have an adequate number of suppliers who would be willing and able to serve their needs—suppliers would benefit from the smoother flows of information and product too, and appreciated the large volumes of product that CBD needed. Institutional acceptability of the alternative options also presented no challenge.

Given its feasibility, CBD apparently evaluated positively the risks and returns of making these large shifts in their strategy. The potential benefits—improved control over quality, and savings of from 20-30% on procurement costs through centralization—were clear, and CBD opted to make the shift.

Table 1 PWH analysis of CBD cases facts in 1st stage of evolution

PWH Variable	Realization in Case
Initial strategy:	Informal supplier registry with individual store purchases from wholesale market. CBD then processes goods as needed.
Is initial strategy too costly?	Yes. Quality and volume requirements not met. Issue heightened by increasing demand and competition during decision period.
Does an alternative exist that is potentially less costly?	Yes. Alternative is centralized purchases direct from producers informal supplier registry with enforced quality standards. Supplier does processing. Alternative trades off low asset specificity of conducting decentralized purchases in wholesale market in favor of high asset specificity of investing in centralized facilities. Complementarity is high due to increased profit opportunities from having volume and quality demands met through tighter chain coordination. In balance, alternative is expected to be less costly.
Is alternative feasible?	Yes. CBD has financial capacity to make investment. Sophisticated management ensures control competence. Tighter relationship benefits producers ensuring availability of willing suppliers, and alternative is legally and culturally acceptable.
Favorable risk/return?	Yes. Anticipated risk & return of alternative deemed preferable to current strategy.
Outcome	Alternative adopted as predicted by PWH—all decision process answers "yes".

Phase 2:

Table 2 summarizes the case facts relevant to CBD's next shift in procurement strategy. Several years after making a shift to vertically integrated assembly functions and a more tightly-controlled supplier registry, CBD found itself facing new challenges that made it once again reconsider the costliness of its coordination strategy. CBD's managers felt that the strategy of vertically integrated assembly operations was working well and felt no need to change. They saw, however, that the supplier registry as working sub-optimally given current market conditions. Consumers had become increasingly sophisticated and were concerned with issues like food safety. At the same time, CBD suspected that there were opportunities to increase their profitability by further improving the quality and regularity of their produce supplies, and this was difficult under the current coordination strategy because some suppliers still lacked loyalty in times of product shortages. Moreover, the shift in coordination enacted in the previous period had increased the level of investment required for suppliers to qualify for the registry, and there were complaints from suppliers who perceived power imbalances in the registry system—particularly their having made investments to qualify for the registry without CBD making any commitment to buy from them on a regular basis.

CBD considered contracts with suppliers as an alternative coordination strategy for input procurement. These contracts could resolve the asset specificity and complementarity problems that were present in the existing strategy. A commitment on the part of CBD to purchase output from suppliers could pacify suppliers' current frustrations, and also provide them the security they needed to make even more specialized investments, for example in greenhouses and sophisticated irrigation systems,

that would improve the quality and regularity of the produce they supplied. At the same time, contracts would help CBD to weed out those suppliers who were not willing to commit to supply them regularly, regardless of market conditions.

Instituting such a shift would require investments to form the contracts, as well as additional managerial expertise to manage them, but these did not present a barrier to CBD given its large size, ready access to investment capital, and highly sophisticated managerial expertise. Likewise, it was anticipated that there would be an adequate number of experienced suppliers who would be willing to make investments to improve the quality of their production provided they could be assured of a buyer. Institutional acceptability was also not gauged to be an impediment. The anticipated return and perceived riskiness of the shift was favorable to CBD, as increased sales and lower costs of coordination were anticipated. Thus, at the time of data collection, CBD was beginning to undertake activities to make this change.

Table 2 PWH analysis of CBD cases facts in 2nd stage of evolution

PWH Variable	Realization in Case
Initial strategy:	Alternative adopted in first stage (centralized purchasing direct from producers, formal supplier registry with enforced standards; supplier does processing)
Is initial strategy too costly?	Yes. There is insufficient assurance of food safety given increasing consumer safety concerns, and a lack of loyalty exists among suppliers given their perceptions of a power imbalance with CBD.

Does an alternative exist that is potentially less costly?	Yes. Specification contracts—build on registry to include commitment to buy/sell. Asset specificity is high for suppliers—fixed investments to join registry and respond to new demands but contracts guarantee purchase. Complementarity is also high due to additional opportunities for farmers to profit if they respond to food safety demands but need to more tightly coordinate supply to realize these opportunities.
Is alternative feasible?	Yes. Capital to institute contracts is available. Sophisticated management ensures control competence. Buy/sell commitments now make asset-specific investments by suppliers worthwhile. Alternative is legally and culturally acceptable.
Favorable risk/return?	Yes.
Outcome	Alternative adopted as predicted by PWH—all decision process answers positive.

4.2 Second case: Sapori

Sapori markets premium quality preserves and fresh produce items to the upper-income strata of metropolitan São Paulo's consumers through independent retail outlets (i.e. ones not owned by Sapori) . Sapori has a 30 item product line, oriented to consumers who seek the healthfulness and novelty of premium and exotic products, such as mini-

eggplant, mini-corn, and recipe-of-the-week combinations. The firm has also developed some of its own varieties for some of the exotic vegetables it markets.

Phase 1:

Table 3 summarizes the case facts leading to Sapori's first shift in procurement strategy. In order to market premium-quality, specialized fresh produce products, Sapori needs moderate volumes of a highly specialized input. When Sapori began operations, they were able to meet these special needs through vertical integration of their production and processing operations. As demand for their products grew, however, they found this strategy to be too costly—though they had tight control over the quality of their produce, their volume and variety needs came to outstrip their production and managerial resources. Acquiring all the produce they needed in this manner was too costly in terms of the firm-specific resources that it required.

An alternative coordination strategy that was available to Sapori was to make purchases from the local wholesale market using spot market relations. Sapori hoped that purchases from the local market would be able to provide them with the volumes and types of produce that they needed, permitting them to specialize their firm resources on the value-added processing activities that were key to their success.

This option seemed very feasible—it carried virtually no capital requirements and little control competence was needed to make such purchases. Likewise, there were numerous suppliers already situated in the wholesale market who would be willing to supply them, and it was institutionally acceptable. Given the costs that they were facing at that point, the risk/return tradeoff of implementing the alternative seemed favorable,

and Sapori took the step to vertically dis-integrate their production activities in favor of spot market purchases of raw material inputs. It should be noted, however, that consideration of asset specificity and complementarity issues in the PWH framework brings into question the adequacy of Sapori's chosen strategy to accommodate the highly specific input requirements.

Table 3 PWH analysis of Sapori cases facts in 1st stage of evolution

PWH Variable	Realization in Case
Initial strategy:	Vertical integration of production and processing activities
Is initial strategy too costly?	Yes. Growth in sales over-extends Sapori's production capabilities. Managerial capital and space became inadequate to meet scope and volume requirements for inputs.
Does an alternative exist that is potentially less costly?	Yes. Informal (spot market) purchases of raw material from local wholesale market would satisfy volume and scope requirements. [PWH model would question benefits of spot market purchases given high asset specificity and complementarity of input (which are accommodated through current strategy of vertical integration) but actual decision makers expect alternative to be less costly given need to meet volume and scope requirements.]
Is alternative feasible?	Yes. Alternative has low capital and control requirements. Willing suppliers exist and the alternative conforms to common business practice. Alternative is legally and culturally

	acceptable.
Favorable risk/return?	Yes.
Outcome	Alternative adopted as predicted by PWH given all decision process questions answered "yes" by decision-makers, but PWH analysis brings into question ability of new strategy to accommodate asset specificity and complementarity.

Phase 2:

Having made this shift, Sapori came to realize that in resolving some of their coordination problems, they had generated others! They were now able to get the volumes and types of produce that they needed, but they found that they were having trouble getting the quality that they were looking for. The day-to-day nature of spot market transactions meant that there was no advance planning, and Sapori could only purchase what was available in the market. They needed produce with special characteristics, however, such as "baby" cuts (harvested when still immature) and they were also developing their own varieties of exotic produce and needed to be able to coordinate in advance if farmers were to grow these. As it was, with spot market purchases, suppliers were unwilling to accommodate these special needs because there was no guarantee that Sapori would be there to purchase from them, and the value of produce grown to meet Sapori's needs was low for alternative buyers. Thus, the new strategy was generating costly coordination errors. Table 4 analyzes case facts relevant to Sapori's second shift in procurement strategy.

To combat this problem, Sapori considered another change in strategy—they could establish relationships with a subset of highly qualified farmers, with specific transactions being guided by written purchase orders. The advance purchase orders, permitted growers to plan their planting activities with the expectation of having a buyer for their output. This facilitated complementarity in moving high-value products more smoothly along the marketing chain, benefiting both Sapori and its suppliers. The ongoing relationships would assure suppliers of a buyer for their product, and permit them to make investments that would enhance their production for Sapori.

An assessment of the feasibility of this alternative was positive. The strategy carried moderate capital needs that Sapori could meet, and Sapori anticipated being able to maintain adequate control by providing technical assistance to their suppliers by a full-time agronomist they employed. There were suppliers available who were able and willing to specialize their activities to meet Sapori's needs, and they had the incentive to do so given the premium prices that Sapori was willing to pay. Institutional acceptability likewise did not present any problems.

Given the apparent feasibility of the alternative and its potential to alleviate the costly coordination problems that they were facing, Sapori's managers perceived the risks and returns on the project to be favorable. The anticipated benefits were clear—making the shift could ensure Sapori was the quality, scope, and volume of input that they required. Sapori thus ceased to make spot market purchases from the local wholesale market and instituted a system of ongoing purchases from a core of highly qualified suppliers.

Table 4 PWH analysis of Sapori cases facts in 2nd stage of evolution

PWH Variable	Realization in Case
Initial strategy:	Alternative adopted in first stage (spot market purchases of input)
Is initial strategy too costly?	Yes. Volume and scope needs met through shift, but advance planning of purchases precluded by spot-market nature of transaction. Sapori can't get special input needs met (early harvest, exotic varieties). Failures to accommodate asset specificity and complementarity make current strategy too costly.
Does an alternative exist that is potentially less costly?	Yes. Informal relation-based alliances with provision of some inputs (e.g. seeds), technical assistance. Asset specificity and complementarity will still be high, but the new strategy offers a better chance of accommodating them than the spot market.
Is alternative feasible?	Yes. Alternative has low capital requirements, and control is facilitated by full-time agronomist employees and Sapori's close proximity to most growers. Capable suppliers familiar with Sapori's needs exist. No challenges to institutional acceptability anticipated.
Favorable risk/return?	Yes.
Outcome	Alternative adopted as predicted by PWH—all decision process answers positive.

Phase 3:

The shift in strategy improved Sapori's raw material procurement results remarkably. Eventually however, they once again had to face the question of whether errors and operational costs incurred under their current strategy were too costly. Two issues led them to consider this: First, like CBD, Sapori became aware that their end consumers were increasingly concerned with the safety of the food they ate, and the level of control offered under the current coordination strategy (based on ongoing informal relations with suppliers and written product orders), seemed insufficient to truly guarantee a safe product. Second, they had become aware that some of the suppliers to whom they had provided seed (for exotic varieties that they had developed) had sold the product of this seed to buyers other than Sapori. It seemed that those growers who had done this lacked commitment to the relationship, as they were apparently willing to compromise it for short-term opportunistic gain. Table 5 summarizes the case facts relevant to Sapori's final shift in procurement strategy.

The next change that Sapori contemplated for their coordination strategy was to institute written contracts with their suppliers, that would that specify the rights and responsibilities of each party, define planting schedules, and make other aspects of the relationship clear. Sapori's managers felt that by formalizing the relationship with suppliers, they would increase complementarity in the relationship—especially as it related to the marketing of a safe product—by further tightening coordination. They also hoped to protect the asset specificity of their investments in varietal development by making it explicit that they had the right to all of the output from the seed they provided.

Consideration of the feasibility of this strategy yielded encouraging results. Relatively little capital was required to define and establish the contracts, and Sapori had the managerial competence required to successfully implement them. It was anticipated that suppliers with whom Sapori already worked would be amenable to the change, as it carried little implication for actual operations, facilitated their planning, and strengthened their market. Institutional acceptability was not expected to be a problem.

The benefits that were anticipated in instituting a contract seemed apparent, and at the time of data collection Sapori was poised to initiate this shift in strategy.

Table 5 PWH analysis of Sapori cases facts in 3rd stage of evolution

PWH Variable	Realization in Case
Initial strategy:	Alternative adopted in second stage (informal, relation-based alliance with producers)
Is initial strategy too costly?	Yes. Consumer concerns for food safety increase coordination requirements for input acquisition, and a lack of commitment on the part of some suppliers (who divert seeds to other uses) threatens the value of investments in exotic varieties.
Does an alternative exist that is potentially less costly?	Yes. Formal contracts with some input provision and advance purchase commitments. High asset specificity faced by suppliers (specialized production) is already accommodated through current strategy, however Sapori's asset specific investments in exotic varieties are threatened by some farmers' diversion of these to other uses and Sapori anticipates formal contracts might

	quell this, increasing long term profitability. Furthermore, they anticipate formal contracts will increase farmers' willingness to investment in traceability and other food safety assurances, increasing complementarity.
Is alternative feasible?	Yes. Capital is available for the definition and implementation of contracts and little change to control needed. Suppliers of proven availability are already working with Sapori. No problems with institutional acceptability are anticipated.
Favorable risk/return?	Yes.
Outcome	Alternative adopted as predicted by PWH—all decision process answers "yes".

4.3 Third case: Sacolão FLV

Sacolão FLV (SF) is one of metropolitan São Paulo's government-promoted discount green grocers. Established in 1992, SF is oriented to lower income consumers and sells a range of about 80 fresh produce items at a uniform price per kilogram. SF falls into the class of "small" food retailers for São Paulo with a sales area of approximately 500 square meters (all of which is used for fresh produce sales). Though privately administered, the government supports the firms through provision of space in which to operate and basic services (e.g. light and water), in exchange for which SF must adhere to the municipal government's price guidelines.

SF's primary challenge is to obtain a consistent volume and quality of fresh produce so that it can meet its clients' needs. A key constraint is the single price-per-kilo format and the need to keep the costs below that despite characteristically fluctuating fresh produce supply and prices.

When the firm opened in 1992, SF purchased fresh produce in São Paulo's wholesale market, relying entirely on spot market coordination. Each day a buyer would compare prices and inspect products, and choose a supplier on the basis of the day's product availability. This was an appropriate strategy for the time—economic instability meant that fresh produce was a relatively unprofitable sector, and although SF's procurement would have been facilitated through tighter coordination in order to mitigate the high variability in prices, volumes and quality of produce that was available in the market, the low profitability of the sector left neither SF nor suppliers with incentive to do so.

Gradually market conditions shifted and SF considered the costliness of their strategy given current market conditions. With economic stabilization, demand for fresh produce had grown and this had stimulated greater levels of production and investment in specialized production by many suppliers who were now able to offer consistent quality produce on a regular basis. SF's management suspected that they could have better control over supplies lower costs if they updated their strategy to reflect these changed conditions. Table 6 summarizes the case facts relevant to SF's shift in procurement strategy.

As an alternative to their spot market coordination strategy, SF considered forging ongoing, informal relations with a relatively small number of suppliers. An informal

alliance could permit mutual familiarity between SF and a limited number of regular suppliers, providing benefits of cooperation from longer-term "preferred supplier-preferred buyer" relations. The give-and-take of the relationship would increase complementarity, benefiting both buyer and suppliers. The provision of services such as protection from price fluctuations and responsiveness to the specific quality and price needs would make the acquisition of fresh produce easier and less costly. At the same time, neither firm would need to make any relationship-specific investments, so that they could maintain their autonomy and exit the relationship at will.

This shift in strategy seemed feasible to SF—it required no explicit capital requirements and there was an increasing number of specialized suppliers in the market who would be interested in having a relatively assured outlet for their product on a long term basis. Control competence was not a problem as it required little change in management, and institutional acceptability was not anticipated to be a problem, given that such relationships were common.

The risk and return assessment was likewise favorable—SF expected to benefit by having easier access to produce and lower price fluctuations, without having to incur any significant costs in making the transition. Thus, the strategy was implemented as envisioned.

Table 6 PWH analysis of Sacolão FLV Case Facts

PWH Variable	Realization in Case
Initial strategy:	Spot market purchases from many suppliers in wholesale market
Is initial strategy too costly?	Yes. Gradual increases in supply in market, reductions in price, volume, variety variability cause difficulty getting consistent volume, quality of input needed.
Does an alternative exist that is potentially less costly?	Yes. Purchase from the wholesale market but rely on informal relations (specification contract) with fewer specialized suppliers. Asset specificity is low—only perishability of product. Initially little complementarity because suppliers profit by playing market, however complementarity increases because increased market supply makes having pre-arranged outlet preferable and buyers wants quantity, quality and availability needs to be responded to.
Is alternative feasible?	Yes. Alternative has no explicit capital requirements. Little change in management needed for control competence. Willing partners exist in specialized suppliers who will benefit from having an assured buyer. Alternative is legally and culturally acceptable.
Favorable risk/return?	Yes.
Outcome	Alternative adopted as predicted by PWH—all decision process answers "yes".

4.4 Fourth Case: Galeria dos Pães

Galeria dos Pães (GP) is an upscale self-service restaurant and supermarket located in one of São Paulo's most affluent neighborhoods. Established in 1992, GP enjoys a strong reputation for the provision of fresh, premium-quality food through both its restaurant and retail sectors. The supermarket specializes in perishables, bakery items, and imports, and contributes approximately 50% to GP's R$1 million monthly revenue. Many of the supermarket products are produced on-site in complement to the restaurant's activities guaranteeing that maximum quality and freshness are consistently maintained. FP sells approximately 200 fresh fruit and vegetable items in the 100 square meters of its fresh produce department. The marketing strategy emphasizes its premium quality, variety and convenience to its demanding clientele with a small area dedicated to the presentation of each item and quick turnover. GP doesn't sell any bulk produce items—approximately 50% of its sales are of select-quality pre-packaged produce, with the remaining 50% divided among sales of organic, hydroponic, and pre-processed produce. Profit margins for individual products can reach over 30%.

Galeria dos Pães is an interesting case in that it has not enacted any significant shift in its procurement strategy since its inception in 1992, nor do they plan to alter their current strategy. This case analysis tests the PWH hypothesis in an alternative manner, however, by comparing GP's coordination strategy for two different types of produce—pre-packaged produce (which is sold whole in Styrofoam trays with plastic wrap coverings), and fresh-cut and organic produce, which present coordination challenges given their holding high-value attributes—convenience and food safety, and production

with organic processes respectively. The firm has significantly different coordination strategies for the procurement and marketing of each of these.

Pre-packaged produce: Table 7 presents case facts relevant to the PWH analytical model. GP's strategy for the marketing of pre-packaged produce is to use a hybrid of a spot market and specifications contract (reflected in ongoing informal relations with suppliers, much as SF has) for the assembly of produce, and then to process it (sort and package) at its own site. Ongoing relations with suppliers permits GP ready access to high qualities of produce in the market—they intentionally buy from relatively small suppliers in order to encourage complementarity present in two firms selling to one another on a regular basis, and suspect that if they bought from a larger supplier it would not appreciate their business so much and complementarity would be lost. The asset specificity inherent in purchases of fresh produce is low, and moderate in processing though by conducting their own processing operations it is minimized because they have relatively small investments in equipment, and use produce that is not sold in their restaurant operations. The strategy is highly feasible because it is relatively simple and has little managerial requirements, and because it takes advantages of resources that GP readily has at hand, such as a large labor force for the processing activities. There are numerous trade partners willing to supply them and benefit from the ongoing relationship, and the strategy is acceptable institutionally.

Though alternative coordination strategies are also available that are feasible and would serve GP's needs, the current strategy is judged to be efficient and effective, and so no alternative strategy would surpass it given the perceived good returns that are accrued with the current strategy.

Table 7 PWH analysis of Galeria dos Pães Case Facts for Pre-packaged Produce

PWH Variable	Realization in Case
Initial strategy:	Spot market – specification contract hybrid for coordination of purchases; Vertical integration of processing.
Is initial strategy too costly?	No. Asset specificity and complementarity are accommodated through on-site processing. Operational costs are low.
Does an alternative exist that is potentially less costly?	No.
Is alternative feasible?	—
Favorable risk/return?	—
Outcome	No change to coordination strategy.

Fresh-cut and organic produce: Fresh-cut and organic produce present a different challenge to GP. They present a high degree of complementarity in that their highly-valued attributes (food safety in the case of fresh-cut, and organic production in the case of organic produce) are highly specialized and need to be marketed effectively (for example identity to be preserved) in order for their value to be realized. Vertical integration of production would not be in GP's interests as it requires substantial managerial competence and investment, and because if they are not sold their high value is forfeited. There is also a relatively competitive supply of these products in São Paulo's

market. A summary of case facts for the PWH analysis of GP's organic and fresh-cut produce coordination strategy is presented in Table 8.

Table 8 PWH analysis of Galeria dos Pães Case Facts for Fresh-cut & Organic Produce

PWH Variable	Realization in Case
Initial strategy:	Suppliers (vertically integrated downstream) responsible for production, processing & management activities.
Is initial strategy too costly?	No. GP does not bear risks in carrying fresh-cut and organic produce line. Suppliers accommodate asset specificity and complementarity through vertical integration, bear risk of participation in market, but this strategy allows them access to the market.
Does an alternative exist that is potentially less costly?	No.
Is alternative feasible?	—
Favorable risk/return?	—
Outcome	No change to coordination strategy.

The relatively high risk in their production and marketing, high managerial requirements, and high level of complementarity result in an interesting coordination strategy, in which suppliers vertically integrate downstream, conducting not only production and processing operations, but also taking responsibility for much of the

marketing operations, for example deciding how much and what to stock in GP's shelves, and even stocking it. They are also responsible for the value of any produce that is not sold (though it is purchased by the retailer, rather than sold on consignment).

GP is not presented with an incentive to change this coordination strategy. It allows them to offer a high-value product that their consumers value, with little risk in either marketing or liability (for example in the case of a food safety failure) as their suppliers' take on virtually all of the responsibility. The suppliers benefit by the complementarity that is achieved—they overcome the barriers to market access by carrying out their own marketing activities and taking on risk inherent in these activities.

5 Discussion and conclusions

Analyses of the evolution of the three firms' coordination strategies appear to provide powerful evidence supporting the determinants and processes of decision-making that PWH posit in their model. The case study results provide considerable insight into issues of incentives and feasibility, as well as the influence that asset specificity and complementarity have on coordination strategy decision.

What insights have the case analysis lent into general questions of coordination strategy decision-making? Several points can be drawn. First, with only the exception of those firms that began with a vertical integration strategy and subsequently de-integrated, firms in each case consistently tended to shift their strategies toward ones offering greater intensities of control. In general, this does not necessarily indicate that the firms initially made the "wrong" coordination strategy choice. Instead, there are suggestions that both retailers and suppliers benefited from the gradual intensification of coordination control,

over which period they learned to better work with one another and adjusted to the greater levels of interaction and interdependence, while incompatible partners were identified and weeded out. There were also important driving forces, namely the shifts in underlying demand and supply conditions faced by the firm that also drove these strategic shifts towards ever-increasing levels of control.

Second, differentiation between issues of complementarity and asset specificity permit a considerably richer insight into issues of coordination than a single-minded focus on asset specificity. The defining difference between the two concepts highlights that coordination can be costly even where there is no reason to anticipate opportunistic behavior on the part of either party, i.e. in situations of complementarity where both parties will benefit from the successful completion of transactions.

Third, it seems that as one moves from lesser to greater degrees of control intensity, one can observe early shifts rightward to be oriented to resolving issues of complementarity, with the resolution of these leading to gradual increases in the levels of asset specificity implicit in the transaction; and this in turn leading to the need for additional shifts in coordination strategy. For example, in the first phase of CBD's coordination strategy, they sought to facilitate the achievement of complementarity benefits by tightening control through the supplier registry, doing which led to relationship specific investments whose asset specificity later needed to be accommodated through further shifts in coordination. This observed phasing needs to be tested with additional cases to see if it can be generalized.

In conclusion, it is argued that the case study analyses provide significant support for the PWH model, as well as new insight into the firms' coordination strategy decisions

that might be forgone when analyzed using a model that lacks the operational approach and consideration of incentives and feasibility guiding the PWH model.

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CHAPTER 5

Fresh Produce Procurement Strategies in a Constrained Supply Environment: Case Study of Companhia Brasileira de Distribuição

(Teaching case & notes)

The General Manager of Produce Operations was in the midst of considering the challenge that he faced in the coming months. His firm, Companhia Brasileira de Distribuição (CBD) had seen several years of growth and high profitability, and fresh produce had been a key contributor to this success. Yet he felt that a shift in strategy was due if CBD's fresh produce sector was to continue on its path of expansion and high performance. To begin with, he sensed both the potential and the need to revise relationships with suppliers in order to improve the level of service. Moreover, as in many countries, food safety had become an issue of concern for consumers in Brazil and he suspected that if CBD could provide the safest and most consistent quality in the market, then even more consumers would respond by becoming loyal customers of CBD. But how would he make such a shift? What changes should be made and how?

1 Background

São Paulo is the largest city in Brazil. Its population of 18 million has seen remarkable changes over the past decade. Since the early 1990s, a time when Brazil's economy was in shambles, São Paulo's residents have benefited from economic stabilization and growth that increased their incomes and permitted higher levels of consumption across all income strata. Concurrent with these changes, large modern

retailers have grown in importance—between 1994 and 2000, the market share of the ten largest retail chains grew from 24% to 47%. In competition with other retail giants like the French Carrefour and American WalMart, CBD has earned the place of Brazil's largest retailer, with sales of US$4.5 billion in 2002.

CBD had its beginnings in 1948, when Valentim dos Santos Diniz, a Portuguese immigrant to Brazil, opened his first supermarket in São Paulo. The firm, which evolved into a group of food retail chains collectively called Companhia Brasileira de Distribuição, survived the financial turmoil of the late 1980s and early 1990s, and after restructuring in the 1990s, gained its current place as Brazil's largest retailer in 2000. Today, CBD has more than 300 stores in São Paulo and nearly 500 nationwide.

2 The Role of Fresh Produce in Retail

Fresh produce is a key strategic sector for modern retailers worldwide. Though it maintains a relatively low overall share of supermarket revenues in Brazil—only 6% on average—profit margins tend to be quite high. Price/cost ratios exceed 130% for some products, particularly for the highest-value produce lines such as pre-processed, pre-packaged, organic and hydroponic produce. Furthermore, though per capita consumption of fresh fruits and vegetables is relatively low on an absolute level in Brazil (40 kg per year relative to 143 kg per year in the U.S.), and consumers spend only 2.5% of their incomes on vegetables (compared to about 4% in the U.S. for example), fresh produce represents a rapidly expanding market. Demand for higher-value products, such as organics and pre-processed produce, is especially dynamic as consumers increasingly seek foods that are healthy, novel and convenient.

Fresh produce also plays an important role in attracting clients and generating customer loyalty. It serves as each store's "calling card," lending an immediate impression of the quality of merchandise that is offered in the store. Consumers typically purchase fresh produce items several times a week, spurring more visits to the supermarket and higher levels of total spending. Given its strategic importance, the fresh produce sector must be administered effectively to be an asset to the store—freshness, quality, variety, novelty and convenience should always be maintained even as prices must remain within consumers' reach and competitive with other retailers. In Brazil, supermarkets and hypermarkets supply approximately 50% of the demand for fresh produce. In São Paulo, supermarkets' market share is relatively smaller at 28%. This is due to consumers' heterogeneous buying patterns resulting from large disparities in income distribution, an ethnically diverse population, and some consumers' preferences for more traditional retail outlets for fresh produce (e.g. the weekly open-air fair).

3 The Fresh Produce Supply Chain

The fresh produce sector is one of the most challenging to manage, particularly for a firm as large as CBD. First, CBD must decide what products it will provide to its clientele. This requires knowledge of the market, including consumers' preferences and priorities among quality and price tradeoffs, their willingness to pay for value-added features, and trends in the market. Second, once these patterns of demand are ascertained, CBD must acquire produce that meets this demand, a difficult task given the characteristics of the market and a risky business environment.

São Paulo state has more than 60,000 vegetable growers, working on an average of just under five hectares each. Small farmers who work on small plots of land in the "green belt" surrounding the city grow most fresh produce consumed in São Paulo. Commonly grown items include tomato, lettuce, onion, squash and eggplant. More than fifty-five different vegetables are grown and marketed in the state. The level of technological sophistication is relatively low. For example, few farmers use greenhouses or other means to protect their crops from weather fluctuations. This increases variations in the quality and quantity of produce that they grow. Meanwhile, the infrastructure linking producers to buyers is also weak—poor roads and non-specialized vehicles and shipping containers lead to high rates of waste—more than 30% of many vegetables are spoiled between the farm and retail shelf. Even communication with suppliers can be difficult—telephone calls are frequently misdirected or cut off—though this situation has improved with the recent proliferation of cellular telephones and the internet.

The characteristics of fresh produce further increase the risks and costs of trade in fresh produce: (1) fresh produce is a very perishable product, and sensitive to post-harvest handling conditions; (2) damage to fresh produce products does not always show up at the time it is incurred, making it difficult to attribute responsibility for damaged merchandise; (3) it is difficult to create objective measures of quality that can be consistently applied and that adequately reflect the range of product attributes sought in the market; and (4) some high-value products, such as organic produce and hydroponic produce, have attributes that require special treatment and coordination along the marketing chain.

These factors, combined with the difficult supply environment, create risk for both suppliers and buyers. For example, a buyer who receives a shipment of bruised tomatoes will not know whether the damage was incurred en route (a reasonable explanation given the rough roads) or whether the supplier is trying to cheat the buyer by delivering a damaged product. Similarly, if a buyer wants to renegotiate the price on a delivery because of a damaged shipment of lettuce, the supplier can't be sure that the lettuce really is in as bad condition as the buyer claims, or if the buyer is simply trying to take advantage of the uncertainty to accrue some savings. The weak judicial system and lack of cultural limits to this type of opportunistic behavior further increase the risk inherent in these transactions, as it is difficult for a buyer or seller who has been cheated to redress these grievances and recoup the loss.

There are four major types of retailers that sell fresh produce in São Paulo. First are large supermarket and hypermarket chains, like CBD. Second are small and medium-sized supermarkets which operate as independents or in small chains, generally comprised of less than ten stores. Like the large chains, these are general line merchandisers. The third type of fresh produce retailer is the discount green grocer that is specialized in the sale of fresh produce (and sometimes other perishables like eggs or fish), and often relies on some version of an "all for a dollar" marketing scheme6 to move large volumes of staple produce items. Finally, there is the open air fair, in which independent vendors come together in different neighborhoods on a weekly basis to sell

[6] More specifically, these retailers sell almost all different fruits and vegetables at the same price per kilogram.

fresh produce and a variety of other items. These fair vendors generally compete on the basis of quality, service, and tradition.

São Paulo's fresh produce retailers employ several different strategies to acquire their fresh produce inputs. Some buy from wholesale markets where a large number of buyers and sellers meet to exchange produce. Others purchase directly from the growing regions either from farmers themselves or from specialized intermediaries, and have the produce shipped directly to their distribution facilities or individual stores. There are also many strategies for the management of relationships with suppliers that are designed to minimize the risks and costs of buying fresh produce. Buying at the public wholesale market generally involves either (1) spot market relations where the buyers and sellers are effectively unknown to one another and there is no expectation of a continued relationship once the sale is made, or (2) informal relationships that are sustained over the long-term and where the buyers and sellers become familiar with one another's needs and business practices. Alternatively, some retailers use supplier registries and contracts when they purchase from the producers in the growing regions. These registries and contracts establish of a mutual set of expectations regarding the responsibilities and rights of both the buyers and suppliers, which facilitates the maintenance of ongoing relationships between them.

4 CBD and its Fresh Produce Activities

CBD manages three different retail chains, each of which has a different competitive focus. The first, Pão de Açúcar is a chain of small and medium-scale neighborhood supermarkets that seeks to compete on the basis of quality differentiation and provision

of services and products to higher income consumers. Barateiro is a chain of medium-scale supermarkets that targets clientele in lower income areas. Extra is a chain of hypermarkets (a hypermarket is a large scale retail store that sells a full line of merchandise from perishable foods to consumer durables) that targets all consumer groups, with attendance differing on the basis of the location of each individual store. Some basic statistics on these three chains are provided in the Table 1.

Table 1 Holdings of the Companhia Brasileira de Distribuição

	2001 revenue (US$ billion)	Number of stores	Average sales area per store (sq. meters)	Target market
Pão de Açúcar	1.06	176	1500	High Income Consumers
Barateiro	0.44	150	1300	Low Income Consumers
Extra Hypermarkets	1.57	55	7500	Dependent on location
Source: Grupo Pão de Açúcar Annual Report 2001 http://www.grupopaodeacucar.com.br/site_ri/ingles/downloads/pdf/Relatorio_anu2001_ing.PDF				

For CBD, sales of perishable foods (including meats, dairy and fresh fruits and vegetables) generate 33% of revenue and are strategically the most important sector.

Among perishables, fresh produce can contribute from anywhere from 4% to 16% of an individual store's sales revenue, depending on the clientele and product lines carried.

Following an extensive internal reorganization in 2001, responsibility for the administration of CBD's fresh produce sector was divided between Category Management and Procurement divisions which are responsible, respectively, for determining what products to stock and for supplying those product needs.

When it comes to serving its clientele, the fresh produce product lines and competitive strategies of CBD are reflective of the client focus of each of the three individual brands. Pão de Açúcar's fresh produce section, with its upper-income clientele orientation, offers a full range of produce including premium-grade bulk (i.e. unpackaged), organic, hydroponic, pre-processed and fresh-cut produce which meets its customers' demand for convenient, healthy, novel products. Barateiro stores, oriented to a clientele that is cost conscious and less willing to pay for differentiated products, typically offer only bulk produce, generally of lower grades. The offerings of Extra Hypermarkets differ depending on the income strata accommodated by each individual store.

Beyond this general division of product lines between each chain, CBD's Category Management division draws on store-level and customer-level information (made possible in part through data collected from customers using Customer Loyalty Cards) to determine clients' preferences and tailor product availability to meet this demand. A Category Management team for each chain is based at the CBD headquarters, and is responsible for a number of tasks including defining product lines for each chain,

deciding on price margins, new product development, and training technicians to work in individual stores' fresh produce departments.

Once the product needs are determined, CBD must acquire fresh produce meeting this demand, and coordinate the logistical task of distributing it among its stores in a timely and cost efficient manner. Fresh produce procurement involves at least five different tasks, each of which can be accomplished through either centralized (i.e. by the headquarters which acts on behalf of all its stores) or decentralized (i.e. at the individual store level) activity. The five tasks are 1) the decision of what and how much to buy, 2) the selection of suppliers, 3) the submission of the order to the supplier, 4) the delivery and distribution of produce among stores, and 5) payment to the supplier.

CBD uses a centralized system is used for all fresh produce items, although the procurement and distribution of products sold in smaller volumes (such as organic produce) and those that are highly perishable (such as leafy greens) contains decentralized elements. A centralized purchase and delivery system allows for separate treatment of procurement (i.e. the acquisition of fresh produce supplies that consistently meet quality, volume, etc. needs) and distribution (i.e. the logistical challenge of receiving shipments of produce and distributing them among stores after they are received). In those cases where procurement has decentralized aspects, individual stores can choose among the suppliers that are registered with the head office, and submit their orders directly to them. Suppliers then make deliveries to individual stores. Other key aspects of the transaction are still centralized, however, including the selection of suppliers who will be registered with the firm, establishment of price margins, and

payment to the supplier. The decentralization and centralization of different procurement tasks for different product lines is summarized in the Table 2.

Table 2 Organization of fresh produce procurement by task

	Centralized	Decentralized
Decision of what and how much to order		All products (with input from central based on sales history and scheduled promotions)
Choice of supplier	All bulk items, some specialized (all suppliers part of supplier registry)	Leafy vegetables, organics, hydroponic, pre-processed (store chooses from supplier registry)
Delivery and distribution	All bulk items, some specialized	Leafy vegetables, organics, hydroponic, pre-processed
Order of fresh produce to supplier	All bulk items, some specialized	Leafy vegetables, organics, hydroponic, pre-processed
Payment to supplier	All products	

Centralization offers CBD a number of benefits. One of the largest benefits is seen in cost savings of up to 30% that CBD achieves by using its own centralized facility to perform many of the functions traditionally undertaken by wholesalers, particularly as they achieve economies of scale and given their large volumes. They have also increased

their control over the quality of produce furnished by suppliers; and improved coordination and targeting of produce to reflect the quality/price preferences of different stores' clientele.

Suppliers also enjoy some benefits from centralization. It allows them to negotiate less frequently with CBD and to deal with buyers who are specialized in fresh produce, rather than having to negotiate with representatives of each individual store. They also save on distribution costs because they can deliver large loads to the central warehouse rather than to numerous individual stores dispersed throughout the city (though CBD does capture part of those cost savings through a 4% discount on produce delivered to the central warehouse).

Despite its clear benefits, the centralized produce acquisition strategy does entail some tradeoffs for CBD. The firm's huge volume of purchases increases its vulnerability to supply shocks and speculative behavior on the part of suppliers, and makes it more likely that their purchases will affect market prices (although it also improves CBD's bargaining position). Also, CBD faces some tradeoffs between the efficiency that is achieved through centralization and accommodating specific needs of some clients. For example, when produce is channeled through centralized facilities, individual stores have less control over selection of suppliers which means they can't always respond to their customers' requests for specific brands of produce. Another aspect of this tradeoff is that produce must be able to stand up to the additional handling involved in loading and unloading at the central facility (rather than delivery direct from the production area to the store), so that it is necessary to procure relatively less mature produce (that will damage less easily) than many consumers like to buy. Likewise, longer-life varieties of

produce withstand centralized distribution better, but consumers do not tend to like these varieties as much as the traditional varieties that are more flavorful and familiar.

All of CBD's suppliers, whether they deliver to the central warehouse or to individual stores, must be registered with the headquarters. To become registered, a potential supplier must submit an application and product sample, and receive a technical visit from CBD in which the capacity of the supplier to consistently meet CBD's requirements is verified. The registry is intended to lay the foundations for a consistent relationship between the supplier and buyer in which there exists a shared understanding of rights and responsibilities. This includes, for example, suppliers' obligations regarding quality and delivery and the buyers' responsibilities for making timely payment. Supply by registered suppliers differs from supply by contracted suppliers in that there is no commitment on the part of CBD to purchase specific volumes of produce or for particular prices, and similarly, suppliers are not obligated to furnish produce to CBD. At the same time, being a registered supplier benefits suppliers by reducing the field of competitors seeking to supply CBD (i.e. competitors are other registered suppliers rather than the universe of producers in São Paulo). Some suppliers complain, however, that they feel that they have little power in the relationship if they want to stay on the supplier list and must always respond to CBD's requests without CBD reciprocating.

In choosing who to admit to their supplier registry, CBD seeks suppliers reflecting three characteristics: quality of output, capacity (scale and infrastructure adequate to consistently supply CBD with fresh produce that adheres to their quality, timing, and volume requirements), and competitiveness (which is a function of productivity and cost).

In addition to ensuring that CBD buys from the most capable suppliers, a multi-faceted strategy is used to control for the quality of incoming produce. First, acceptable parameters for incoming produce are defined and distributed as technical standards that specify grades on the basis of size, weight, coloration, and damage for each produce item. Second, during the technical visit required for admission to the supplier registry, the capacity of the supplier to comply with these quality standards is ascertained, and the quality standards are explained. Third, each product order specifies the grade of produce that is being ordered, and the supplier is expected to have pre-sorted each delivery to meet the specified grade parameters. Fourth, upon delivery, a technician examines a sample of the shipment in the presence of a representative of the supplier to verify adherence to the quality standards. For specialty items such as organic produce, these steps are complemented by requirements for certification from a recognized organization, or by additional auditing by CBD's food safety office for items, such as fresh-cut produce, for which the risks and costs of product failure (like microbiological contamination that could cause consumers to get sick) are high.

5 CBD's Procurement Strategy in Transition

The General Manager considered the challenges that they were currently facing. Although they had built a strong supplier base and an efficient logistical structure, he was aware of some shortcomings in the current procurement strategy such as a lack of supplier loyalty and price speculation on the part of suppliers in times of market shortages, as well as perceptions of power imbalances leading to discontent among suppliers themselves. Furthermore, food safety was becoming a major issue in

consumers' purchase decisions, and he felt that if CBD could guarantee that the produce they sold was free of microbiological and chemical contaminants, this would be a key competitive point that could further differentiate CBD in consumers' minds.

Resolving these procurement issues while ensuring a safe supply of fresh produce would not be easy. It would require buying from suppliers with a strong technological base, for example greenhouses and irrigation and packing sheds. Equally important would be the suppliers' managerial capacity and professionalism, which would be key not only in producing a safe and high quality product, but also documenting it and being able to trace its movement along the supply chain through activities like record keeping and testing for the quality of water used in production and post-harvest activities.

The General Manager faced several options that might allow CBD to make the improvements that he sought. One option was to open up their registry and purchase from any supplier who was able to supply produce meeting CBD's requirements. This option could potentially help to resolve their current procurement problems by increasing the number of suppliers that they had access to and creating more competition among suppliers to sell to CBD. Compliance with quality and safety standards could be verified through testing samples of all incoming produce shipments, and rewarded through premiums on this produce.

A second option would be emulate what the General Manager had seen leading retailers in other countries do when faced with similar challenges—CBD could tighten relations with suppliers that were already on the registry, and implement contracts with them that would assure purchases by CBD if they would make the investments needed to provide a product that met CBD's product needs. They could require their suppliers to

adopt practices such as Good Agricultural Practices that permit traceability of product shipments from the farm to the consumer and make it easier to prevent and monitor and likelihood of food safety problems. Periodic or random testing of produce for food safety criteria could be used as a backup means to ensure compliance. This way, CBD could create a base of suppliers with appropriate technologies that would have appropriate technologies needed to reduce much of the variation in supply and quality, while ensuring compliance with food safety guidelines. This option would not be easy to implement—given the shortage of suppliers with the capacity and resources to adopt such practices immediately, CBD might need to help their current suppliers upgrade to respond to such requirements. For example, they could provide them with technical assistance, by having their own technical auditors visit the farms and advise suppliers of what changes need to be made and to help find them resources to make them.

Either option would involve major shifts to CBD's current procurement strategy, and the success or failure of the strategy chosen would have major implications for CBD's performance in the fresh produce market.

6 Discussion questions

1. What are the advantages and drawbacks of each of the two options that have been outlined for CBD? Which of the two options do you think that CBD should choose and why?

2. Is the fresh produce procurement challenge that CBD faces unique to a developing country environment? What similarities and differences exist between the environment that CBD must accommodate in its procurement strategy and one that you are familiar with (for example the U.S. market), and what importance do these differences make?

7 Teaching Notes

7.1 Purpose of the teaching case

This teaching case is intended for upper-level undergraduate and graduate student audiences, in courses in microeconomic theory applications and agribusiness decision-making courses. It draws from concepts in transaction cost economics, strategic management and industrial organization to explore how the particular characteristics of the firm, Companhia Brasileira de Distribuição (CBD), combined with the features of the market environment, influence CBD's strategic decision making in the management of its retail fresh produce sector, and looks at choices currently facing CBD as it seeks to accommodate consumers' food safety concerns and other weaknesses evident in the procurement strategy. A teaching aid consisting of a Powerpoint presentation of photographs from the field, supply chain and different retail venues as well as CBD's own stores is available from the corresponding author. Instructors are also directed to CBD's home page where very specific information such as annual financial reports and strategic plans is available for download in English (www.cbd-ri.com.br/eng/home/index.asp), should they be interested in deepening the analysis.

7.2 Case summary

Fresh produce is a key strategic sector for Brazilian food retailers, as it is worldwide. Designing an effective and cost efficient procurement strategy is difficult due to weak infrastructure and institutions and reliance on small producers who are geographically dispersed and who generally use low levels of technology, which increases variability in the quality, volumes, and prices of produce supplied in the market. Retailers use different strategies to meet their fresh produce needs. Some buy form the public wholesale market, others buy direct from farmers. Relationships with suppliers range from anonymous "spot market" relationships to informal long term relationships and formal contracts with suppliers.

CBD holds three food retail chains—Pão de Açúcar Supermarkets, Barateiro Supermarkets, and Extra Hypermarkets, each of which has a different competitive strategy and target clientele. CBD separates the administration of the customer interface and procurement aspects of fresh produce sector administration. The customer-focused Category Management division seeks to identify and develop consumer demand. The Procurement division is responsible for ensuring the provision of fresh produce supplies responding to this demand. All aspects of procurement and distribution are centralized to some degree. All suppliers must be registered, and must have a demonstrated ability to adhere to CBD's quality standards.

CBD's management is poised to implement a shift in its procurement strategy in order to resolve some longstanding problems with its current strategy, and also to take a place as the leader in accommodating consumers' concerns over the safety (i.e. absence of chemical or bacterial contamination) of produce in Brazil. Two possible strategies are

outlined. In the discussion questions following the text, students are asked to recommend a strategy.

7.3 Teaching objectives

- Have students make decisions based on an understanding of transaction cost economics and its impact on vertical coordination.
- Help students appreciate the tradeoffs entailed in different supply chain management decisions, e.g. centralization versus decentralization of procurement and different ways of coordinating transactions with suppliers.
- Have students appreciate challenges of supply chain management in a developing country context and to be able to relate these challenges to supply chain management issues in a country like the United States.

7.4 Theoretical applications

New Institutional Economics: The case illustrates several applications of New Institutional Economics. The weak institutional environment, combined with product and market characteristics, underlie problems of asymmetric information and moral hazard, heightening transaction costs and risk (Williamson 1985). As a result, strict coordination of CBD's supply chain is required, as evidenced by their chosen procurement strategy (Zylbersztajn and Farina 1999). The relationship-based governance methods that CBD employs reflect its attempt to mitigate the transaction costs of fresh produce procurement: suppliers must invest time and effort to be included on the registry of approved suppliers

which increases the stake that suppliers have in the relationship and responding to CBD's quality, volume, and pricing stipulations. Furthermore, the formal, relationship-based governance methods also reflect CBD's efforts to economize on the transaction costs of fresh produce procurement through a redistribution (relative to the spot market), from 1) ex post to ex ante costs, and 2) variable to fixed costs, with the variable costs of sorting, grading, and other quality control efforts shifted to the suppliers (Peterson, Wysocki, et. al. 2001). The current transition reflects an intensification of this approach rather than a departure from it.

Industrial Organization: One of the salient characteristics of CBD that differentiates it from other fresh produce retailers is its size. A large volume of through put provides CBD with opportunities to save costs through economies of scale and scope. CBD has found it economical to integrate the functions typically performed by wholesale intermediaries—receipt, re-grouping, and distribution to retail vendors—for most of its products. By building a centralized procurement and distribution facility, CBD cuts out a level of the marketing chain, and thus can acquire fresh produce of better quality and a lower cost than other firms.

CBD's size and large volume of purchases in the fresh produce market also provides it with market power that allows it advantages in negotiation with suppliers. CBD can stipulate volume (and other) discounts from its suppliers, and maintain a large selection of registered suppliers who are eager to gain access to such a large-volume buyer. CBD's independence from the wholesale market and large volume also lend it more influence in price formation.

Strategic Management: CBD faces the problem of modifying its current procurement strategy to resolve some remaining problems while addressing the need to obtain a supply of produce that meets food safety criteria. This is a strategic issue not only in terms of coordination within the fresh produce sector, but also at the firm level, due to the key role that fresh produce plays.

Analysis of CBD's performance from a strategic management perspective shows that its performance is inadequate in several areas. Customer satisfaction is flagging due to the increasing importance of food safety issues, and productivity and profitability are also sub-optimal due to several supply chain management issues such as a lack of supplier loyalty and variations in the volumes and quality of produce supplied. Overall, however, CBD is very competitive in the market.

The customer satisfaction and productivity/profitability problems are strategic issues to resolve due to the fact that fresh produce is an important sector for the whole retail operation. A need to change the coordination strategy to resolve these issues is evidenced. The key strategic issue that needs to be addressed is: How can CBD improve its vertical coordination strategy for fresh produce in order to improve performance in the areas that have been identified?

CBD is a proactive leader in the domestic retail industry. Its core strategy is to grow by increasing its market share and expanding its geographic scope of operations. It has a competitive advantage in both high and low end markets, with product offerings differentiated for each store format. Thus it can be categorized as a firm that carries a diverse product line with a high degree of market segmentation.

CBD's vertical coordination strategy for the procurement of fresh produce is a hybrid between the spot market and vertical integration, but does not qualify as a formal contract in the sense of it not including specific provisions for the purchase of fresh produce. The registry does, however, show some characteristics of a contract, in that it establishes a foundation by which ongoing transactions can be conducted, with the rights and responsibilities of each party being specified in advance.

CBD's fresh produce activities do, however, show some elements of vertical integration in terms of the organization of activities involved in the procurement and distribution of fresh produce among individual stores—the centralized procurement and distribution activities show a vertical integration of activities at the level of the firm, compared to a decentralized strategy which would reflect an equity-based alliance between individual stores and the firm.

7.5 Recommendations on teaching the case

Rather than dive right into the first study question, it is useful to spend time being sure that the students understand the problem faced by CBD. Their current procurement strategy has been quite successful, but the new demands from consumers (most especially in regard to safety and health) require more sophistication from all supply chain participants than in the past. In other words, continuing to deliver customer satisfaction and competitiveness will require further changes in strategy. Helping students understand the causes of the current strategy's success and its inability to meet the new situation provides a sound foundation to a deep discussion of the pros and cons of the options presented at the end of case.

In working to answer study question 1, the teacher needs to continually work with the students to use economic concepts and vocabulary to achieve a rigorous analysis. Asset specificity, complementary, transaction costs, market power concepts, and strategic management vocabulary all need to be focused on articulating the pros and cons as well as settling on the best solution. Students have a tendency to want to argue from the pure business facts of the case rather than apply sound theory to the discussion. Asking students to rephrase their business observations in economic language is critical to an effective analysis and resolution of the case. This effort is especially needed for undergraduates, but even in the graduate classroom students need to be reminded to focus on applying the theory to the real market facts found in the case. Our experience suggests that it is not easy to get students to translate case facts into economic analysis. However, this translation makes the case truly valuable as a teaching tool.

In working to answer study question 2, it can be useful to have students from different country backgrounds (if such diversity exists in the class) share some of their own experiences with food systems in their home country, whether it is a developed nation or a developing one. In doing this, students will likely need some assistance in being explicit about the characteristics of their own system in contrast to the one in Sao Paulo. Drawing from students' own experiences should help to sharpen the discussion of similarities and differences.

7.6 Suggested answers for discussion questions

1. What are the advantages and drawbacks of each of the two options that have been outlined for CBD? Which of the two options do you think that CBD should choose and why?

CBD faces the problem of modifying its current procurement strategy to resolve some remaining problems while addressing the need to obtain a supply of produce that meets food safety criteria.

From an analytical viewpoint, the two different strategies reflect opposing tendencies in terms of vertical coordination strategies. The first involves a shift toward looser coordination and more focus on individual transactions, while the second involves a shift toward tighter coordination between CBD and its suppliers, with more focus on the relationship between buyer and supplier. The first strategy will involve relatively high variable costs per transaction, while the second involves high fixed costs (to implement contract, etc.) but lower variable costs.

What are the advantages and disadvantages of each strategy?

First strategy advantages

- More potential suppliers
- More competition to be a supplier to CBD
- Resolve the issue of lack of supplier loyalty by reducing dependence on individual suppliers

- Resolve the issue of suppliers' speculative behavior by making them compete with others
- Low fixed costs of procurement

First strategy disadvantages

- The weak capacity of most suppliers in São Paulo means that even with more potential suppliers CBD would, on average, be less likely to have its quality and safety standards met.
- Testing for safety is costly and will lead to high variable costs
- Meeting quality and safety standards requires investments on part of suppliers (packing sheds, irrigation, etc.). There are few enough demanding buyers in the market (like CBD) that suppliers may not be willing to invest without assurance of a buyer

Second strategy advantages

- Reduces need for frequent food safety testing because capacity of suppliers is already demonstrated—just need to test to verify compliance on a random basis.
- Permits traceability of produce along supply chain
- Suppliers have assured buyer so they will be more willing to make relationship-specific investment

Second strategy disadvantages

- More dependence on few suppliers

- High fixed costs of defining and monitoring performance of contracted suppliers
- CBD will likely need to assist suppliers in making the transition to higher levels of service due to most suppliers' low capacity and constrained access to resources.

Which of the two options meets CBD's more pressing needs?

The market for food safe products is very thin—currently CBD is one of the few buyers actively seeking such attributes. Thus, investments necessary to comply with these product standards will be very asset specific. Relying on spot market relations does not allow the producer to adequately ensure himself against the risk of having the product not meet standards for some fault other than his own.

There is also an issue of complementarity that is forgone under the spot market relationship. The planning that is necessary to coordinate the transmission of the product along the supply chain so that its value (based on freshness and tight control over quality and safety) cannot be achieved using spot market.

Resolution of the decision: CBD chose to pursue the second option of tightening their relations with suppliers and requiring higher levels of service from them. They have used a multi-faceted strategy in its implementation. First is the implementation of contracts with suppliers that involve a commitment for CBD to purchase from them on a regular basis, provided they comply with CBD's quality standards. Second, a new set of processes and standards is being implemented that will ensure the quality, safety, and traceability of produce supplied by CBD. New requirements of suppliers include adherence to Good Agricultural Practices, Good Manufacturing Practices (for processed

produce), labeling and documentation that permits traceability, HACCP processes in some cases, periodic labeling and microbiological tests, maintenance of detailed production records particularly with regards to the application of chemicals, and performance auditing. CBD is helping suppliers in the implementation of such processes through the provision of technical assistance, particularly with regards to identification of permissible chemicals to be used on the crops and post-harvest activities, and is allowing a phase-in period of approximately a year so that suppliers can get up to speed. Furthermore, CBD is providing an incentive system that will reward suppliers' performance in a number of areas including financial rewards and eligibility to participate in their private label program. This new system is expected to benefit suppliers less directly too, by encouraging them to upgrade their facilities, plan their activities more easily, and reduce the market risk that they face.

2. Is the fresh produce procurement challenge that CBD faces unique to a developing country environment? What similarities and differences exist between the environment that CBD must accommodate in its procurement strategy and one that you are familiar with (for example the U.S. market), and what importance do these differences make?

Similarities

- Reliance on personal relations (even with the Perishable Agricultural Commodities Act, PACA, legal recourse is used as a last resort in the U.S. between produce buyers and sellers).

- Similar trends among consumers' demand in some segments, such as growing demand for convenience, novelty, safety
- Characteristics of fresh produce are largely the same

Differences

- Lack of some legal protections for buyers and sellers (there is no legislation in Brazil that is effective in providing protections to buyers and sellers like the U.S. PACA).
- Different consumer segments—Even though there are similar trends among consumers in some segments (particularly higher income), there are also more low-income buyers, and a generally lower level of fresh produce consumption.
- There is a larger diversity of retail formats in Brazil than in the U.S., with more competition among them (and hence a broader distribution of market share among them).
- Supply environment differs—Suppliers generally have a lower capacity to make investments and use relatively unsophisticated technologies.
- Infrastructure differs—There are poor roads, communications and lack of specialized transport equipment lead to high rates of damage and waste. These problems are more severe and raise the costs of doing business in Brazil compared to a country like the U.S.
- Institutions differ—They are weaker in Brazil given a court system that is costly and ineffective to use, no consistently applied grades and standards, a high rate of default and opportunism, and the lack of legislation to protect buyers and sellers.

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CHAPTER 6

Supermarket Market-Channel Participation and Technology Adoption Decisions of Horticultural Producers in Brazil

1 Introduction

Supermarkets[1] in Brazil, as in other developing countries, have seen a rapid growth in consumer demand for qualitative attributes such as food quality, safety, variety, healthfulness, and convenience. At the same time, supermarkets compete on cost with traditional retailers and with other supermarkets. Chains thus tend to have a dual merchandising strategy for fresh produce (fruits and vegetables), focusing on low prices for poorer consumers and quality for richer consumers, and have transformed their procurement systems to be able to deliver these produce attributes to consumers. Thus new market channels are emerging – with a particular channel defined by a combination of type of buyer, attribute requirements, and contractual relations with their suppliers. The investments and practices required of suppliers differ over the channels, as do the returns and risks. This is because supermarkets tend to set private standards that differ from public standards, or from the requirements of informal markets without effective standards. For example, see Berdegue et al. (2004) for the case of Central America.

The supermarket sector has grown quickly from a tiny niche in 1990 to a major and often dominant share of food retail in Latin America in general (Reardon and Berdegue 2002), and in Brazil in particular (Farina, 2002). Yet there has as yet been little treatment

[1] We use "supermarkets" for simplicity to mean large-format stores, including supermarkets, hypermarkets, discount stores and so on, and distinguish only where necessary.

in the literature of the domestic market channels to supermarkets in developing countries, in particular how private standards and other product and transaction requirements of local supermarkets are transmitted to, and affect local growers. The few studies that address this issue do so focusing on how developed country retailers affect developing country farmers, such as US and European quality standards for horticulture producers in Central America (Thrupp, 1995), or UK supermarket chains standards on Kenyan and Zimbabwean horticultural producers (Dolan and Humphrey, 2000, McCulloch and Ota, 2002, Jaffee, 2003, and Henson, Boselie and Weatherspoon, 2004), or EUREPGAP European retailers collective standards on developing country producers, such as voor den Dag (2003) for the case of French beans in Kenya. More generally, research on how changes in market structure (such as consolidation of the processing or retail sectors) affects technology adoption by growers, is in incipient stages, with recent contributions such as that of Heiman, McWilliams, and Zilberman (2000), examining effects of input agribusiness marketing strategies on growers' technology adoption in the U.S.

This paper aims at contributing to filling that gap in the literature, with a study based on field research in Brazil. After presenting a taxonomy of market channels, based on distinct sets of requirements imposed by buyers on suppliers, and thus marketing choices of suppliers, we address two research questions. (1) What determines the supplier's choice among those marketing channels? (2) What are the technology implications of the market channel choice – that is, what is the relation between market channel choice and technology use? The importance of these questions for agribusiness and rural development is that the analysis reveals requirements and challenges facing small/medium producers in accessing dynamic markets through modern retailers – and

thus informs policy, agricultural research, and development programs in Brazil and elsewhere. The research questions are addressed by analyzing data on tomato and lettuce producers in the area supplying São Paulo. The data come form a survey of 55 tomato and lettuce growers conducted from April-July 2002.

The paper proceeds as follows. Section 2 presents the conceptual framework. Section 3 presents the study context, focusing on the salient characteristics of market-channels, to inform the implementation model. Section 4 presents the data, empirical model and hypotheses . Section 5 reports and discusses results, and Section 6 concludes.

2 Conceptual Framework

The emergence of demand for food safety attributes in produce and corresponding efforts by producers to supply produce with these attributes lead to the emergence of dual supply channels. The first is for what we can call "conventional attributes" and the other for produce with "new attributes" (such as higher cosmetic quality and lower pesticide and bacterial residuals relative to conventional). In this paper we ascribe demand for the new attributes only to the supermarket market-channel.

Production of the new attributes (such as higher cosmetic quality and lower pesticide residues than "conventional") requires of the grower production technology, commercial practices, and investments, which, in principle, differ from those required to produce conventional attributes. For example, to produce the "new attributes" required by the supermarket market-channel, the grower may have to follow an input use regime (communicated in the contract from the supermarket or the specialized wholesaler), specific production practices that require worker training, such as in pruning and

handling and packing that allow for specific organoleptic or cosmetic quality attributes in the produce, certification of water quality which in turn requires investments in and maintenance of the wells and irrigation infrastructure, adoption of good agricultural practices (GAPs) which can imply several additional expenditures such as in reporting, relative to conventional, and post-harvest practices and investments such as in transport and packing crates. These can be thought of as the vector of technological choices implied by the attribute vector derived from the private standards for quality and safety of the supermarket chain (Reardon et al. 2001).

Producing to meet these "new" attribute requirements presents new risks and costs to suppliers—the costs of making the necessary investments to comply with the new product standards, and the risks of failing to meet these standards or opportunistic hold-up on the part of the buyer. Buyers who seek the "new attributes" must provide growers with either a price premium or some other boost to revenues or lower risk or both, relative to returns and risk of conventional market channels, to compensate them the additional risks and costs incurred in the decision to supply them. . Using the example here of the supermarket-channel, the supermarket specifies the requirements of the product and the transaction (including the specification of quality and safety attributes of the produce) and thus, implicitly, the costs to be incurred above those for the conventional market. The supermarkets then either offer a price premium relative to "conventional" or they offset the higher production costs with cost savings elsewhere (such as transaction costs saved in marketing to few buyers who purchase a large share of the suppliers' total output, and also commit to purchase the product from the supplier thus reducing the market risk of this channel.

The specification of prices and services and other transaction terms between all buyers and sellers constitutes a contract. We use the term "contract" here in the broad sense used by Hueth et al. (1999), where a contract can be simply an informal relationship, with written contract or not, but where there is some penalty implicit or explicit, tangible or intangible (such as in loss of reputation) in non-compliance. Such contracts are common in the produce industry (the world over) and applicable in the present case for the "new attributes" market segment.

The profit-maximization, risk-minimization choices of a supplier to supply produce with "new attributes" to the supermarket market-channel, instead of to the conventional market channel, can be characterized here as a set of recursive choices. (In practice the choices might be recursive or simultaneous.)

The first choice of the grower is the choice of supplying for (and thus producing for the vector of required product and transaction attributes of) a given market channel. This is simplified here as a choice between the supermarket market-channel, versus the conventional market-channel (to traditional wholesalers). This choice can be modeled in the same way as a technology adoption choice (Sadoulet and de Janvry, 1995) if modeled as a function of a vector of output prices (P) (including produce j with new attributes and produce k with conventional attributes, and other products), vector of input prices (w), vector of risks (σ) (including risk in the supermarket-channel versus the conventional channel), a vector of quasi-fixed capital other than that specific to the channel (K) (including human, organization, and physical capital, as well as land, which can be own or rented), and other shifters (Z):

(1) Participation in supermarket market-channel = f(P, w, σ, K, Z)

The second choice of the grower is the choice of technology. Technology is embodied in variable input use and capital investment decisions, contingent on choice of marketing channel and thus the vector of product and transaction attributes required to participate in that channel and the vector of net returns and risks. The technology choices here are embodied-technology choices that are hypothesized to differentiate growers producing and delivering to the buyer produce with "new attributes" by their use of production and post-harvest equipment such as packing and cleaning equipment, cooling chambers, refrigerated trucks, and communications equipment (internet, fax, mobile phones). The embodied-technology choice equations are again adoption equations similar to (1); in implementation, some of the prices may be 0 because of non-variation:

(2) Use of embodied-technology j = f(P, w, б, K, Z)

3 Context (Market Channel Characteristics and Categories)

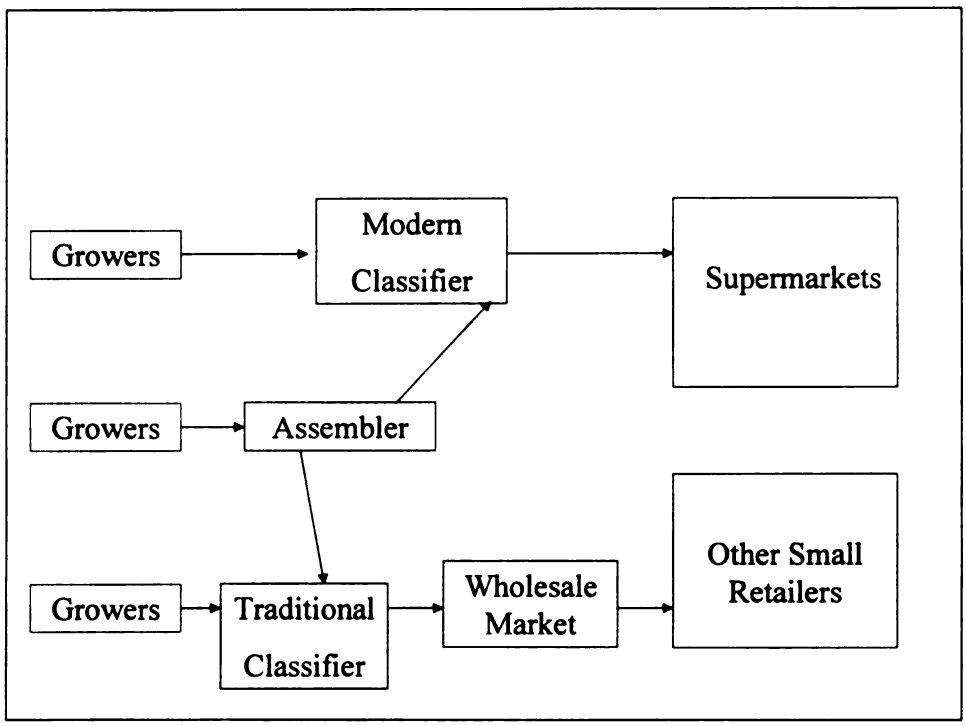
In this section we identify the relevant categories for the left-hand side of the adoption equations 1 and 2 presented in the previous section, that is, the channel and technology choices. To do so, we analyze the salient characteristics of the Sao Paulo region's tomato and lettuce markets.

3.1 Tomato market channels and marketing chain

The tomato supply chain is depicted in Figure 1. Tomatoes are produced in the peri-urban area of São Paulo by farmers who are largely specialized in tomato production, in some cases producing tomato in rotation with grains. Growers can sell either to wholesalers based in the traditional wholesale market, wholesalers based in the growing regions, or to several types of intermediaries who purchase tomatoes to re-sell to wholesalers. The traditional tomato marketing chain, still used outside the supermarket procurement channel, moves tomatoes from the farms to packing houses where they are classified and packed into wooden crates, then to the traditional wholesale market. These wholesalers sell the bulk (on average 48%) of their merchandise to small retailers and fresh processors who visit the traditional wholesale market to inspect the product and negotiate transactions.

The Supermarket Channel moves tomato from growers to wholesalers that have packing houses in the growing regions for whom supermarkets are their primary buyers, responsible for 68% of their sales. Given supermarkets' stringent quality requirements, the intermediaries who supply them have technologically sophisticated classifying plants (that, for example, have optical scanners to differentiate tomatoes by color, and pack in plastic or cardboard boxes that supermarkets prefer). Growers can thus choose among three marketing channels: 1) the Traditional Wholesale Channel, 2) the Supermarket Channel, and 3) and the Intermediary Channel which in turn sells to either the Traditional Wholesale or Supermarket Channel. The contracts characteristically used for each type of channel are discussed below.

Figure 1 Tomato Marketing Chain



Intermediary channel with Fixed-price contract. Growers marketing tomatoes to the Intermediary Channel sell their produce at the farm-gate to intermediaries who purchase on behalf of wholesalers and classifiers. Purchase arrangements are made at harvest time, and include transport of the tomatoes. Prices are discounted slightly to account for the value of the services provided. These contracts do not offer forward planning of sales, but once a sales agreement is made (at harvest usually) then payment is immediately made. The most significant entry barrier is that the Intermediaries seek to purchase tomato in large volumes, which favors growers who are specialized in tomato production (rather than those who produce a number of vegetable crops). (Unfortunately,

the nature of data collection did not allow for determination of to what extent tomato purchased by these intermediaries enters the Traditional vs. Supermarket channels).

Supermarket Channel with Financing contracts. Financing contracts involve the provision by the buyer of working capital to support production on a specific area of land. In exchange, the grower commits to sell his output from that land to the buyer at harvest. A fixed deduction per box produced is agreed upon in advance and subtracted upon payment following harvest. These contracts are offered by classifiers and wholesalers (in combination with the consignment contract), though the focus here is on financing contracts offered by classifiers. Entry into these contracts requires one-on-one negotiation between the classifier and a proven capacity to produce. They are used increasingly as classifiers increase in number and seek to ensure that they will have adequate throughput to keep their plants working at efficient levels of capacity. The contracts are advantageous in that the grower is assured of a buyer for his harvest. They involve some risk in that the payment is deducted from the final payment (which is made at going market prices) at a fixed price per box. But depending on actual output and market prices, the value of the final payment is difficult to predict (i.e. it will amount to a large payment if the harvest is very large and prices low, but a small payment if the harvest is small and prices are high).

Traditional Wholesale Channel with Consignment contracts. A consignment contract involves the grower sending his product to an intermediary who then sells it and gives the proceeds to the grower, minus a marketing commission (of approximately 17%) and various other costs such as taxes, transport and other explicit fees. These contracts are considered undesirable by growers, as they are used as a means for intermediaries to

shift price risk to growers, and also because the growers cannot verify the sales price that the intermediary receives and are thus vulnerable to opportunistic behavior on the part of the intermediary. There are very low barriers to entry with these contracts, and many wholesalers will finance the operating costs of the crop. This market channel is also one of the most accessible to the smallest growers who, due to their tendency to have diversified crop portfolios, tend to have small volumes of tomatoes to sell, lessening other buyers' interest in them.

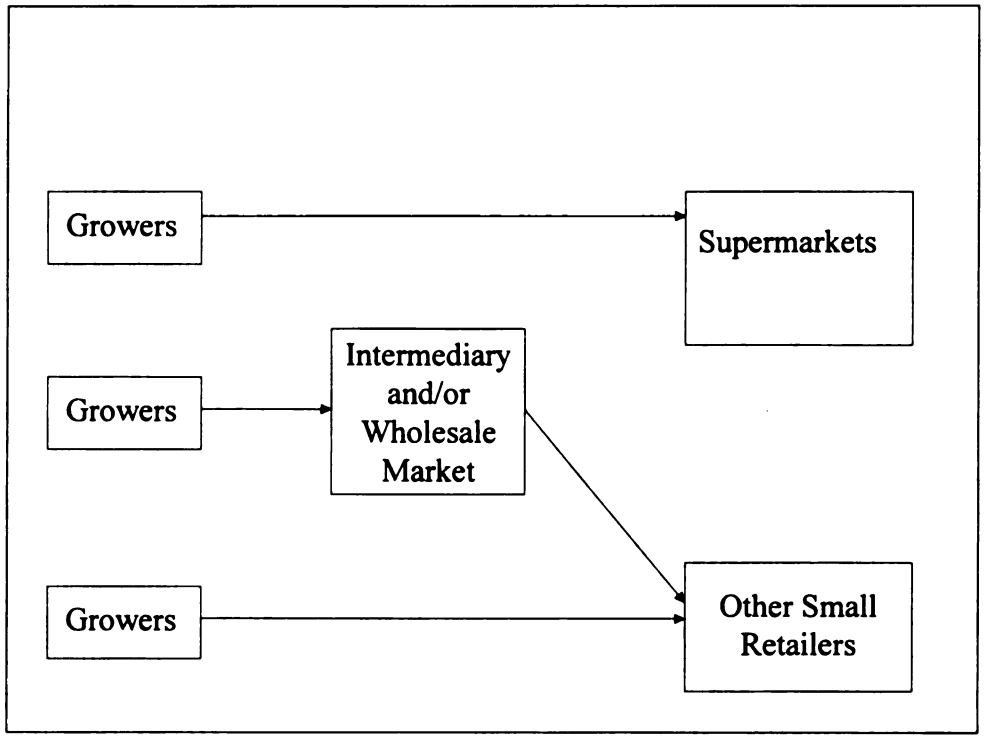
3.2 Lettuce market channels and marketing chain

The lettuce marketing chain is depicted in Figure 2. Lettuce is produced in the green belt surrounding metropolitan Sao Paulo by small growers who typically produce a fairly large mix of products. Growers can sell to a diversity of different buyers including to intermediaries who buy at the farm gate, small supermarkets, large supermarket chains, the wholesale market, to processors, direct to consumers. Most growers operate individually, but there is also limited participation in marketing cooperatives. The high perishability of lettuce, lack of a cold chain, and the non-existence of automated classifying infrastructure make direct sales between growers and retailers much more common than in the tomato market. Likewise, the traditional wholesale market plays a relatively minor role, with only 8% of São Paulo's lettuce production passing through the main wholesale market in 1999 (a decline from 55% in 1990).

Growers can choose among three market channels, the first two of which are characteristic of traditional channels. These are 1) the Traditional Intermediary Channel which moves the product from the production area to intermediaries who sell in turn to a

variety of small retailers and to a lesser extent at the traditional wholesale market; 2) The Traditional Small Retailer Channel which moves lettuce directly from the grower to retailers (without participation of intermediaries) who come direct to the farm gate; and 3) the Supermarket Channel, in which lettuce is purchased by Supermarkets directly from growers, grower associations or firms that perform value-added services on lettuce that they purchase from growers.

Figure 2 Lettuce Marketing Chain



The Supermarket Channel has important organizational differences from the traditional channel that moves produce directly from the grower to the retailer, however. Principal among these are that the growers are responsible for providing a number of services with the lettuce (such as delivery to individual retail outlets of the large chains)

as well as for meeting stringent product and process standards such as certification of water quality. The Supermarket Channel is "captained" by the large retail supermarket and hypermarket chains which set the standards in terms of product requirements and account for the most movement of produce. However it also includes the small and medium-sized supermarkets, particularly those oriented to higher income clienteles and who seek to provide many higher-quality attributes.

Lettuce contracts do not show the wide diversity that tomato contracts do with neither the consignment nor the financing contracts in evidence. Instead, a variety of Fixed Price contracts exist. The Supermarket Channel contract is a Fixed Price Contract with High Service Requirements. The Intermediary and Small Retailer Channels both rely on Fixed Price Contracts with Low Service Requirements, but differ in terms of negotiation and pricing methods. The characteristics of these contracts are summarized below.

Supermarket Channel with Fixed price contracts and high service requirements. Supermarket Channel buyers are very demanding of their suppliers in terms of the provision of both physical services and services to guarantee the quality and safety of their products. Physical services sought include product packaging, transport of the product, and delivery among individual stores. Quality and safety assurance services include water quality certification, HACCP, and Good Agricultural and Manufacturing Practices. It is interesting to note that only the largest chains explicitly demand the quality and safety services (as opposed to all the firms that seek the physical services). However, the fact that a firm qualifies on these fronts to sell to the large chains is an important point in gaining access to the smaller high-end supermarkets that generally do

not require them explicitly. These are fixed price contracts; however, unlike the Low Service Fixed Price contracts, the supplier has some degree of bargaining power, and often provides the retailer with a price table on which negotiation is based. These contracts have high entry barriers, particularly investments in advanced post-harvest practices, investments to meet certification requirements, transport and communications.

Intermediary Channel with Fixed price contract and low service requirements. These contracts involve the provision of less service by the supplier. In many cases, the product is collected at the farm gate on a regular basis. Ongoing long-term relationships between buyer and seller predominate. Given the highly variable quality of lettuce, and the lack of enforceable grades and standards, personal relationships and negotiation are important. The above characterization is also true for the Small Retailer Channel with Fixed price contract and low service requirements.

4 Empirical Model, Hypotheses, Methods and Data

4.1 Data

The data used come from a survey of retailers, intermediaries and farmers from April to July 2002. Fifty-five farmers (32 lettuce growers and 23 tomato growers) in the peri-urban region of Sao Paulo were interviewed. The sample was chosen as a "judgment sample" (www.statpac.com/surveys/sampling.htm); the main producing areas of lettuce and tomato (for the Sao Paulo market) were identified, and extension agents as key informants were used to identify the sample of growers who reflected the heterogeneity of growers in the population. While the non-random sampling method does limit the ability to generalize results to the larger population it does allow for conclusions to be

drawn about differences among growers within the sample, which can be held to provide insight into issues facing the overall population. Data was collected on farming activities and resources, and trends in these over the past five years. Additionally, a survey of 15 tomato intermediaries was conducted, nine located in the traditional wholesale market in Sao Paulo and six (with their own processing facilities) in the peri-urban area.

4.2 Market Channel Choice

Using the market channel categories identified in section 3 as a starting point, an empirical analysis was made of growers' participation in market channels and the specific composition of these market channels. We used cluster analysis of the market outlets that growers reported using. Partitional cluster analysis techniques using the k-means algorithm and within group average measures to minimize the squared Euclidean distances of all points between clusters were used to differentiate the market channels to which growers belong. The mean points of the clusters became the market-channel choices of the growers, with the growers' selection of the channel determined by the grower's characteristics (in particular, the K vector in equation 1, because the P and w vectors do not vary in the cross section analysis over the limited geographical scope of the peri-urban area.

The growers' characteristics variables used in the cluster analysis, representing determinants of market channel choice, are as follows. Note that in general, given the incentive to produce for the supermarket channel (price premium and lower risk through contract), the main determinants are the capacities to meet the supermarket requirements, communicated directly or via a wholesaler buying for the supermarket. These

requirements include, as noted in section 3, consistent delivery of high quality produce – which implies having equipment and skills. The specific correlates and our hypotheses of their relation to the supermarket channel choice are as follows.

First, we hypothesize that larger the farm, the greater the probability that the grower will be in the supermarket channel cluster. It is commonly assumed, for example by policymakers designing agricultural diversification programs, that fruit and vegetable production displays no economies of size or scale – and thus mere labor intensity (such as small growers can supply in abundance) is sufficient to be competitive in fruit and vegetable production for urban markets. But, as signaled by Cook (2004), fruit and vegetable production systems that consistently produce quality and sufficient volumes for supermarkets are technology-, capital-, non-labor input-, information system- and infrastructure (packaging, pre-cooling, cold chain management)-intensive, and that meeting these requirements involves economies of size. Moreover, evidence from elsewhere (such as Berdegue et al. 2004) suggests that supermarkets and specialized/dedicated wholesalers have a predilection, all else equal, to source from medium/large farmers in order to reduce the number of suppliers and thus transaction costs.

Second, other assets that we hypothesize to be important in participating in the supermarket market-channel include human capital (own-education, skilled labor, and specialization in horticulture in farming operations), off-farm sources of income to serve as risk management mechanisms to balance the initial risk of selling to a non-traditional market and also to provide finance for operations, and access to finance for working and investment capital.

Specialization in agriculture is measured by the share of individual growers' family budgets from agriculture; the share of their agricultural income from vegetables, and the number of different vegetables produced. Specialization in the production of "high-value" products includes specialty produce such as organic, hydroponic, pre-packaged, greenhouse-grown and pre-processed produce. The employment of skilled labor is proxied using the share of total employees who are permanent on the farm, either as hired or family labor. Having access to financing for operational and investment expenses is reflected by growers' use of different sources of operational and investment capital, including banks, special government programs such as PRONAF and FINAME, input suppliers, business associates and family and friends. The level of education in agricultural pursuits is indicated by growers' completion of specialized educational programs in agriculture, either at the university (such as an agronomy degree) or technical schools.

Third, the use of modern production practices, such as regular employment of soil analyses, also is expected to be correlated with participation in supermarket market-channels. Growers' market-oriented management practices are indicated by the extent to which they purchase key inputs from the market, specifically whether they have a greenhouse to produce their own seedlings or rely on the market for these.

Note that the use of cluster analysis allows us not to assume strict causality, but rather general relationships, and hence obviates the need to have only exogenous variables among the above correlates.

4.3 Technology Choice

Technology use was analyzed in two manners.

First, cluster analysis was also used to separate growers into high and low technology groups. Here within-group averages were minimized using Jaccard measures, drawing on growers' dichotomous responses regarding their use of specific post-harvest, transportation, communications and value-added (for lettuce only) technologies (Tan et al.). The resulting clusters were then matched with growers' participation in different market channels using cross-tabs w/chi-square tests for statistical significance.

Second, indices were created based on growers' possession of specific equipment (the same equipment analyzed in the cluster analysis). Growers' possession of different equipment was then analyzed with respect to their market channel participation using comparison of means with analysis of variance to determine the statistical significance of the results.

The technology variable is modeled as dichotomous, reflecting that a grower either has a package of needed equipment and other components that are necessary for producing the requirements of the supermarket channel, or does not. The choice is thus between traditional and "advanced" – "advanced" equipment and infrastructure includes transportation, post-harvest communications, and value-added technologies. Specific equipment included open, closed and refrigerated trucks for transportation and delivery of produce; plastic crates, vegetable washers, and cold storage rooms for post-harvest technologies; computer and internet access for communications, and greenhouses and pre-processing infrastructure for value-added technology.

5 Results

5.1 Cluster analysis results of market channel choice

Tomatoes. Cluster analysis of tomato growers' marketing decisions (summarized in Table 1) revealed consistent patterns of participation in the three market channels – the Modern Classifier channel (the most direct to the supermarket), the Intermediary Channel, and the Traditional Wholesale Channel. Around 75% of the growers sold to the Intermediary Channel, only 5% sold to the Modern Classifier Channel, and the rest (20%) sold to the Traditional Wholesale Market Channel.

Table 1 Cluster analysis results for market channel participation and composition for tomato growers

Variable		Supermarket Channel	Intermediary	Traditional Wholesale
Participation in cluster		5%	75%	20%
Division of Sales by Buyer Type				
Share of sales to intermediary	Mean	7%	100%	5%
	P-value	.000		
Share of sales wholesale market	Mean	3%	0%	91%
	P-value	.000		
Share of sales to classifier	Mean	27%	0%	2%
	P-value	.039		
Share of sales to retail buyers	Mean	64%	0%	2%
	P-value	.000		

Table 2 reports results on the tomato grower characteristic correlates of market channel choice. As hypothesized, participants in the Supermarket Channel are more likely to use more skilled labor (controlling for land), and have higher levels of specialized education (Technical School), as compared to those participating in the other channels. It is interesting that farm size did not have a significant effect – whereas physical capital and skills to produce quality and consistency do matter. Furthermore, the use of greenhouses for production of seedlings was higher for growers in the Supermarket Market-Channel than for others. Given the importance of quality in producing for the Supermarket Market-Channel, it is possible then that one of the ways that growers ensure high quality is by vertical integration of some of the key activities that determine the quality of the product—such as the production of seedlings.

Table 2 Characteristics of tomato growers participating in different market channels

Variable		Supermarket Channel	Intermediary	Traditional Wholesale
% Family budget from agriculture	Mean	77%	73%	89%
	P-value	.567		
% Agricultural revenue from vegetables	Mean	97%	73%	72%
	P-value	.291		
Number of different vegetables produced	Mean	1	2	2
	P-value	.592		
	Mean	54	19	22

Hectares vegetables cultivated	Mean	54	19	22
	P-value	.162		
Share of permanent laborers among total	Mean	66	11	10
	P-value	.002		
Age	Mean	40	50	37
	P-value	.496		
Technical education in agriculture (chi-sq)	Mean	67%	7%	0%
	P-value	.015		
Outside sources for operational capital (chi-sq)	Mean	100%	100%	80%
	P-value	.168		
Days of credit for input purchases	Mean	120	99	119
	P-value	.423		
Outside sources for investment capital	Mean	33%	57%	80%
	P-value	.412		
Has greenhouse for seedling production	Mean	33%	0%	0%
	P-value	.036		

Lettuce. Cluster analysis of lettuce growers' marketing choices (summarized in Table 3) also showed consistent patterns of participation in three market channels. Twenty-five percent of the growers sold to the Supermarket Channel, which was comprised of large supermarket and hypermarket chains and small and medium-sized supermarkets. Another 25% of the growers sold to a Small Retail Channel, comprised

Table 3 Cluster analysis results for market channel participation and composition for lettuce growers

Variable		Supermarket Channel	Traditional Market Channel	
			Intermediary	Small Retailer
Number in cluster		25%	50%	25%
Division of Sales by Buyer Type				
Share of sales to large chains	Mean	34%	2%	0%
	P-value	.000		
Share of sales to small and medium supermarkets	Mean	32%	1%	0%
	P-value	.000		
Share of sales to intermediaries	Mean	6%	71%	4%
	P-value	.000		
Share of sales to small, non-supermarket retailers	Mean	3%	18%	96%
	P-value	.000		
Share of sales to wholesale market	Mean	15%	2%	0%
	P-value	.177		
Share of sales to processors or consumers	Mean	10%	6%	0%
	P-value	.485		

primarily of small non-supermarket retailers such as street fair vendors and discount green grocers. The remaining 50% sold to an Intermediary Channel. P-values show that each market channel has statistically different levels of sales to different types of buyers except for sales to the wholesale market and processors and consumers.

Table 4 reports results on the lettuce grower characteristic correlates of market channel choice. It shows a consistent pattern of results in which the relatively more attractive market channels are used by growers who are more specialized in agriculture, produce a broader array of products, have larger farms, and for whom the production of high-value "specialty" produce constitutes a larger portion of the revenue of those who produce it. These growers also rely very heavily on skilled laborers (86% of their total compared to only 8% for the other groups), are younger, and have highly specialized training in agriculture as evidenced by 43% of the Supermarket Channel growers having university educations in agriculture compared to none of the other growers. Interestingly, while Supermarket Channel growers are not the most reliant on outside sources of capital for operational expenses (though only half of the growers selling to Small Retailer Traditional Channel only rely on outside capital for their operational expenses), those Supermarket Market-Channel growers who do borrow for operational expenses are extended credit for approximately twice as long as the other growers.

Why does farm size matter for lettuce growers but not for tomato growers? We surmise that the reason is based on the structure of the marketing channel. All tomatoes pass through mechanized classification plants. However, there is no mechanized classification of lettuce, and a large proportion of it moves directly from producers to retailers. Thus, the classifiers play two roles in the tomato markets that they do not play

Table 4 Characteristics of lettuce growers participating in different market channels

Variable		Supermarket Channel	Traditional Market Channel	
			Intermediary	Small Retailer
% Family budget from agriculture	Mean	96%	98%	90%
	P-value	.230		
% Agricultural revenue from vegetables	Mean	100%	99%	93%
	P-value	.090		
Number of different vegetables produced	Mean	18	7	7
	P-value	.002		
Hectares vegetables cultivated	Mean	33	7	10
	P-value	.018		
Produces "specialty" produce (chi-sq)	Mean	13%	13%	0%
	P-value	.576		
"Specialty" produce share of produce sales (for those who produce)	Mean	32%	7%	0%
	P-value	.057		
Share of permanent laborers among total	Mean	86%	8%	8%
	P-value	.001		
Age	Mean	36	39	57
	P-value	.036		
University education in agriculture (chi-sq)	Mean	43%	0%	0%
	P-value	.003		

Outside sources for operational capital (chi-sq)	Mean	88%	92%	50%
	P-value	.054		
Days of credit for input purchases	Mean	62	29	33
	P-value	.127		
Outside sources for investment capital	Mean	75%	56%	50%
	P-value	.558		
Conducts soil analysis	Mean	88%	92%	63%
	P-value	.212		
Has greenhouse for seedling production	Mean	63%	71%	88%
	P-value	.543		

in lettuce markets. First, they aggregate the production of numerous tomato growers in order to meet demand. Second, they perform most of the operations that qualify tomatoes for the Supermarket Market-Channels. That is, though it is crucial for tomato coming into the plant to be of high quality, the value-added operations on the tomato such as sorting, packaging and transport, take place at the plant. Thus, there is no inherent scale advantage for tomato growers to sell to the Supermarket Market-Channel buyers. In fact, given the increasing number of classifiers in the area and competition for adequate volumes of throughput to meet demand and keep plants running at efficient capacity levels, it is likely that the classifier-intermediaries do not currently seek to purchase tomato from large-scale growers exclusively. In contrast to this situation for tomato, the proportion of sales of lettuce direct from the grower to the retail buyer means that the

services and attributes that make lettuce qualify for the Supermarket Market-Channel frequently take place at the farm level. Furthermore, Supermarket Market-Channel buyers tend to require a minimum variety of produce (such as different varieties of lettuce or value-added features) as well as a minimum volume, which creates a bias towards larger growers.

5.2 Results of technology use analysis

As shown in Tables 5 and 6, there were no statistically significant differences between tomato growers in different market channels in terms of their technology use, in terms of embodied-technology reflected in the equipment use shown. The explanation for this lack of statistically significant difference in technology use also lies in the structure of the marketing chain. Again, it is key that a grower producing for the Supermarket Market-Channel be able to produce a high quality tomato, but given the importance of classifiers in the activities that qualify the tomato for the Supermarket Market-Channel, it does not turn out to be crucial for the grower to possess these technologies.

Table 5 High and low technology holdings and market channel choice among tomato growers

Variable	Supermarket Channel	Traditional Wholesale	Intermediary
High Technology	100%	80%	79%
Low Technology	0%	20%	21%
Pearson Chi-square test for significance	.678		

Table 6 Technology holdings and market channel choice among tomato growers

Variable		Supermarket Channel	Intermediary	Traditional Wholesale
Possession of post-harvest equipment (0-1 index)	Mean	.91	.32.	.40
	P-value	.141		
Possession of advanced delivery equipment (0-1 index)	Mean	.27	.18	.18
	P-value	.561		
Access to communications equipment (0-1 index)	Mean	1	.62	.67
	P-value	.418		

By contrast, Table 7 shows that there are sharp differences in technology use among lettuce growers, over the market channels. Among lettuce growers, 100% of those selling to the Supermarket Channel are in the "high technology group", compared to 69% of the Intermediary Channel growers, and only 38% of the Small Retailer Channel growers. This pattern is as one would expect given the production and post-harvest requirements of the different channels.

Table 7 High and low technology holdings and market channel choice among lettuce growers

Variable	Supermarket Channel	Traditional Market Channel	
		Intermediary	Small Retailer
High Technology	100%	69%	38%
Low Technology	0%	31%	62%
Pearson Chi-square	.026		

Table 8 Technology holdings and market channel choice among lettuce growers

Variable		Supermarket Channel	Traditional Market Channel	
			Intermediary	Small Retailer
Possession of post-harvest equipment (0-1 index)	Mean	1	.45	.45
	P-value	.028		
Possession of advanced delivery equipment (0-1 index)	Mean	.55	.08	.06
	P-value	.000		
Access to communications equipment (0-1 index)	Mean	.75	.58	.21
	P-value	.028		
Possession of value-added equipment (0-1 index)	Mean	.19	.03	.07
	P-value	.112		

Table 8 shows that Supermarket Channel lettuce growers scored ranked significantly higher than any of the Traditional market channel growers in the possession of post-harvest equipment, advanced delivery equipment, access to communications equipment, and value-added equipment. Interestingly, with the exception of access to communications equipment (for which Intermediary Channel growers rated almost three

times as high as Small Retail Channel growers), there was little difference, on average, in the different Traditional Market Channel growers' ratings on indices for equipment possession in these categories.

There are two important implications of these results for tomato growers. First, they point to the key role that intermediaries play in the tomato market channels in facilitating the access of heterogeneous growers to the Supermarket Market-Channel. Second, they point to the importance of the human capital dimension in determining the access of growers to the Supermarket Market-Channel—while there are clear differences in the characteristics of tomato growers producing for the different market channels, these differences are not easily attributable to differences in their technology holdings or size. Instead it is crucial that the tomato growers who participate in the Supermarket Market-Channel be able to produce quality, but the results indicate that the ability to produce quality is more a function of their having skilled labor and specialized educations (i.e. the human capital dimension) than their using specific equipment portfolios. For lettuce growers, however, the situation is very different—like tomato, the human capital element is crucial. Unlike tomato growers, however, lettuce growers need to have access to specific advanced technologies and be of sufficient size to participate effectively in the Supermarket Market-Channel.

6 Conclusions

This paper examined the relationships between growers' choice of market channel (emphasizing the supermarket market-channel versus others), technology use, and grower characteristics such as human capital and farm size. Three key findings emerged. First,

both tomato and lettuce growers selling to the supermarket market-channel had more human capital than those not participating. Second, while farm size was important in whether lettuce growers sell to supermarkets, it was not important for tomato growers. While the latter was expected due to hypothesized economies of size, the latter was surprising until one notes that the role of specialized/dedicated wholesalers is far more important in intermediating tomato growers (as opposed to lettuce growers) access to supermarket channels. The wholesalers thus classify, grade and bulk from many smaller growers and deliver to supermarkets, while in the lettuce channel larger, well-equipped growers deliver that service and sell directly to supermarkets. Third, technology use was significantly more capital-intensive among lettuce growers selling to the supermarket channels, as hypothesized given the product and transaction attributes demanded by the supermarkets. However, that was not the case for tomato growers, except to note the greater importance of greenhouses for quality-seedling production. Again, the explanation lies in the intermediation point noted above.

These results are important to agribusiness researchers and policymakers interested in technology design and research and extension to enable producers to adapt to the needs of changing agrifood markets, with new requirements of attributes of products and transactions, that in turn have implications for technology adoption and human capital investment among growers. This is particularly pressing in places like Brazil where the market for horticultural products is changing fast, conditioned by the rapid rise of supermarkets.

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CHAPTER 7

Conclusion

The rise of supermarkets to prominence is a phenomenon in both developing and more developed countries worldwide. Their activities have been associated with profound changes in agrifood systems including shifts in market structure, the participation of diverse actors, levels of competition in the market and the welfare of both upstream and downstream players. This dissertation addressed these issues within the context of São Paulo Brazil's fresh produce market.

The dissertation took as its point of departure the rise of large retail chains in the Brazilian marketplace. The ten largest retail chains increased their share of the Brazilian retail market from 24% to 37% between 1994 and 2000. Supermarkets (including both chains and independents) currently account for about 75% of food retail sales.

The dissertation addressed three broad research questions: 1) What factors led to the rise of large retail chains in Brazil and what effects have they had on the market structure? 2) How have smaller retailers responded by altering their fresh produce procurement strategies? and 3) How have growers responded in their market channel and technology use decisions?

The first section of the dissertation examined the factors led to the rise of large retail chains in Brazil and their effects on the fresh produce market structure. The recent evolution of the fresh produce market including the rise of large retail chains and their effects on market structure can be understood within the SCP framework, looking at three phases: economic crisis, economic stabilization, and post-stabilization.

The late 1980s to early 1990s was a time of economic crisis for Brazil. Stagnant and falling incomes and high inflation depressed demand among consumers. The lack of demand and uncertain investment climate meant that there was no incentive to produce or market quality produce.

These conditions changed with economic stabilization that resulted from the Real Plan in 1994. With economic stabilization, the basic conditions affecting firm behavior shifted. Consumers' incomes grew and there was an increase in demand for fresh produce, not only the volume demanded but also quality and other attributes like convenience and perceived healthfulness. Increased demand and a more favorable investment climate affected firm strategy. At the retail level, a number of retailers, the "first movers," sought to increase their market presence through organic expansion and mergers and acquisitions. Their efforts at expansion were facilitated by an increase in the entry of international capital as international firms either entered the market under their own names or bought into existing retailers.

As the "first moving" retailers grew, they sought to take advantage of their increasing scale to reduce the costs and increase the quality of their fresh produce through innovations in their procurement strategies. Central among these innovations were the centralization of procurement and distribution and an increase in purchases direct from the production areas rather than through traditional wholesale channels. These retailers' activities led to shifts in the market structure, particularly shifts in cost structures, scale and scope economies and increased barriers to entry. They also led to a bifurcation of the marketing chain into a "public" chain that was moves produce from the growing region through the traditional wholesale market to retail buyers, and a "private" marketing chain

that moves produce directly from the growing region to retail buyers, by-passing the traditional marketing channels.

The second section of the dissertation examined small retailers' responses to the changed market conditions, particularly in terms of alterations they may have made in their fresh produce procurement strategies.

In addressing this question, it is necessary to move to the third stage of market evolution, and to differentiate between three types of players in the market. The third stage of market evolution is the post-stabilization phase. Diverse retailers exist in the market at this point, these fit into three categories: 1) large chains—for example Companhia Brasileira de Distribuição and Carrefour—that are the "first movers" of the previous stage of evolution, 2) independents including small and medium supermarkets, and 3) traditional retailers such as open-air fair vendors.

Aggregate data shows that between 1994 and 2000 (from the economic stabilization to the post-stabilization phase), traditional retailers lost market share while independents have gained, and large chains, who represent a small percentage of the total number of firms and occupy a very large share of the market, also declined somewhat in importance. These numbers generated considerable surprise as popular wisdom held that the large retailers would continually expand, driving other firms out of the market. The dissertation considered how retailers' changes in procurement strategies might have contributed to their varying market performance.

Retailers are understood as forming their procurement strategies with the objective of minimizing the cost of acquiring volumes, varieties, qualities of fresh

produce needed for their merchandising needs. These costs are the sum of purchase, processing and transaction costs.

In deciding upon a procurement strategy, retailers have three choices to make. They must choose how to organize their procurement, that is, whether purchases should be centralized, decentralized or contracted out. They must choose the sources from which they purchase produce, namely from the traditional wholesale market or direct from the growing region. They also must choose how to govern the transactions and relationships that they have with their suppliers, whether it be through formal or informal relations and whether they should rely on public grades and standards to control the quality of produce that they purchase or institute their own private standards.

These decisions must be made taking into account the characteristics of the fresh produce market. Fresh produce is a highly perishable product, it is vulnerable to damage from handling and transport, and any damage that might be inflicted may not be evident until after a transaction takes place. Information asymmetries about market conditions and the quality of the product prevail, and firms' behavior in the market is not well controlled by either formal (legislative) or informal (cultural) institutions. For example, public grades and standards are ineffective in providing consistent quality produce, and if opportunistic behavior does occur then the injured party has little recourse to redress its grievances. The specific procurement decisions that firms must make further affect information costs, asset specificity and uncertainty. For example, the centralization of fresh produce procurement requires large fixed investment costs, and the decision to purchase from the growing area rather than from the traditional wholesale market narrows the range of suppliers, increasing asset specificity and vulnerability to holdup.

The different types of firms showed different responses in terms of changes to their procurement strategies over the past five years. Large chains, many of whom had already centralized their procurement and begun to purchase from growing areas completed the shift from decentralized to centralized procurement and further increased their purchases of fresh produce from the growing areas at the expense of purchases from the traditional wholesale market. They also relied on formal relations with suppliers, generally in the form of preferred supplier registries, and private grades and standards.

Independent retailers were highly decentralized in their purchases of fresh produce and this showed little change. They increased their purchases from growers, and were heavily reliant on informal relations with their suppliers and public standards, though some firms did, in fact, institute their own private quality standards.

Traditional retailers showed the least change in the organization of their procurement. They did not make any changes to the organization of their procurement, and they showed only a slight increase in their purchase of lettuce from growing regions and no change at all in their sources of tomato. They continued to rely exclusively on informal relations with their suppliers and public grades and standards. It is expected that the lack of responsiveness on the part of traditional retailers is an important factor contributing to their decline in market share and participation between the stabilization and post-stabilization periods, as it likely indicates that they neither reduced their costs nor improved the quality of their produce merchandise appreciably over that period.

The third and final section of the dissertation asked how growers have responded to the changed market conditions in their production and marketing strategies, and have these changes have affected their use of technology.

In the post-stabilization period, growers faced a radically different market environment than they previously had. Retailers had responded to consumers' increased demand for food quality attributes, such as organoleptic quality, food safety and convenience, in their merchandising strategies, and communicated new attribute requirements through their product standards. This, along with shifts in the organization, sources and governance of their procurement, led to the emergence of new market channels. These market channels are characterized by the buyer types, their attribute requirements, and the contractual relations they maintain with suppliers. Participation in the new market channels implies investment requirements for suppliers, affecting their risks and returns, while participation in the traditional market channels had low entry barriers but lower returns and was increasingly marginalized in terms of the volume of produce flowing through it.

Growers were modeled as choosing the market channel and technology (embodied in the combinations of equipment used to meet attribute demand for specific channels) to use in producing for that market channel as part of a profit maximization objective. Two market channels were identified—the Supermarket Channel, consisting of both large chains and small and medium-sized supermarkets oriented to more demanding clienteles, and the Traditional Channel, including traditional wholesale buyers and small traditional retailers. Growers participating in the supermarket channels had higher levels of human capital and used more capital-intensive technology, except in the case of tomatoes where market intermediaries played a major role in ensuring that supermarket channel quality and service requirements were met, thus facilitating the participation of growers with lesser levels of technology.

In sum, the dissertation found that large retail chains gained prominence in fresh produce markets due to changes in the incentives they faced as a result of economic stabilization. The large retailers' fresh produce procurement and merchandising strategies permitted them to reduce their costs and improve the quality of their merchandise. As the large retailers increased their share of the market, smaller retailers were in a position of having to respond if they were to remain competitive. Independent retailers were most proactive in changing procurement strategies to meet new market conditions, changing the organization, sources and coordination of their fresh produce procurement. Traditional retailers were less responsive, making few changes to their procurement strategies. This was likely a significant factor contributing to their decline in numbers and market share over the past decade. Shifts in retailers' competitive strategies led to changes in the structure of the market, particularly the emergence of a Supermarket Channel characterized by high quality and service requirements, as well as high returns, risk and entry requirements for suppliers. Growers participating in the supermarket channels had higher levels of human capital and used more capital-intensive technology, except in the case of tomatoes where market intermediaries played a major role in ensuring that supermarket channel quality and service requirements were met, thus facilitating the participation of growers with lesser levels of technology. Human capital and capital intensive technology were shown to be positively correlated with participation the Supermarket Channels, however the role of intermediaries was also highlighted as important in facilitating the access of more capital-poor growers to those channels as well.